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Production Outsourcing and Firm Performance: An Empirical Analysis of Japanese Manufacturers

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Abstract
The purpose of this article is to illustrate the best form of governance for optimizing firm performance. Developed on the basis of transaction cost economics and capability theory, I test hypotheses using a dataset comprised of 1,421 Japanese manufacturing firms between 2007 and 2011. Results of these analyses demonstrate that the relationship between the degree to which a firm engages in outsourcing and its performance is parabolic in shape. This relationship has not been extensively found in past research. Ultimately, this article suggests that there exists a U-shape relationship between a firm's outsourcing rate and its performance.

Keywords: *Outsourcing, Firm performance, Product capability, Manufacturing, U-shape.*

JEL Classification: M19

1. Introduction

The leading companies in the mobile phone industry (Samsung and Apple) utilize different production systems. Whereas Samsung Electronics produces all of their phones internally, Apple opts to outsource the production of their mobile devices (Fuji Chimera Research Institute, 2012). Although the companies differ in terms of their production strategies, they both enjoy outstanding performance within the mobile phone market. This raises an interesting question. Is there an optimal degree of outsourcing that allows a firm to achieve excellent performance? This question addresses one of the fundamental research foci within the field of production management—in-house production of goods or services vs. buying them in the market. Although researchers have long-explored issues related to firm boundaries, only recently has this area of scholarship empirically examined the relationship between outsourcing and firm performance.

The purpose of this article is to illustrate the best form of governance in relation to optimizing firm performance. To do so, I have organized this paper into a series of interrelated sections. In the next section, I examine the determinants of vertical integration and outsourcing through a thorough review of the literature concerning firm boundaries. In Section 3, I propose three hypotheses based on transaction cost economics (TCE) and capability theory. In Section 4,

I utilize regression analysis to test these hypotheses. Finally, I discuss some implications of these findings and offer some concluding remarks in Section 5.

2. Theoretical Background

In this section, I review past research that has explored the determinants of firm boundaries. Specifically, I summarize literature concerning TCE and capability theory, and introduce a modularity perspective to complement those two frameworks, instead of mentioning the order of the excellence among those theories (Argyres & Zenger, 2012; Jacobides & Winter, 2005; Mayer & Salomon, 2006).

Transaction Cost Economics (TCE) and Modularity

Many scholars consider seminal work by Coase (1937) to be the origin of TCE. As such, much of the subsequent work related to TCE has been derived from Coase's research. For example, Dahlman (1979) crystallized Coase's concept of transaction costs (Coase, 1988). Specifically, Dahlman (1979) identified costs associated with searching and information, bargaining and decisions, and policing and enforcement as the first conceptual elements of transaction costs. Williamson (1975), however, was the first to conceptualize transaction costs as determinants of firm boundaries. Williamson (1975) argued that a hierarchical structure could aid an organization in saving transaction costs. Williamson (1975, p. 39) developed a framework of organizational failure by associating "bounded rationality" with "uncertainty/complexity" and "opportunism" with "a small-numbers exchange relations." Williamson argued that vertical integration weakens conflicts of interest between parties and economizes an organization's transaction costs because the internal organization has advantages over the market with regard to the issues outlined above. The basic logic of TCE is that firm boundaries depend on the size of transaction cost and vertical integration is unnecessary as long as a complex contract between parties can be written and enforced. However, integration is considered necessary when the contract causes a firm to incur prohibitive costs (Williamson, 1975).

Christensen and Raynor (2003) argued that when a product's performance or design is unsatisfactory, integration is a useful strategy. A product is considered "not good enough" when its functionality and/or reliability are insufficient for addressing the needs of customers in a given tier of the market (Christensen & Raynor, 2003, pp. 128-129). When this occurs, firms that produce their goods on the basis of proprietary, interdependent architectures have a distinct advantage over their competitors (Christensen & Raynor, 2003). Baldwin and Clark (2000) discussed an interdependent design process in terms of transaction and agency costs and argued that the contract structure of a single firm or corporation can reduce costs associated with links and interactions between design tasks. Thus, when interdependence between firms is high, integration can minimize transaction costs (Christensen, Verlinden, & Westerman, 2002).

