



Toward the Intensity of Supply Chain  
Competence: A Comparison Using Competitive  
Strategy Typology

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# **Toward the Intensity of Supply Chain Competence: A Comparison Using Competitive Strategy Typology**

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## **Abstract**

Supply chain competence is one of the most critical core competences for many enterprises in the era of global transactions and electronic commerce. However, the role of supply chain competence has seldom been addressed in the research of competitive strategy. This paper investigates the impact of business level strategy on supply chain competence. In this study, business strategies were classified into four different types and the intensity of supply chain competence of the strategy types were compared. Empirical data from enterprises were collected and analyzed to assess the significance of the differences from the comparison. The results supported our hypotheses and the implications for management decisions are discussed.

*Keywords:* supply chain competence, business strategy, core competence, differentiation, cost leadership, hybrid strategy, obscure strategy

## **1. Introduction**

Recent development of the extensive globalization, the meticulousness of enterprise internationalization and business integration, and the rapid development of information technology have caused business environments to change rapidly and tremendously. For enterprises, customers require an increasingly rapid response and fulfillment. To respond promptly to changing internal situations and external environments, enterprises must interact efficiently with vendors of upper, middle, and lower streams to form a highly efficient supply chain network. Supply chain competence thus becomes a critical core competence pursued by enterprises [1-4].

In the era of big data, developing supply chain competence is even more critical than before for a firm [5-7]. The first challenge is the growing data volume in supply chain operations. This is because supply chain activities need to collaborate with other trading partners across corporate boundary. For many enterprises, the supply chain needs to integrate value chains of participating parties [8, 9]. The second challenge is the increasing data velocity in supply chain operations. Many organizations are gradually aware of that they must compete, as part of a supply chain against other supply chains, to quickly reflect customers' changing demands [10]. The third challenge is the expanding data variety in supply chain operations. Supply chain operations need to be seamlessly integrated with more and more business functions such as production, marketing and information systems [11-13].

Studies have shown that competitive business strategy could lead to competitive advantage for firms [14-16]. Furthermore, the high level concept of business strategy needs to be implemented and realized in distinctive core competences such as supply chain competence [17]. However, research which has empirically investigated the linkage between business strategy pursuit and distinctive competence is scant. How different business strategies influence the development of enterprise core competences towards gaining competitive advantage is thus far less clear in the literature.

This study is intent on filling the gap of the literature and examines the relationship between business strategy and supply chain competence. The paper focuses on the role of a firm's business level strategy in shaping supply chain competence, and further examines possible impact of business strategy pursuit on supply chain competence.

The paper begins with a review of the relevant literature about the relationships between business strategy and supply chain competence. Business strategies are classified into four different types. Then it proposes hypotheses which compare the intensity of supply chain competence with respect to different strategy types. Following that, the hypotheses are tested using a sample of large Taiwanese companies with international operations. The findings are presented along with the managerial implications of the study.

## 2. Hypotheses

Porter's framework for business strategy of competition is one of the most widely accepted typology of business competition models [14, 16]. Porter's research in industrial economics suggested two fundamental types of generic business level strategies for achieving above average rates of return: cost leadership and differentiation [14, 15]. Porter proposed that to succeed in business, a firm must pursue one or more of these generic business strategies, and that a firm's strategic choice eventually determines its competitiveness and profitability [18]. Other scholars argued that the two types of business strategies are not strictly mutual exclusive. Firms adopting cost leadership strategy may seek to deliver distinctive products or services under the main theme of low cost thinking. Firms with differentiation strategy could also attempt low cost operations as long as the uniqueness of products or services is maintained [19, 20].

Thus using cost leadership and differentiation as two major strategic orientations, this study classified firms into four strategic types, as depicted in Table 1.

