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Edward A. Morash & Steven R. Clinton

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SUPPLY CHAIN INTEGRATION: CUSTOMER VALUE THROUGH COLLABORATIVE CLOSENESS VERSUS OPERATIONAL EXCELLENCE

Edward A. Morash
Michigan State University

Steven R. Clinton
University of New Orleans

In a global and competitive environment, supply chain relationships and processes must be continuously integrated and aligned with strategy. The objective should be to improve the efficiency and effectiveness of supply chains to create value for final consumers. The present research investigates and compares three major forms of supply chain integration for approximately two thousand global firms. The three forms of supply chain integration include intra-organizational process integration, inter-organizational collaborative integration including strategic alliances, and operational excellence. Significant firm and country differences as to value chain integration are identified which appear to relate to cost reduction versus differentiation strategies.

INTRODUCTION

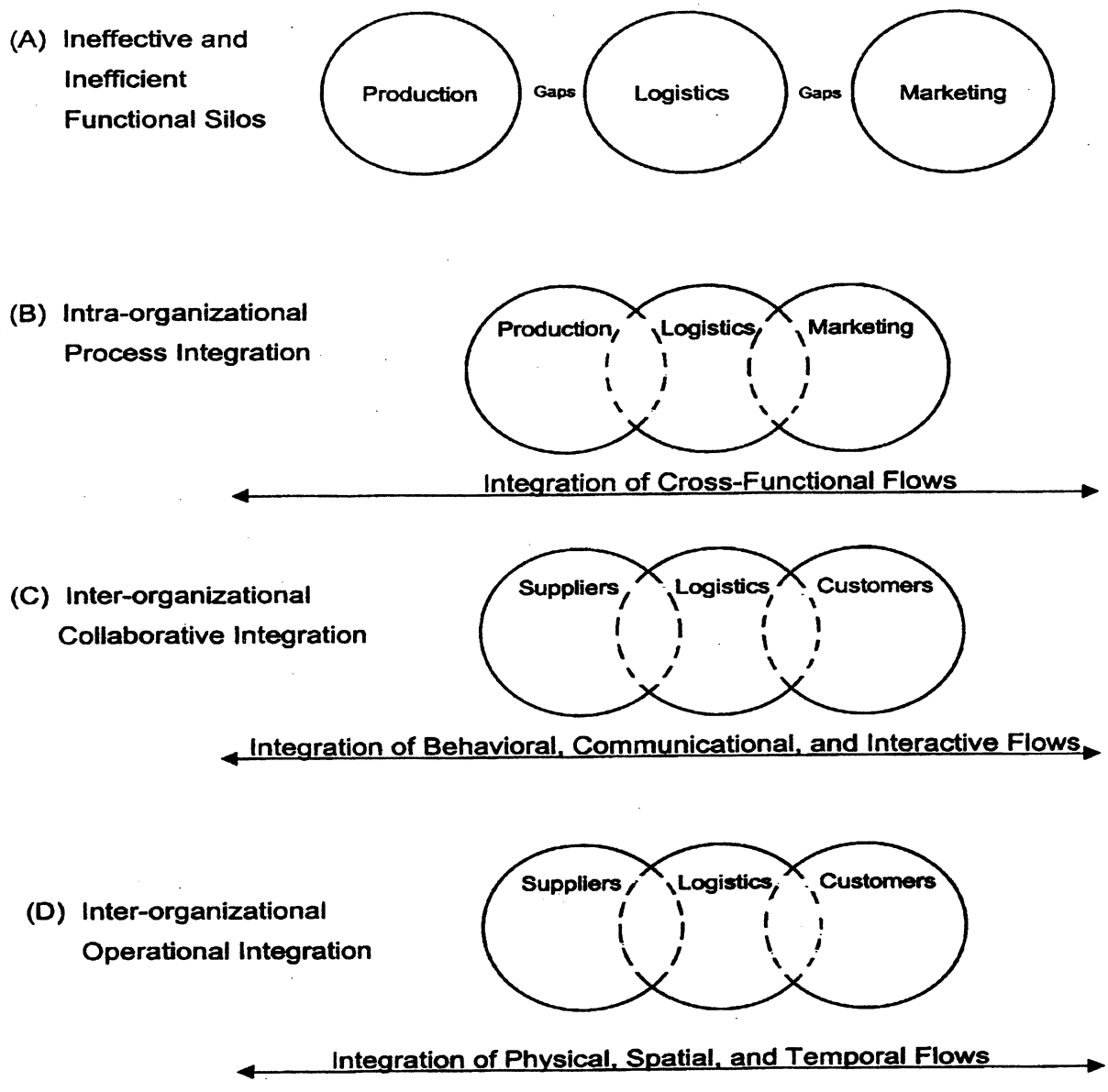
An increasingly important topic is supply chain integration. Supply chain integration links a firm with its customers, suppliers, and other channel members. As such, it integrates their relationships, activities, functions, processes, and locations (Bowersox and Morash 1989; Hammer 1990; and Hammer and Champy 1993). In general, integration supports the current movement from conventional, arms- length and often conflict-laden relationships to cooperative, long-term business partnerships and strategic alliances (Harrigan 1988; Ohmae 1989; Bowersox 1990; Sonnenberg 1992; Kanter 1994). The purpose is to improve the effectiveness and efficiency of supply chains for ultimate consumers.