In a modular architecture, interfaces between modules or components are specified so completely that it is not significant who makes those modules or components (Christensen & Raynor, 2003). Modular architectures enable a firm to link resources and capabilities of many firms together at low cost, responding to environmental changes (Sanchez & Mahoney, 1996). Thus, modularization can reduce the complexity of contracts and transaction costs. As long as interfaces between each module are clearly specified, intercompany technical coordination is unnecessary and development lead-time can be reduced.

Firm Boundary Determination by Capability

With respect to technical expertise, Ulrich and Smallwood (2004) discussed individual functional competence and organizational core competencies. In reference to social issues, the authors addressed individual leadership capability and organizational social capacity. Although they used the term "competence" in relation to technical issues and "capability" in relation to social issues, I treat these terms as equivalent. As such, they can be used interchangeably.

Richardson (1972) argued that activities have to be carried out by organizations with appropriate capabilities such as appropriate knowledge, experience and skill. Technological capability refers to the organizational routines and accumulated knowledge that an organization uses to produce its goods and/or services (Spiller & Zelner, 1997, p. 568). Therefore, "capability" is not a tangible asset, but the ability to transform resources into business activities. This conceptualization differs from that offered by Ray, Barney, and Muhanna (2004), who argued that "resources and capabilities are used interchangeably and refer to the tangible and intangible assets firms use to develop and implement their strategies" (p. 24).

Langlois and Robertson (1995) argued that firms and other types of organizations consist of two distinct but changing parts. The first part, the intrinsic core, is comprised of elements that are idiosyncratically synergistic, inimitable, and non-contestable. Capabilities contained in the firm's intrinsic core cannot be duplicated, bought, or sold. Another part, according to Langlois and Robertson (1995), is the ancillary capabilities. These capabilities are those that are contestable and may not be unique to the firm that possesses them. Capability theory suggests that boundaries of firms are determined by the relative costs of developing ancillary capabilities internally or purchasing them in the market (Langlois and Robertson, 1995). Christensen and his colleagues (2002) also implied that firms should outsource the production of goods or services if (a) the development of those goods or services is not one of their core competencies, or (b) another entity can produce the goods or services at a lower cost.

Is it possible to purchase idiosyncratic or unique capabilities? Firms focus on activities for which they can utilize their intrinsic cores or core competencies and trade goods or services that are borne from that utilization. The implications of this process differ from those related to the purchase of goods or services that do not represent the firm's core capabilities. Generally, the decision whether to develop those goods or services internally versus buying them in the market is contingent on the relative costs associated with each strategy (Barney, 1999; Christensen et al., 2002; Langlois & Robertson, 1995). However, firms can obtain and leverage competitive advantages with synergistic effects by combining their own core capabilities with those procured from external sources. As a result, firms can save transaction costs and governance costs for created values.

In this article, I adopt the perspective offered by Murray, Kotabe and Westjohn (2009, p. 100), who claim "many firms are leveraging their resources by strategically outsourcing the competencies that they either lack the ability to perform or need to perform exceptionally well globally." The distinction between a firm's intrinsic core and its ancillary capabilities may not always be appropriate, given that its non-intrinsic core is not always characterized by its ancillary capabilities. For example, aircraft manufacturers (e.g., Boeing, Airbus) do not develop aircraft engines; this does not render the development of engines to be an ancillary capability for these firms. However, the aircraft engine is a core component for aircraft manufacturers.

This raises a question: In what form can core capabilities be purchased? The answer to this question can be found in the concept of modularity. Modularized goods or services can be purchased in the market, and the purchasers can produce their own products or services by using the modules without the specific knowledge of them. The acquisition and use of the modules,

however, is dependent on the clear specification of the ways in which the modules interface with the other parts or components. For example, intangible capabilities (e.g., design knowledge, technical knowhow) can be traded in the form of CPUs for personal computers or aircraft engines. In this way, the decision to develop ancillary capabilities internally or purchase them from an external provider is essentially a decision related to the purchase of another companies' tangible products or intangible services.