Table 1 Classification of firms by strategy types

Firm type	Criteria	
	Intensity of differentiation strategy pursuit	Intensity of cost leadership strategy pursuit
Hybrid	high	high
Differentiator	high	low
Cost leader	low	high
Obscurer	low	low

The successful implementation of the business strategies relies on making right decisions on core functions of a firm, such as human resource management, production, marketing [21], research and development, sales, information systems [22], and supply chain management. These functions form a value chain and all have a role in lowering the cost structure and increasing the value of products through differentiation [15]. A firm's ability to acquire superior functional efficiency, including supply chain competence, will determine if its product offering is differentiated from that of its competitors, and if it has a low cost structure simultaneously. Firms that increase the utility consumers get from their offerings through differentiation, while at the same time lowering their cost structure, can create more value than their rivals, and will acquire a competitive advantage, superior profitability, and profit growth [19, 23].

Cost leadership strategy is pursued through low cost operations in each segment of supply chain activities, including production scheduling, demand management, sourcing and procurement, inventory management, distribution and delivery [24, 25]. For differentiation strategy, the principal thinking in these operations are geared towards the design and delivery of distinctive products and services. Differentiation may also eventuate in unique methods or channels of sourcing or delivery, in innovative manufacturing processes or inventory operations in a supply chain [26].

Pursuing cost leadership strategy and differentiation strategy concurrently, firms are expected to face greater challenge than pursuing a pure strategy. This is because firms in this case need to deal with uncertainties in both differentiation and low cost. Therefore, firms with a hybrid strategy are expected to require higher intensity in supply chain competence. Firms with low intention in strategy pursuit are expected to exhibit lower intensity in supply chain competence.

In summary, the following is hypothesized:

Hypothesis: There are significant differences in the intensity of supply chain competence with respect to different business strategy types.

### **3. Method**

#### **3.1 Survey Instrument**

The survey instrument was developed using questions derived from the literature on Porter's competitive strategies and supply chain competence discussed previously. We operationalized the study variables by using multi-item reflective measures on a 7-point scale [27].

The construct of cost leadership strategy pursuit was measured using four items that reflect the extent to which a firm pursues a cost-oriented strategy. First, cost leadership refers to the generation of higher margins than those of competitors by achieving lower operation costs. Firms with a cost leadership strategy often have highly stable product lines and a strong emphasis on profit and budget controls [18]. Second, pursuing of cost leadership is often reflected in price competitiveness [28, 29]. The third item was the economic scale. A firm can gain a cost advantage through economies of scale or superior manufacturing processes [14, 15]. Finally, larger firms with greater access to resources are more likely to take advantage of cost leadership strategy through development of lower cost products, whereas smaller firms are often forced to compete using highly differentiated products and services in a niche market [30].

The differentiation strategy pursuit construct was measured using four items that reflect the extent to which a firm pursues a differentiation strategy. Differentiation entails being unique or distinct from competitors, for example, by providing superior information, prices, distribution channels, and prestige to the customer [14]. Differentiation prevents a business

from competitive rivalry, insulating it from competitive forces that reduce margins [31]. Extending Porter’s competitive strategy framework, Miller distinguished differentiation strategies based on innovation from those based on marketing [18]. These propositions form two items included in the construct. Differentiation strategies based on innovation may create a dynamic environment or a distinct business model in which it is difficult for competitors to predict and react. This unpredictability may provide the innovator a substantial advantage over its competitors [18, 29].

The construct of supply chain competence was measured using six items. Respondents rated their intensity of pursuing supply chain competence over the time frame of past few years. Beamon [32] proposed a framework for measuring supply chain competence. The framework included the measurement of resources, output, and flexibility as the strategic goals of supply chain operations. The key measuring variables included cost, activity time, customer responsiveness, and flexibility. These variables have been recognized as direct and observable measures of supply chain practice. Firms in a supply chain achieve efficiency by lowering operational costs, reducing inventory, promoting flexibility, ensuring on-time deliveries, and minimizing shortages of critical resources. These objectives relate to all parties in a buyer–supplier relationship, and therefore, can represent the core competence of supply chain operations [33, 34].