As a result, supply chain integration must balance end use expectations against input or supply costs. End users, or final consumers, seek a wide array of value-added services or benefits. Understanding and controlling these service offerings or benefits - demand management - is done within the context of input or supply costs. After all, the overall goal is to be profitable while providing customers with desirable service offerings.

Supply chain integration can take at least three major forms, which are schematically summarized in Figure 1 (Hammer and Champy 1993; Treacy and Wiersema 1993, 1995). However, it is important to note that Figure 1 is a simplification of supply chain processes. There can be many more intra-organizational functions or sub-processes (e.g., procurement, sales, order-processing and customer service, etc.) as well as additional inter-organizational entities (e.g., retailers, wholesalers, second and third-tier suppliers, etc.), which are not depicted in Figure 1.

The first intra-organizational form is a company's cross-functional process integration within the firm such as between production, logistics, and marketing (Shapiro, Rangan, and Sviokla 1992; Hammer and Champy 1993). This may require balancing a company's intra-organizational demand and supply management. Second, inter-organizational integration can focus on a company's collaborative closeness of relationships with both outside customers and suppliers including partnerships and strategic alliances (Bowersox 1990; Grönroos 1990; Sonnenberg

FIGURE 1
THREE FORMS OF SUPPLY CHAIN INTEGRATION



1992; Treacy and Wiersema 1993, 1995). For customers alone, this is sometimes referred to as competing on the basis of customer intimacy or demand management (Treacy and Wiersema 1993; Morash, Dröge, and Vickery 1996, 1997). Third, inter-organizational integration can also involve operational integration such as optimizing inter-company material flows (Hines 1993; Christopher 1994; Global Research Team 1995). This is sometimes referred to as operational excellence or supply management in logistics strategy literature (Morash, Dröge, and Vickery 1996, 1997; Treacy and Wiersema 1993, 1995).

Descriptive literature on operational excellence and collaborative closeness suggests that beyond some minimum threshold or acceptable level on each discipline, firms can and should focus primarily on one value discipline (Treacy and Wiersema 1993, 1995). Furthermore, to be successful, this theory predicts that the chosen value emphasis should be apparent and consistent across all levels of the organization including strategic, tactical, and operational (Hofer and Schendel 1978; Treacy and Wiersema 1993, 1995). Figure 2 provides a matrix diagram showing examples of consistency across the three levels of decision making for operational excellence and collaborative closeness. However, these predictions have not been previously tested empirically in prior supply chain strategy literature. They will be addressed empirically in the present research.

FIGURE 2

EXAMPLES OF CONSISTENT INTEGRATIVE PRACTICES ACROSS THREE LEVELS OF DECISION MAKING FOR OPERATIONAL EXCELLENCE, COLLABORATIVE CLOSENESS, AND CROSS-FUNCTIONAL PROCESS INTEGRATION

LEVEL OF DECISION-MAKING	INTER-ORGANIZATIONAL INTEGRATION		INTRA-ORGANIZATIONAL INTEGRATION Cross-Functional Processes
	Operational Excellence	Collaborative Closeness	
1. Strategic	1. Supply Chain Reengineering, JIT Systems, etc.	1. Obtain Customer Input into Corporate Strategies, Form Strategic Alliances with Customers and Partners, etc.	1. Integrated Cross-Functional Processes Between Logistics, Marketing, and Production
2. Tactical	2. Standardize and Simplify Supply Chain Practices	2. Cross-Functional Teams Visit Suppliers and Customers	2. Assign Tasks
3. Operational	3. Adjust Delivery Schedules, Recover From Operating Problems, etc.	3. Share Performance Results with Suppliers and Customers	3. Coordinate Decisions

Each of these three forms of supply chain integration will next be discussed and elaborated upon in turn. This will be followed by the study's research questions and the methodology used to empirically investigate and compare these three forms of supply chain integration between firms in the United States and three Pacific Rim countries.