I call capabilities that have been transformed into tangible products or intangible services "product capabilities." In this article, I broadly assume that product capability exists in the form of a module. I suggest that a firm's decision concerning the degree to which it purchases product capabilities in the market should serve as a determinant of the firm's boundaries.

3. Hypothesis Development

In this section, I develop hypotheses on the basis of previous research related to firm boundaries by utilizing transaction costs and capability theory. The first hypothesis relates to the relationship between outsourcing and firm performance. The latter two hypotheses regard the identification of factors that moderate this relationship.

Outsourcing Degree and Firm Performance

To what extent should firms purchase product capabilities externally? The degree to which a firm engages in outsourcing a part of its value chain provides three integration patterns: full integration, non-integration, and taper integration (Harrigan, 1984; Porter, 1980; Rothaermel, Hitt & Jobe, 2006). Under conditions of full integration, firms obtain all production requirements in-house. In contrast, under non-integration, firms outsource all production requirements. When firms produce some of their requirements internally and obtain some of their requirements from the market, the firm can be said to be operating under a taper integration method (Porter, 1980). Given the variety of ways in which a firm can procure its production requirements, each firm must decide to produce or buy goods or services for each activity in the value chain. The aggregate sum of all these decisions represents a firm's overall level of integration or outsourcing, the degree of which will differ for every firm (Kotabe & Mol, 2009). Because this article focuses on manufacturing firms, I investigate the level of each firm's production-related integration as a means to identify which integration pattern is most effective for improving a firm's performance.

Rothaermel et al. (2006) argued that greater degrees of vertical integration bring lower degrees of strategic freedom and greater bureaucratic costs. They further claimed that a firm can reduce transaction costs through a taper integration strategy to access diverse sources of knowledge, to integrate tacit knowledge and complementary assets, and to make its strategy flexible. Additionally, they argued that taper integration enhances firm performance by balancing vertical integration with strategic outsourcing. With respect to the latter of these strategies, the authors posited that the extensive pursuit of strategic outsourcing through alliances can impose diminishing returns on firm-level outcomes. In exploring this possibility, Rothaermel et al. (2006) showed that the relationship between the degree to which a firm is vertically integrated and its revenue is, in fact, characterized by diminishing returns such that the relationship is in an inverted U-shape.

Similar to the work of Rothaermel and his associates, Grimpe and Kaiser's (2010) research related to R&D also revealed an inverted U-shape relationship between R&D outsourcing rate and innovation performance (i.e., the share of a firm's sales attributed to new

products). In their analysis of Dutch Manufacturing firms, Kotabe and Mol (2009) and Kotabe, Mol, Murray, and Parente (2012) similarly found the relationship between a firm's outsourcing rate and its performance to be in an inverted U-shape. Finally, Leachman, Pegels, and Shin (2005) demonstrated an inverted U-shape relationship between outsourcing rate and manufacturing performance among automobile manufacturers.

Alternatively, Parmigiani (2007) argued that firms that concurrently outsource and produce goods or services (i.e., concurrent sourcing) may only need to buy or produce a small percentage of their requirements to receive the benefits offered by the market and hierarchical structure of the organization. In addition, Mols (2010) argued that concurrent sourcing is costly because it is inefficient compared to relying on either internal production or external procurement exclusively, and that the disadvantages of concurrent sourcing include increase in conflict and complexity, and loss of economies of scale and scope advantages. In a case study of Apple, Lo (2011) concluded that firms in industries characterized by high innovation shares tend to (a) economize organizational investment to put more effort into R&D and (b) prefer international outsourcing to FDI while the incomplete contract distortion is restrained. Through outsourcing, firms can concentrate on those activities on which they are able to leverage their core competencies (Hendry, 1995; Quinn & Hilmer, 1994) and limit governance costs (hierarchical costs).