All items for this study were assessed with a 7-point Likert scale ranging from “strongly disagree” to “strongly agree.” In addition, we use firm size, IT department size and industry sector as control variables, as these factors have been noted in several studies to affect intention to adopt information technologies [35, 36]. Table 2 presents the items used to measure each of the independent and dependent construct variables.

Table 2 Constructs and items used in the survey

Construct and item description (1 – strongly disagree; 7 – strongly agree)
<b>CLS: Cost leadership strategy pursuit</b>
CLS1: We provide low cost products or services based on operational efficiency.
CLS2: We deliver products or services with lower price than competitors.
CLS3: We provide products or services with economy of scale.
CLS4: We develop our products or services with lower cost than our competitors.
<b>DFS: Differentiation strategy pursuit</b>
DFS1: We deliver products or services with distinctive business model.
DFS2: We differentiate our products or services based on innovation.
DFS3: We deliver products or services with superior functionality to our competitors.
DFS4: We differentiate our products or services based on effective marketing.

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**SCC: Supply chain competence**

SCC1: We delivery products or services on time.

SCC2: Reducing lead time is crucial to us in our supply chain operations.

SCC3: We respond promptly to changes of customer requirements.

SCC4: Lack of critical resources is effectively avoided in our supply chain operations.

SCC5: Inventory and logistics flexibility is above average in our supply chain operations.

SCC6: Reducing the cost of our supply chain operations is important to us.

**Control Variables (rescaled)**

Firm Size: Total number of employees.

IT Size: Total number of IT staffs.

Industry: Industry sectors of firms. 1 for service firms and 0 for manufacturing firms.

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### **3.2 Sample and Data Collection**

Empirical data for testing the hypothesized relationships were obtained by conducting a survey of large Taiwanese companies. A questionnaire developed in accordance with Table 2 was implemented as the survey instrument. It was pretested in an iterative manner among a sample of 15 executives and managers. The questionnaire items were revised on the basis of the results of the expert interviews and refined through pretesting to establish content validity. The pretesting focused on instrument clarity, question wording, and validity. During the pretesting, members of the testing sample were invited to comment on the questions and wording of the questionnaire. The comments of these respondents then provided a basis for revisions to the construct measures.

A Taiwanese marketing research organization publishes comprehensive data of the 1,000 largest corporations in Taiwan with international operations. Most of these companies are public listed corporations with global transactions. After the pretesting and revision, survey invitations and the questionnaires were mailed to these 1,000 companies. Follow-up letters were sent approximately 15 days after the initial mailing. Data were collected through responses from executives and managers of the companies. Data collection was completed in two months. In total, 201 valid questionnaires were obtained, with a valid response rate of 20.1%. We compared respondent and non-respondent firms in terms of industry, size (number of employees) and revenue. These comparisons did not show any significant differences, suggesting no response bias. Table 3 shows the profile of the final sample list.

Table 3 Profile of the final sampling firms

	Count	% of sample
<b>Number of employees</b>		
Under 100	33	16%
100~1,000	64	32%
1,000~5,000	59	29%
5,000~10,000	35	17%
Above 10,000	10	5%
Total	201	100%
<b>Number of IT Staffs</b>		
Under 5	66	33%
6~10	31	15%
11~20	49	24%
21~50	34	17%
Above 50	21	10%
Total	201	100%
<b>Industry sectors</b>		
Manufacturing	93	46%
Services	108	54%
Total	201	100%

## 4. Results

Our goal was to investigate the impact of business strategy typology on supply chain competence. The results were used to test the relationship between business strategy typology and supply chain competence.

### 4.1 Reliability and Validity

Cronbach's alpha tests the interrelationship among the items composing a construct to determine if the items measure a single construct. Nunnally and Bernstein [37] recommended a threshold alpha value of .7. Cicchetti, Koenig, Klin, Volkmar, Paul and Sparrow [38]



suggested the following reliability guidelines for determining significance:  $\alpha < .70$  (unacceptable),  $.70 \leq \alpha < .80$  (fair),  $.80 \leq \alpha < .90$  (good), and  $\alpha > .90$  (excellent).