TYPES OF SUPPLY CHAIN INTEGRATION

Intra-organizational Process Integration

The first form of supply chain integration involves the general trend from intra-organizational functional management to cross-functional process management (Hammer 1990; Shapiro, Rangan, and Sviokla 1992; Hammer and Champy 1993;). At its most basic level, intra-organizational process management recognizes that the different departments and functional areas within a firm should not act as functional "silos", but rather as part of a coordinated and integrated process. This is visually shown in the top two panels of Figure 1. For example, customer orders flow through numerous company departments, functions, and activities which should be designed as an integrated customer order fulfillment process (Lynagh and Poist 1984; Bowersox, Morash, and Daugherty 1988; Bowersox and Morash 1989; Shapiro, Rangan, and Sviokla 1992).

Conceptually, this means that intra-organizational customer demand requirements and supply capabilities must be aligned and balanced in order to create unified value for ultimate customers. Managerially, it means that special attention must be given to the interfaces and "handoffs" between functional areas such as procurement, production, logistics, marketing, and sales. For example, this is represented by the dotted lines in Panel B of Figure 1.

Some stage theories also predict that this intra-organizational process integration is a preliminary requirement for subsequent successful inter-organizational integration with suppliers and customers (Stevens 1990; Kanter 1994; Sabath 1995; Bowersox and Closs 1996). This prediction may recognize that external uncertainties and linkages with customers and suppliers must be intra-organizationally "absorbed" into the proper place in a firm's external organizational structure. This internal "absorption" matches environmental conditions and enables the firm to successfully engage in inter-organizational relations. This can be visually displayed by a comparison of Panel B in Figure 1 with visibly matching inter-organizational Panels C or D. Inter-organizational integration will be discussed next.

Inter-organizational Collaborative Closeness

A second form of supply chain integration relates to inter-organizational collaborative integration including strategic alliances (Ohmae 1989; Bowersox 1990; Grönroos 1990; Treacy and Wiersema 1995). Collaborative integration involves close and interactive long-term relationships with a firm's external customers, suppliers, and partners. The emphasis is on the behavioral, communicational, and interactive flows of the supply chain as shown in Panel C of Figure 1. As such, there is recognition by cooperating firms that the supply chain is part of the overall product offering and that they must act in a concerted way to assure value for final consumers. There is also an emphasis on using the supply chain as a proactive marketing weapon to achieve growth objectives. For example, some supply chain firms do marketing research on the needs of their customer's customers (Global Research Team 1995). There is an awareness that if their customer succeeds, then everyone in the supply chain will grow.

Conceptually, these integrative relationships may extend the boundaries of the firm to embrace materials and logistics service suppliers and customers such that exact boundaries between firms become blurred (Leifer and Delbecq 1978; Bowersox, Morash, and Daugherty 1988; Bowersox and Morash 1989). For example, some transportation and third-party companies manage the entire supply chain's inventory by means of collaborative interactions and computer transferred information (e.g., EDI). Such boundary expansions are reflected by dotted lines in Panel C of Figure 1. However again, Figure 1 is a simplification of collaborative integration since world-class firms are now attempting to integrate the activities and processes of five or more firms in the supply chain. Recent examples include collaborative forecasting, collaborative scheduling, or sharing capacity where all firms in the supply chain use the same demand forecast, schedule, or assets, respectively (Global Research Team 1995). This may create the basis for a core competency for the supply chain as a whole.

Although not previously tested empirically, descriptive strategy and logistics literature suggests that collaborative integration such as customer intimacy is especially important to support corporate strategies related to differentiation (Treacy and Wiersema 1995). Supply chain examples include special value-added services for downstream customers or logistical agility where service offerings are continuously tailored to unique and changing key customer requirements (Cooke 1995; Global Research Team 1995; Novack, Langley, and Rinehart 1995). These distinct offerings represent specific solutions directed at what individual customers want rather than general solutions reflecting what the market wants (Champa and Long 1989; Treacy and Wiersema 1995; Feitzinger and Lee 1997). As such, differentiation may become customer specific and may require supply chain collaborative integration to support such strategies. This perspective will be discussed next, and will be empirically tested in the present research.