The research outlined above suggests that the inverted U-shape relationship between outsourcing and firm performance is not consistent. Although a significant amount of past scholarship (Grimpe & Kaiser, 2010; Kotabe et al., 2012; Kotabe & Mol, 2009; Leachman, Pegels &Shin, 2005; Rothaermel et al., 2006) has provided empirical evidence for this inverted U-shape relationship, the companies sampled for this research operated exclusively in specific industries and/or countries. Further, the operational measurements for performance among these past studies were not consistent. Given these inconsistencies, it is possible that firms will select their boundaries in reaction to changes to their operational environments. In other words, it is possible for firms enjoy greater performance outcomes by opting to engage in full integration or non-integration rather than balance outsourcing and internal production. Nevertheless, differences in firm performance resulting from differences in integration decisions have yet to be satisfactorily explored.

Table 1: Advantages and Risks by Vertical Integration Type

Degree of Integration	Advantages	Risks
Full Integration	• Capture integration economies	• Asset inflexibility (Penalties from underutilized plants)
Taper Integration (Concurrent Sourcing)	• Increase bargaining power • Enable firm to understand suppliers' cost structures and profit margins • Enhance strategic flexibility (Rothaermel et.al, 2006)	• Subcontractors will not be available to absorb fluctuations in production and demand • Inefficient with complexity compared with full integration and non-integration (Mols, 2010) • Loss of economies of scale and scope (Mols, 2010)
Non-Integration	• No penalties from underutilized plants (Avoid purchasing large capacity when firm's needs are small)	• Firm loses cost advantages of integration (Increase cost due to engagement of a larger number of contracts (Rothaermel et.al, 2006))

Source: Harrigan (1984, p. 645).

Table 1 summarizes some advantages and risks for production at various degrees of vertical integration. Non-integration keeps firms from being punished as a result of underutilized plant space, but is more costly than an integration strategy. However, outsourcing is often associated with limiting production costs relative to internal production because outside suppliers can aggregate demand (Roodhooft & Warlop, 1999). In addition, according to Teece (2009, p. 29), "outsourcing has made scale an industry asset in the sense that economies of scale can be captured by outsourcing to contract manufacturers". Therefore, in some cases, firms can reduce production costs by outsourcing. Furthermore, if firms select fewer suppliers characterized by cost competitiveness, they can reduce the number of contracts to which they are bound and effectively monitor their suppliers' opportunistic behaviors. As a consequence, firms can economize transaction costs through a strategy of non-integration. In contrast, taper integration does not provide firms with economies of scale or scope, and it requires the provision of both transaction costs and governance costs. Taken together, these characteristics may render taper integration an inefficient and complex strategy relative to full integration or non-integration. As such, firms could enjoy better performance when practicing non-integration relative to taper integration.

According to Table 1, full integration provides firms with integration economies, but firms are responsible for penalties associated with the underutilization of plants. Although full integration may make a firm's assets inflexible, those firms can achieve better performance with substantial economies of scales under full integration. In addition, the inefficiencies and complexities related to taper integration makes its transaction and governance costs higher than those associated with a full integration strategy. Given this, I propose the following hypothesis:

> H1: *The relationship between the degree to which a firm engages in outsourcing and its performance is U-shaped.*

Moderators for Outsourcing and Firm Performance Relationship

In addition to the direct relationship outlined in H1, it is important to identify potential moderators of the relationship between outsourcing and firm performance. To do so, I utilize capability theory. Following capability theory, firms tend to engage in productive activities for which they can utilize their core capabilities. Therefore, a firm that can efficiently transform its resources into productive value will utilize that capability internally. As noted by Kotabe (2012, p. 334), "if a firm has high labor productivity, it is better off by internalizing activities and outsourcing them leads to misalignment and associated lower performance." Therefore, labor productivity could act as a negative moderator for the relationship between outsourcing and firm performance. Given this, I offer the following hypothesis:

> H2: *Labor productivity is a negative moderator of the relationship between outsourcing and firm performance.*