Content validity [39] refers to the extent to which the instrument measures what it is designed to measure. Most of the measures used in the study were adopted from relevant research. The study's validity was further improved by pre-testing the instrument on a panel of experts comprising 15 business executives and supply chain managers.

Table 4 summarizes the descriptive statistics and results of the reliability and validity tests. The reliability of the instrument was examined using composite reliability estimates by employing Cronbach's  $\alpha$ . All the coefficients exceeded Nunnally's recommended level (0.70) of internal consistency [37, 38]. In addition, factor analysis was performed to confirm construct validity. The discriminant validity was confirmed since items for each constructs loaded on to single factors with all loadings greater than 0.8.

Table 4 Descriptive statistics and reliability and validity test

Construct	Item	Mean	SD	Cronbach's alpha	Cronbach's alpha if item deleted	Factor loading on single factor
CLS	CLS1	3.716	1.521	0.952	0.956	0.912
	CLS2	3.597	1.460		0.978	0.855
	CLS3	3.657	1.320		0.905	0.909
	CLS4	3.677	1.351		0.908	0.993
DFS	DFS1	4.552	1.371	0.905	0.893	0.854
	DFS2	4.393	1.375		0.857	0.921
	DFS3	4.308	1.579		0.889	0.866
	DFS4	4.214	1.456		0.870	0.895
SCC	SCP1	4.507	1.460	0.920	0.911	0.815
	SCP2	4.935	1.338		0.901	0.870
	SCP3	4.612	1.330		0.901	0.869
	SCP4	4.552	1.330		0.905	0.847
	SCP5	4.423	1.465		0.909	0.827
	SCP6	4.547	1.396		0.904	0.849

We also assessed discriminant validity on the basis of the construct correlation. Table 5 summarizes the correlations among different factors. The tests indicated acceptable results with respect to discriminant validity.

Table 5 Construct correlation

Construct	1	2	3	4	5	6
1. CLS	1					
2. DFS	0.625**	1				
3. SCC	0.556**	0.642**	1			
4. Firm Size	-0.031	-0.048	-0.035	1		
5. IT Size	0.185**	0.085	0.048	0.357**	1	
6. Industry	-0.024	-0.026	-0.061	-0.027	-0.144*	1

\*p < 0.05, \*\*p < 0.01

#### 4.2 Tests of Hypotheses

We compared firms with different strategic orientations using ANOVA test with Scheffé's method. The firms were classified as hybrid, differentiator, cost leader and obscurer firms. Firms were classified as hybrid if their ratings for both the differentiation strategy pursuit (DFS) and cost leadership strategy pursuit (CLS) were, on average, above the sample means for differentiation and cost leadership, respectively. Otherwise, they were classified as either differentiator or cost leader depending on the strategy on which they rated higher than average. The rest of firms were classified as obscurer. Table 6 summarized the classification of firms with their average ratings on supply chain competence (SCC).

Table 6 Classification of firms by strategy types

Firm type	Criteria		Count	% of sample	SCC	
	DFS	CLS			Mean	SD
Hybrid	high	high	71	35.3%	5.263	0.788
Differentiator	high	low	27	13.4%	4.660	1.061
Cost leader	low	high	46	22.9%	4.359	0.632
Obscurer	low	low	57	28.4%	3.927	1.489
Total			201	100.0%	4.596	1.172

To determine whether the differences in the means of SCC for each group of firm strategies were statistically significant, we used an ANOVA test with Scheffé's method. The Scheffé method is used for post hoc multiple comparisons and is suitable whether sample sizes are equal or unequal. Table 7 summarizes the results of the comparison.