Collaborative closeness means selling the customer not just a product or service but rather a total solution that includes on-going help, high levels of support, and interactive advisory services (Normann and Ramirez 1993; Treacy and Wiersema 1993, 1995; Greis and Kasarda 1997). For example, some

supply chains are now using co-location of employees or resident suppliers at the customer's premises. Firms following this strategic approach become experts on their customer's business and continuously cultivate the relationship. As "internal consultants" within their client's organization, they continually search laterally for additional opportunities to improve supply chain processes and to add value (Normann and Ramirez 1993; Treacy and Wiersema 1995). Rather than just meeting customer expectations, they try to stay ahead of these expectations by guiding the customer to appropriate change. In total, such proactive demand management attempts to go beyond the typical market offerings and outcomes of standardized variety, reactive responsiveness, and even mere satisfaction of existing customer expectations. Managerially delighting the customer means that the unexpected should gradually become the expected (Oliver, Rust, and Varki 1997).

Inter-organizational Operational Excellence

The third form of supply chain integration relates to operational excellence (Stevens 1990; Treacy and Wiersema 1993, 1995; Christopher 1994; Bowersox and Closs 1996). This inter-organizational operational focus also extends a process orientation to external customers and suppliers. However, the inter-organizational emphasis is on the physical, spatial, temporal, and economic nature of supply chain integration. This is visually shown in Panel D of Figure 1. It has been stated that "companies pursuing operational excellence are indefatigable in seeking ways to minimize costs, to eliminate intermediate production steps, to reduce transaction and other 'friction' costs, and to optimize business processes across functional and organizational boundaries" (Treacy and Wiersema 1993).

For customers, operational excellence means efficiently delivering reliable products and services at competitive prices and with minimal difficulty and inconvenience (Treacy and Wiersema 1995). For supply chain structure, it means that suppliers are frequently selected based primarily on cost and reliability while production systems are operated for efficiency and zero defects. In turn, information systems are designed primarily for performance appraisal and low cost transaction processing between supply chain members. The output emphasis of the supply chain is on "hassle-free" basic products and services that are standardized rather than customized (Global Research Team 1995).

The objective of supply chain operational excellence is usually to lead an industry in price, reliability, convenience, and speed (Treacy and Wiersema 1993, 1995; Morash, et al. 1996). This theory contends that an operational supply chain focus typically supports a strategy of total cost minimization which can be reflected in lower consumer prices and reductions in customer costs from optimal order fulfillment and channel time compression. As such, operational excellence may emphasize using the overall supply chain cost as a marketing weapon in order to retain existing downstream customers. For example, lean and flexible JIT manufacturing may serve as a partial substitute for previously mentioned collaborative and agile logistics. In essence, operational supply chain integration may best support a corporate strategy of total cost reduction and efficiency. This premise will be evaluated empirically in the present study.

Global Supply Chain Strategy and Structure

On an international basis, integrated global strategies also require inter-organizational supply chain integration. This implies that global strategies must fit with organizational structures (Chandler 1962; Hofstede 1980; Kikuchi 1994). It also implies that a firm's organizational structure must seamlessly match and mesh with that of suppliers, partners, and customers to achieve integration. At its most basic level, supply chain integration through operational excellence or collaborative closeness attempts to leverage the type of inter-organizational relationship for competitive advantage. In essence, the type of global relationship itself may provide synergy that can be used for strategic competitive advantage in the marketplace.

However, in the realm of global logistics and international supply chains, it is not clear whether different countries develop and employ these integrative relationships and supporting structures to the same extent. Possibly, the leveraging of relationships and the particular application of integrative value disciplines for competitive advantage may differ between regions or countries (Hofstede 1980; Kikuchi 1994). Different supply chain integrative approaches may also support different corporate market strategies of cost reduction or differentiation as part of the dominant value discipline. This question is inextricably tied to the current managerial dilemma of balancing supply and demand management such that supply chain strategy is consistent with corporate market strategy and the environment.

In summary, intra-organizational process integration, inter-organizational collaborative integration, and operational integration have been described in different strategy and logistics literature. However, questions remain as to whether firms follow one integrative discipline exclusively or if each form exists to varying degrees within firms. Some descriptive supply chain literature and theory also postulates stage models of incremental and cumulative development such as first achieving intra-organizational integration followed by inter-organizational integration (e.g., Stevens 1990; Gross and Kujawa 1992; Kanter 1994). Indeed, current managerial beliefs suggest that intra-organizational barriers are the primary impediment to achieving the full benefits of inter-organizational supply chain integration (Sabath 1995; Meachum 1996). The question of consistency or managerial focus between operational, tactical, and strategic integration levels also needs to be addressed (e.g., Hofer and Schendel 1978; Treacy and Wiersema 1993, 1995).

The next section will present the methodology and data sources used to address these research questions. This will be followed by the empirical results, conclusions, and implications for supply chain theory and managerial practice.