Because firms are able to focus their core capabilities on those activities for which they are most appropriate by purchasing other companies' product capabilities in the market, R&D efficiency will improve, causing the R&D expense to sales ratio to fall. Additionally, because the purchase of product capabilities in the form of modules can reduce transaction costs, it can serve to improve overall firm performance. In other words, there exists a negative relationship between the degree to which firms with high R&D intensity (R&D expenditure to sales ratio) engage in

outsourcing and their performance (Kotabe et al., 2012). Therefore, when outsourcing, increases in a firm's R&D intensity may decrease that firm's performance. As such, I offer the following hypothesis:

> H3: *R&D intensity is a negative moderator of the relationship between outsourcing and firm performance.*

4. Empirical Analysis

In this section, I test the three hypotheses proposed in the previous section. I first describe the data used to test the hypotheses, then present the results of the analysis.

Data

All companies sampled for this study are Japanese manufacturing firms. Specifically, data were collected from 1,421 firms for the five years between 2007 and 2011. Given this data collection strategy, the entire dataset consists of 7,105 independent observations. All data were downloaded using the Nikkei NEEDS Financial QUEST Version 2.0. The purpose of collecting longitudinal data over five years is to observe medium- to long-term activities within individual firms. Sampling data from only one year would risk allowing outlier events (e.g., financial crises, natural disasters) to influence observations of firms' performances. As a result, the observation of their typical activities would be more difficult.

Data were collected on the basis of a Japanese fiscal year lasting from April 1 to March 31. As such, panel data for each year were constructed on the basis of this time period. Firms that lacked data required to perform regression analyses were removed from the data set. In addition, firms that did not have data for the entire five-year period between 2007 and 2011 were also removed. These exclusion criteria reduced the original sample from 7,555 observations to the above-cited 7,105 observations.

To analyze the hypotheses proposed above, I utilize the fixed effects regression model to evaluate the proposed hypotheses because it was supported by the F test and the Hausman test.

Dependent Variable

For all three hypotheses, firm performance is used as the dependent valuable. Previous research in this domain has used a number of variables to represent firm performance. These include sales share (Grimpe & Kaizer, 2010; Kotabe et al., 2012), revenue (Rothermel et al., 2006), and return on assets (Hsu & Wang, 2012; Lim, Stratopoulos, & Wirjanto, 2012). In this paper, I used return on sales (ROS) as the dependent measure meant to indicate firm performance. I did so because it is one of the most important financial indicators, and recent research has also adopted ROS as a proxy for firm performance (see Acquaah, 2012; Li, Veliyath, & Tan, 2013). Because business operations can be quantified, I used operating profit to calculate ROS.

Independent Valuables

In addition to the outcome measure, I also incorporated a number of independent variables into the fixed effects regression model. These predictor variables are described below.

(1) OSR (Outsourcing Rate)

Typically, vertical integration rate is demonstrated by value-added to sales ratio (Balakrishnan & Wernerfelt, 1986; Hutzschenreuter & Grone, 2009; Levy, 1985; Nor Ghani,

Ahmad, & Khalil, 2006). In these studies, outsourcing rate is calculated as [(Sales – Value Added) / Sales] (Mauri & de Figueiredo, 2012). In this study, however, I calculate OSR using data that has been officially published by the company to which it is attributed. Outsourcing rate can be shown by the rate of industrial purchases to sales (Kotabe & Mol, 2009; Kotabe et al., 2012). I follow that rate to calculate OSR but use "cost of goods sold" as a denominator because this article focuses on production outsourcing. To obtain data related to the calculation of OSR, I downloaded non-consolidated financial statements using Nikkei NEEDS Financial QUEST 2.0. Following Matsuda (1989), I calculated OSR as follows: [(Goods purchased + Low materials + Outsourced processing fee + Fuels & utilities) – Purchases from related companies] / Cost of goods sold.