Table 7 Comparison of firms by strategy types

Firm type A	Firm type B	SCC		
		Mean (A – B)	SE	P-value
Hybrid	Differentiator	0.602	0.236	0.093
	Cost leader	0.904	0.198	0.000***
	Obscurer	1.336	0.186	0.000***
Differentiator	Cost leader	0.302	0.253	0.701
	Obscurer	0.734	0.244	0.031*
Cost leader	Obscurer	0.432	0.207	0.230

\*p < 0.05, \*\*p < 0.01, \*\*\*p < 0.001

Results from this analysis revealed that the mean SCC difference between hybrid and differentiator organizations was not statistically significant, but that the difference between hybrid and cost leaders was statistically significant, as was the difference between hybrid and obscurer firms and the difference between differentiators and obscurer firms.

## 5. Discussion

This study investigated the impact of a firm's business strategy pursuit on the intensity of supply chain competence from a strategy typology perspective. The first critical insight we obtained from our empirical results is that a hybrid strategy is actually a common practice among enterprises, and it relates to higher intensity of supply chain competence than pure cost leadership strategy and obscure strategy.

The post hoc analysis results revealed that when firms that are both differentiators and cost leaders are considered hybrid, they compose a large proportion of the sample (35.3%) and, on average, tend to have higher ratings in supply chain competence than firms that implement any other strategy in the typology. An explanation for this result is that hybrid firms tend to be more salient in strategy management and have more prominent business intent than the others, and thus are able to conduct higher pursuit for supply chain competence. On the other hand, firms with low intent in both differentiation and cost leadership (28.4% of the sample) tend to be strategically irresolute and stuck-in-the-middle, and without a clear motivation for pursuing operational efficiency. Moreover, comparing the

percentage of hybrid (35.3% of the sample) with that of the firms with a dominant business strategy, differentiators (13.4% of the sample) and cost leaders (22.9% of the sample), we see that hybrid strategy is actually a relatively common practice among enterprises. Thus our findings support the literature that pure strategies may only be theoretical in principle, and a combination of business strategies is what is practiced by firms in reality [40-42]. However, while a hybrid strategy may achieve competitive advantage, it requires agile deployment and coordination of various firm resources to avoid or resolve possible conflict of interests between the two pure strategies, and will increase the complexity of supply chain operations, thus demand the support of higher supply chain competence. The results of our study provide empirical support for this implication.

Furthermore, the results indicate that the SCC difference between hybrid and differentiators was not statistically significant, but that the difference between hybrid and cost leaders was statistically significant, as was the difference between differentiators and obscurer firms. An explanation for this is that the purposes for which differentiators and cost leaders utilize supply chain competence are relatively distinct, and the means through which the two strategies are linked to supply chain competence are quite different.

Differentiation strategy pursuit is linked to supply chain competence through effectiveness in product innovation and customization, whereas cost leadership strategy pursuit is linked to supply chain competence through efficiency in operations [43]. Even though both strategies have a positive impact on supply chain competence, differentiation strategy pursuit is considered to have a stronger relationship with supply chain competence than cost leadership strategy pursuit will have. Because differentiation strategy pursuit represents an approach to product or service innovation, whether through the development of unique product features or through the enablement of business innovations which explore opportunities, it requires the support of highly efficient supply chain operations which are responsive to changing customer preferences. These supply chain operations need to react to unique customer experiences with speed and flexibility. To sustain in competition, the differentiators will always need to be a step ahead, looking for the next uniqueness enhancing innovation. The differentiators are therefore more likely to require promptness and flexibility in supply chain operations. Furthermore, the impact that the introduction of a radical product or business innovation has on the supply chain activities of a firm is likely to exceed that of the implementation of a cost efficient solution that is more common in an industry regardless of the efficiency that it brings [44].

This demonstrates that the complexity of a multi-faceted differentiation strategy is more difficult for firms to pursuit than the efficiency-based cost leadership strategy, and thus required higher support of functional operations. Therefore, a differentiation strategy can offer multiple and complex dimensions such as innovation and customization through which

a firm can create competitive advantage, and is more difficult for competitors to imitate than a cost leadership strategy.

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