METHOD

To compare the supply chain integration strategies and practices of the United States, Japan, Korea, and Australia, a questionnaire was first developed by the research team, and then sent to approximately ten thousand firms in the United States and the Pacific Rim. To ensure a valid and reliable instrument, the research team first reviewed all relevant marketing and global literature for concept definitions, prior marketing scales, and existing models. Expert panels were also used to validate construct measures. The initial survey instrument was then individually field pretested for content validity and reliability with executives from numerous participating firms including foreign firms. Modifications were made based on these interviews. The research team's 16-member global advisory board also made recommendations and suggestions for improving the validity and reliability of the survey instrument.

To ensure that questionnaire translations into foreign languages were accurate, native speakers and subject experts were used to translate the questionnaires. As recommended by Douglas and Craig (1983), the questionnaires were then back-translated using different native speakers to check for consistency.

The survey measurement scales are shown at the bottom of each Table and are of the five point Likert-type scales. A number of questions asked respondents to evaluate the extent of change in use of specific practices compared to five years earlier. For example, "In the last five years, my firm has significantly increased centralization of decision making." Respondents were asked to use a "Strongly Disagree-Strongly Agree" scale in responding to these questions. Tests for measurement equivalence across cultures found no consistent pattern of cross-country equivalence bias in the use of these scales.

Samples

The United States sample consisted of firms from the Council of Logistics Management (CLM), a major national professional association that broadly represents firms from 13 major categories including manufacturers, wholesalers, retailers, service suppliers, etc. These firms are from many different industries, geographically represent all parts of the U.S., and are inclusive of most major U.S. companies. For each Pacific Rim country, the major analogous national logistics professional association was selected. To help identify these similar leading professional logistics associations, the global advisory board to the research team was used to achieve "multiple source informant" agreement. The associations selected have group and industry memberships similar to CLM, and are broadly representative of national coverage, channel position, and industry types. The countrywide mailing list rosters of these associations were also checked for comparability. However, these are not perfectly matched samples since different countries have their own competitive advantages despite being diversified economies. Virtually all of these association members have a major presence in their countries and represent most significant firms in their respective industries. (For a complete discussion, please see the CLM publication, Global Research Team at Michigan State University, *World Class Logistics: The Challenge of Managing Continuous Change*, referenced at the end).

The top-level executives of each company were identified by the respective professional associations. The questionnaires were then sent by each professional association to the top executives of their entire membership, along with the association's own letter of support.

The questionnaires were sent to 9,634 firms in the United States, Japan, Korea, and Australia. A total of 1,951 usable questionnaires were returned for an overall response rate of 20.1 percent in the Pacific Rim region and 20.4 percent in the United States. The sample sizes for each country are shown in the Tables. Statistical analyses of nonrespondents with respondents and of possible systematic country response patterns did not identify these as potential sources of survey bias.

To test for the possibility of covariates other than country sources of variation, on an aggregate questionnaire and regional basis, ANOVA was used to test differences between firms by size, region, industry, location of headquarters and channel position. No significant between group differences were found other than those attributable to country.

Using SAS for pairwise comparisons in this analysis, the Duncan, Scheffe, and Tukey options were specified. The results were consistent across the three techniques. The Duncan option was selected by the global research team's methodologists as the preferred ANOVA "means" choice within SAS, and was used for this analysis.

RESULTS

Inter-Organizational Operational Excellence

Table 1 shows the results for items related to customer and supplier inter-organizational integration with an operational excellence focus. All four countries are compared on operational supply chain integrative practices. In general, Japan is shown to presently have the greatest increase in emphasis on operational supply chain integration.

TABLE 1
INTER-ORGANIZATIONAL CUSTOMER AND SUPPLIER INTEGRATION: OPERATIONAL EXCELLENCE FOCUS

	US n=1223 Mean:	JAPAN n=324 Mean:	KOREA n=124 Mean:	AUS n=280 Mean:
OPERATIONAL SUPPLY CHAIN INTEGRATION				
1. Importance of Strategic Just-in-Time Production Systems[a]	2.04	1.63[1]	1.83	2.01
2. Importance of Strategic Supply Chain Process Reengineering[a]	2.01	1.59[2]	1.75	2.19
3. Importance of Operational Problem Recovery[a]	2.46	2.00[1]	2.36	2.27
4. Increased Standardization of Supply Chain Operations[b]	2.30	1.31[1]	2.67	2.99
5. Increased Simplification of Supply Chain Operations[b]	3.53	2.64[1]	3.29	3.10
6. Importance of Green Logistics (e.g., Recycling, etc.)[a]	2.44	2.06[1]	2.28	2.33
7. Importance of Reverse Logistics (e.g., Product Returns, etc.)[a]	3.04	2.74[1]	3.17	2.94

[a] LIKERT SCALE: (1) Very Important to (5) Not Important at All with a midpoint of (3).
[b] LIKERT SCALE: (1) Strongly Agree to (5) Strongly Disagree with a midpoint of (3).
All increased type questions were anchored relative to five years earlier.