(2) SIZE

In this study, I utilize firm sales (in million Japanese yen) as a proxy for firm size. Firm sales are calculated by taking the log of annual sales (Leiblein & Miller, 2003; Leiblein, Reuer, & Dalsace, 2002).

(3) UCT (Uncertainty)

The absolute value of each firm's year-to-year sales growth rate was used as a proxy for uncertainty.

(4) PPE (Profit per Employee)

Profit per employee is the annual net profit (in million Japanese yen) divided by the number of a firm's employees.

(5) SPE (Sales per Employee)

Sales per employee is a firm's annual sales (in million Japanese yen) divided by the number of a firm's employees. This variable serves to demonstrate labor productivity (Kotabe et al., 2012; Mol, 2005) and it is the key variable for testing H2.

(6) RDR (R&D Rate)

R&D rate is the ratio of annual R&D expenditures to sales. This variable signifies a firm's R&D intensity (Kotabe et al., 2012; Leachman et al., 2005; Mol, 2005) and serves as the key variable for testing H3.

(7) Y1, Y2, Y3, Y4 (Year dummies)

Y1, Y2, Y3 and Y4 are used as dummy variables to respectively represent 2007, 2008, 2009 and 2010. 2011 serves as the base year.

SIZE, UCT, PPE, SPE and RDR are used as control valuables in all regression models with the four year dummies. In addition to the above mentioned valuables, the interaction terms such as (SPE x OSR) and (RDR x OSR) are used to test the Hypothesis 2 and 3 respectively. OSR squired (OSR^2) is used to test the Hypothesis 1.

Analysis Results

Table 2 provides descriptive statistics and correlations among the variables outlined above. Table 3 summarizes the results of the fixed effects regression analysis.

Table 2: Descriptive Statistics and Correlation Matrix (N=7,105)

	Mean	Std. Dev.	ROS	SIZE	UCT	PPE	SPE	RDR	OSR
ROS	-0.0087	1.1350	1						
SIZE	10.2154	1.5540	0.1798	1					
UCT	0.1623	1.4445	-0.0104	-0.0006	1				
PPE	1.1841	17.7315	0.2316	0.1249	0.0166	1			
SPE	67.8918	107.2152	0.0305	0.342	0.032	0.1311	1		
RDR	0.0470	0.2745	-0.4175	-0.144	0.0198	-0.0546	-0.04	1	
OSR	0.6596	0.2375	0.0828	-0.0254	0.0004	0.0172	0.0242	-0.0735	1

Table 3: Fixed Effects Regression Results

Valuables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
	ROS (Dependent Valuable)						
SIZE	1.1988 ***	1.235 ***	1.2544 ***	1.2422 ***	1.2355 ***	1.2599 ***	1.2548 ***
UCT	0.0052	0.0046	0.0052	0.0063	0.005	0.0068	0.0057
PPE	0.0042 ***	0.0042 ***	0.0043 ***	0.0041 ***	0.0043 ***	0.0042 ***	0.0043 ***
SPE	-0.0013 ***	-0.0014 ***	-0.0016 ***	0.0001	-0.0014 ***	-0.0001	-0.0016 ***
RDR	-1.275 ***	-1.2614 ***	-1.2624 ***	-1.2608 ***	-1.3761 ***	-1.2617 ***	-1.3751 ***
OSR		-0.3521 ***	-1.1916 ***	-0.1024	-0.3794 ***	-0.8946 ***	-1.2167 ***
OSR^2			0.7151 ***			0.6659 ***	0.7137 ***
SPE x OSR				-0.0029 ***		-0.0028 ***	
RDR x OSR					0.334		0.3282
Y1	-0.1524 ***	-0.1607 ***	-0.159 ***	-0.1608 ***	-0.1602 ***	-0.1593 ***	-0.1585 ***
Y2	-0.0743 **	-0.0796 **	-0.0774 **	-0.0782 **	-0.0794 **	-0.0763 **	-0.0773 **
Y3	0.0541	0.0419	0.0495	0.0428	0.0411	0.0499	0.0487
Y4	0.0091	0.0058	0.0092	0.0047	0.0055	0.0079	0.0089
_cons	-12.0816 ***	-12.2037 ***	-12.1942 ***	-12.414 ***	-12.1932 ***	-12.3963 ***	-12.1838 ***
N	7,105	7,105	7,105	7,105	7,105	7,105	7,105
R^2	0.1534	0.1556	0.1575	0.1586	0.1558	0.1602	0.1577
F-value	114.2433	104.5484	96.3839	97.1937	95.1845	90.1607	88.4761