[1] Japan is significantly different than the U.S., Korea, and Australia at $p \leq .05$.
[2] All means are significantly different at $p \leq .05$.

Specifically, Japan is significantly more likely to currently attach greater strategic importance to just-in-time (JIT) production systems and also to the currently popular concept of strategic supply chain process reengineering. These strategic JIT and reengineering practices received the second and third highest importance ratings from Japanese managers in Table 1, possibly underscoring their strategic importance for operational supply chain integration.

Japanese managers also presently attach significantly greater importance to operational problem recovery. They also report the greatest current increase in standardizing and simplifying supply chain operations. This standardization of supply chain operations received the strongest response rating in all of Table 1 (lowest mean). Standardization is also the highest range differentiator between countries in Table 1 (highest numerical difference), possibly highlighting its particular importance for efficient supply chain operational integration.

Finally, Japan currently attaches significantly greater importance to "green marketing" such as recycling and to reverse marketing such as product returns. In total, Japan is shown to currently place the greatest increased emphasis on operational supply chain integration when compared to the U.S., Australia, and Korea. Standardization of operations appears particularly supportive of increased supply chain operational integration.

Inter-organizational Collaborative Closeness

Table 2 shows the results for inter-organizational customer and supplier integration with a collaborative closeness focus. Again, all four countries are compared on customer and supplier collaborative integration and communications. In general, the U.S. and Australia are shown to have a significantly greater increase in collaborative integration with both customers and suppliers than Japan and Korea.

TABLE 2
INTER-ORGANIZATIONAL CUSTOMER AND SUPPLIER INTEGRATION: COLLABORATIVE CLOSENESS FOCUS

	US n=1223 Mean:	JAPAN n=324 Mean:	KOREA n=124 Mean:	AUS n=280 Mean:
COLLABORATIVE SUPPLY CHAIN INTEGRATION				
1. Customer Input Into Corporate Strategy[a,b]	2.55[1]	3.37	3.29	2.61[1]
2. Frequent Contacting of Customers by Logistics Managers[a,b]	2.00[1]	2.20	2.77	2.02[1]
3. Frequent Visiting of Key Customers by Senior-Level Logistical Executives[a,b]	2.66[1]	2.88	3.23	2.56[1]
4. Form Strategic Alliances With Customers[a,b]	1.98[1]	2.39	3.24	2.07[1]
5. Sharing Information is Crucial in Supplier Relationships[a,b]	1.63[1]	1.98	1.87	1.70[1]
6. Frequently Measure Suppliers' Performance[a,b]	1.85[1]	2.16	2.82	1.87[1]
7. Frequently Share Performance Results With Suppliers[a,b]	1.90[2]	2.34	2.93	2.13[2]
8. Form Strategic Alliances With Material Suppliers[a,b]	2.08[1]	2.53	3.28	2.05[1]

[a] LIKERT SCALE: (1) Strongly Agree to (5) Strongly Disagree with a midpoint of (3).
[b] Item worded as increases relative to five years earlier.

[1] The U.S. and Australia are significantly different from Japan and Korea at $p < .05$.
[2] The U.S. (or Australia) is significantly different than Japan, Korea, and Australia (or the U.S.) at $p < .05$.

Specifically, for customer collaborative integration and communications, both the U.S. and Australian respondents report significantly increased customer input into corporate strategy than do Japan and Korea. U.S. and Australian managers also report significantly increased customer contacts, and senior level executives more often visit key customers. Finally, strategic alliances with customers have increased to a greater extent for U.S. and Australian firms.

For supplier collaborative integration and communications, the U.S. and Australian respondents similarly report a significantly greater increase in collaborative integration and communications than Japan and Korea. Specifically, the U.S. and Australia are more likely to view information sharing as crucial to relationship building than Japan or Korea. Since this information sharing variable has the greatest importance ranking in all of Table 2, it may be particularly necessary for collaborative integration.

The U.S. and Australian managers report significantly increased measurement of suppliers' performance; and the sharing of these performance results with their suppliers. Finally, the U.S. and Australia report both significantly increased strategic alliances with suppliers and the sharing of information within these relationships.

In summary, considering both supplier and customer collaborative integration, the sharing of information received the strongest response in all of Table 2, as indicated by the lowest mean scores across all four countries. This strong information sharing may be indicative of its particular managerial relevance for supporting increased collaborative integration. Furthermore, the overall results show that U.S. and Australian managers report a greater increase in emphasis on collaborative integration and communications than do Japanese and Korean managers. This is found to be the case for both customer and supplier integration. It is also true at all levels of managerial decision making, but particularly at the strategic level of integration.

Intra-organizational Cross-Functional Integration

Table 3 compares the four countries on intra-organizational integrative practices across firm functions. Functional areas represent departments within a company such as marketing, logistics, or production. As mentioned in the Introduction, intra-organizational integration of different functions and departments is sometimes thought to be a preliminary step to subsequent inter-organizational integration.

In general, Korea is shown to place the significantly greatest increase in emphasis on intra-organizational integration. Specifically, Korean managers report the greatest increase in cross-functional integration of areas such as purchasing, logistics, production, marketing, and distribution compared to five years earlier. Similarly, Korea is shown to place the greatest increased emphasis on specialized job functions. Further, Korean firms report that intra-organizational coordination of decision making should be centralized. In total, Korean firms are found to currently place the greatest increase in emphasis on intra-organizational integration.

This finding is interesting since Korea is a newly industrialized nation. Some stage theories (e.g., Stevens 1990; Kanter 1994; Bowersox and Closs 1996) predict that intra-organizational integration must first be developed and stressed as a prior necessary condition before inter-organizational integration can be fully achieved. The present results support this prediction. However, for the specific cross-functional integration variable, the relatively high level of responses across all four countries in Table 3 implies that cross-functional process integration must receive continuous managerial attention in all countries. This latter finding supports current literature and theory on "reengineering the corporation" (e.g., Hammer 1990; Hammer and Champy 1993).

Total Cost Reduction Versus Differentiation Strategies

The bottom portion of Table 3 compares the four countries on a strategic focus of total cost reduction versus product/service differentiation. Interestingly, Japan followed by Korea are shown to place the greatest emphasis on total cost reduction as a strategic efficiency orientation. In contrast, for corporate strategy, the U.S. and Australia are more likely to stress differentiation.

Specifically, Table 3 shows that Japan followed by Korea places the greatest emphasis on strategic cost reduction. Japan and Korea also report the greatest increase in usage of information systems primarily for cost reduction. Similarly, Japan shows the greatest increase in the use of the currently emerging practice of activity based costing (ABC) for cost minimization.

In summary, Japan and to a lesser degree Korea place the greatest strategic and operational emphasis on total cost reduction. In turn, at a strategic level, the U.S. and Australia place the greatest emphasis on a differentiation focus. The question as to whether particular integration approaches of operational excellence or collaborative closeness support different cost and differentiation strategies will be addressed next.

Integration Approaches and Total Cost Versus Differentiation Strategies

Table 4 reports the correlation coefficients between individual operational integrative practices and the corporate market strategies of cost versus differentiation. Because of the large sample sizes, most correlations are significant. Therefore, only correlations above .1 are reported in Table 4 and only for the two largest economies.

TABLE 3
INTRA-ORGANIZATIONAL INTEGRATION: CROSS-FUNCTIONAL PROCESS FOCUS

	US n=1223 Mean:	JAPAN n=324 Mean:	KOREA n=124 Mean:	AUS n=280 Mean:
A. CROSS-FUNCTIONAL INTEGRATION:				
1. Cross-functional Integration Between Purchasing, Logistics, Production, Marketing, and Distribution has Increased.[a]	1.86	1.94	1.65[2]	1.91
2. Organization of Job Functions is More Specialized[a]	3.91	2.20	2.02[2]	2.24
3. Intra-Organizational Coordination of Decision-Making Should Be Centralized[a]	2.67	2.81	2.45[1]	2.64
B. STRATEGIC FOCUS OF COST REDUCTION VERSUS DIFFERENTIATION				
4. Focus of Corporate Strategy is on Cost Reduction(1) versus Differentiation(5)[b]	3.46	2.85[3]	3.04[3]	3.73
5. Use of Information Systems Primarily for Cost Reduction Has Increased[a]	2.82	2.41[3]	2.19[3]	2.64
6. Use of Activity Based Costing (ABC) for Cost Reduction Has Increased[a]	2.98	2.36[3]	3.30[3]	2.99

[a] LIKERT SCALE: (1) Strongly Agree to (5) Strongly Disagree with a midpoint of (3). All increased type questions were anchored relative to five years earlier.
[b] SCALE: (1)Cost to (5)Differentiation with a midpoint of (3).