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Model 1 incorporates only the five control variables and the four dummy variables. In addition to the control variables and dummies, Model 2 also incorporates OSR, which is shown to be negative and significant ($p < 0.001$). Model 4 features the addition of an interaction term (SPE x OSR) to Model 2. The coefficient associated with the interaction term is similarly shown to be negative and significant ($p < 0.001$). Model 6 includes all the variables that are included in Model 4, but also incorporates OSR^2. The interaction term is shown to be a negative, significant predictor of firm performance in Model 6 as well ($p < 0.001$). Taken together, these results suggest that a firm's labor productivity negatively affects the relationship between outsourcing and performance. Therefore, Hypothesis 2 is supported.

In Model 5, which features the addition of an interaction term (RDR x OSR) to Model 2, shows that interaction term to be non-significant. In Model 7, which includes OSR^2 in addition to

the variables featured in Model 5, the interaction term (RDR x OSR) is again non-significant. These results collectively suggest that a firm's R&D intensity does not moderate the relationship between outsourcing and firm performance. As such, I find no evidence to support Hypothesis 3.

Finally, OSR^2 is shown to be statistically significant ($p > 0.001$) in each of the models (3, 6 and 7) in which it is included as a predictor, suggesting that the relationship between outsourcing and a firm's performance is U-shaped. This result supports Hypothesis 1.

5. Discussion and Conclusions

The results of empirical analysis performed in this study expand extant discussions on outsourcing and performance (Grimpe & Kaiser, 2010; Kotabe et al., 2012; Kotabe & Mol, 2009; Leachman, Pegels & Shin, 2005; Rothaermel et al., 2006). First, this study demonstrates that within the Japanese manufacturing industry, the effects of a firm's degree of outsourcing on its performance (as measured by return [operating profit] on sales) is characterized by a U-shape. The support generated for Hypothesis 1 can help inform managers about what types of strategies to implement with respect to production. Specifically, firms can increase their returns on sales by selecting an integration strategy similar to non-integration or full integration, as these strategies reduce the sum of transaction costs and governance costs for created values. In contrast, a taper integration strategy can lead to higher costs because of inherent inefficiencies, suggesting an inverted U-shape relationship between outsourcing rate and costs.

Second, this study demonstrated that labor productivity (but not R&D intensity) negatively moderates the relationship between the outsourcing and firm performance. This finding replicates past research by Kotabe et al. (2012), which also showed that labor productivity negatively influenced the relationship between outsourcing and firm performance. Firms' core capabilities are those that allow them to exclusively transform resources into high labor productivity in the short term. Therefore, in accordance with capability theory, firms should perform those activities for which they have core capabilities internally, thus reducing transaction costs. Given this, the evidence supporting Hypothesis 2 contributes to discussions on capability theory.

Despite the utility of its findings, this study suffers a few inherent limitations. When firms outsource a part of their value chains, the exact optimal degree to which outsourcing is effective was not determined. This article only suggests that higher degrees of outsourcing or internal production yields better performance in a general sense. In addition, this article specifically uses data from Japanese manufacturing firms and uses ROS as a measure for firm performance. Therefore, the results of my empirical analysis are difficult to compare to research that has used other data or methods. In spite of its shortcomings and methodological uniqueness, the findings produced by this study show the U-shape relationship between outsourcing rate and firm performance which was not discovered in past studies reviewed in this article. As such, this article's primary contribution to scholarship on outsourcing rests in its demonstration of that relationship through the application of TCE and capability theory with the modularization perspective.

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