[1] Korea is significantly different from the U.S. and Japan at $p \leq .05$.
[2] Korea is significantly different from the U.S., Japan, and Australia at $p \leq .05$.
[3] Japan (or Korea) is significantly different from the U.S. and Australia at $p \leq .05$.

TABLE 4
PRODUCT MOMENT CORRELATIONS BETWEEN SUPPLY CHAIN OPERATIONAL EXCELLENCE AND CORPORATE COST REDUCTION VERSUS DIFFERENTIATION STRATEGIES

	Correlations* with Corporate Strategies:			
	U.S.		Japan	
	Cost	Diff.	Cost	Diff.
OPERATIONAL SUPPLY CHAIN INTEGRATION				
1. Importance of Strategic Supply Chain Process Reengineering	.343[1]	.167[1]	.471[1]	.196[2]
2. Importance of Operational Problem Recovery	.305[1]	.166[1]	.274[1]	.173[3]
3. Increased Standardization of Supply Chain Operations	.113[2]	NS	.268[1]	NS
4. Increased Simplification of Supply Chain Operations	NS	NS	.351[1]	.238[2]
5. Increased Performance Measurement Capabilities	.157[1]	.200[1]	.415[1]	.213[1]
6. Increased Information Systems Capability	.263[1]	.180[1]	.419[1]	.198[2]
7. Importance of Green Logistics (e.g., Recycling, etc.)[a]	NS	.138[1]	.204[2]	.219[1]
8. Importance of Reverse Logistics (e.g., Product Returns, etc.)[a]	.223[1]	.214[1]	.274[1]	.172[3]

* Correlations are significantly different from zero at [1]$p \leq .0001$; [2]$p \leq .001$; [3]$p \leq .01$, [4]$p \leq .05$
All increased type questions were anchored relative to five years earlier.

NS means correlation is not significant or correlation is less than .1

For both Japan and the U.S., the operational integrative practices are most strongly related to the overall strategy of total cost reduction. Furthermore, the correlations are highest for Japan. This latter finding is not surprising since it has already been established that Japanese firms are more likely to stress a cost reduction strategy.

Table 5 shows the correlation coefficients between individual collaborative closeness practices and the market strategies of cost versus differentiation. For the U.S., all the correlations are clearly strongest for the relationships with the differentiation strategy.

For Japan, there is some tendency for the correlations to be stronger with the differentiation strategy but not as clear-cut as with the U.S. Again, one interpretation is the previous finding that Japanese firms are less likely to emphasize a pure differentiation strategy. Therefore, the relationships with differentiation wouldn't be as strong as for the U.S. Thus, the results appear to support the viewpoint that a collaborative closeness approach to supply chain integration is more associated with a market strategy of differentiation. In contrast, operational excellence is more associated with a market strategy of total cost reduction.

TABLE 5
PRODUCT MOMENT CORRELATIONS BETWEEN SUPPLY CHAIN COLLABORATIVE CLOSENESS AND CORPORATE COST VERSUS DIFFERENTIATION STRATEGIES

	Correlations* with Corporate Strategies:			
	U.S.		Japan	
	Cost	Diff.	Cost	Diff.
A. CUSTOMER COLLABORATIVE CLOSENESS				
1. Customer Input Into Corporate Strategy[a]	.185[1]	.343[1]	.210[1]	.262[1]
2. Frequent Contacting of Customers by Logistics Managers[a]	NS	.210[1]	.201[2]	.267[1]
3. Frequent Visiting of Key Customers by Senior-Level Logistical Executives[a]	NS	.222[1]	.207[2]	.193[2]
4. Form Strategic Alliances with Customers[a]	NS	.316[1]	.107[4]	.169[3]
5. Increased Customer Involvement in Strategic Alliances	NS	.278[1]	NS	.227[1]
B. SUPPLIER COLLABORATIVE CLOSENESS				
6. Sharing Information is Crucial in Supplier Relationships	NS	.141[1]	.215[1]	.217[1]
7. Frequently Measure Suppliers' Performance[a]	.130[2]	.198[1]	.332[1]	.140[3]
8. Frequently Share Performance Results with Suppliers[a]	NS	.285[1]	.226[1]	.194[2]
9. Form Strategic Alliances with Material Suppliers[a]	NS	.204[1]	NS	.189[2]
10. Form Strategic Alliances with Logistics Service Suppliers[a]	.148[1]	.175[1]	NS	.123[4]

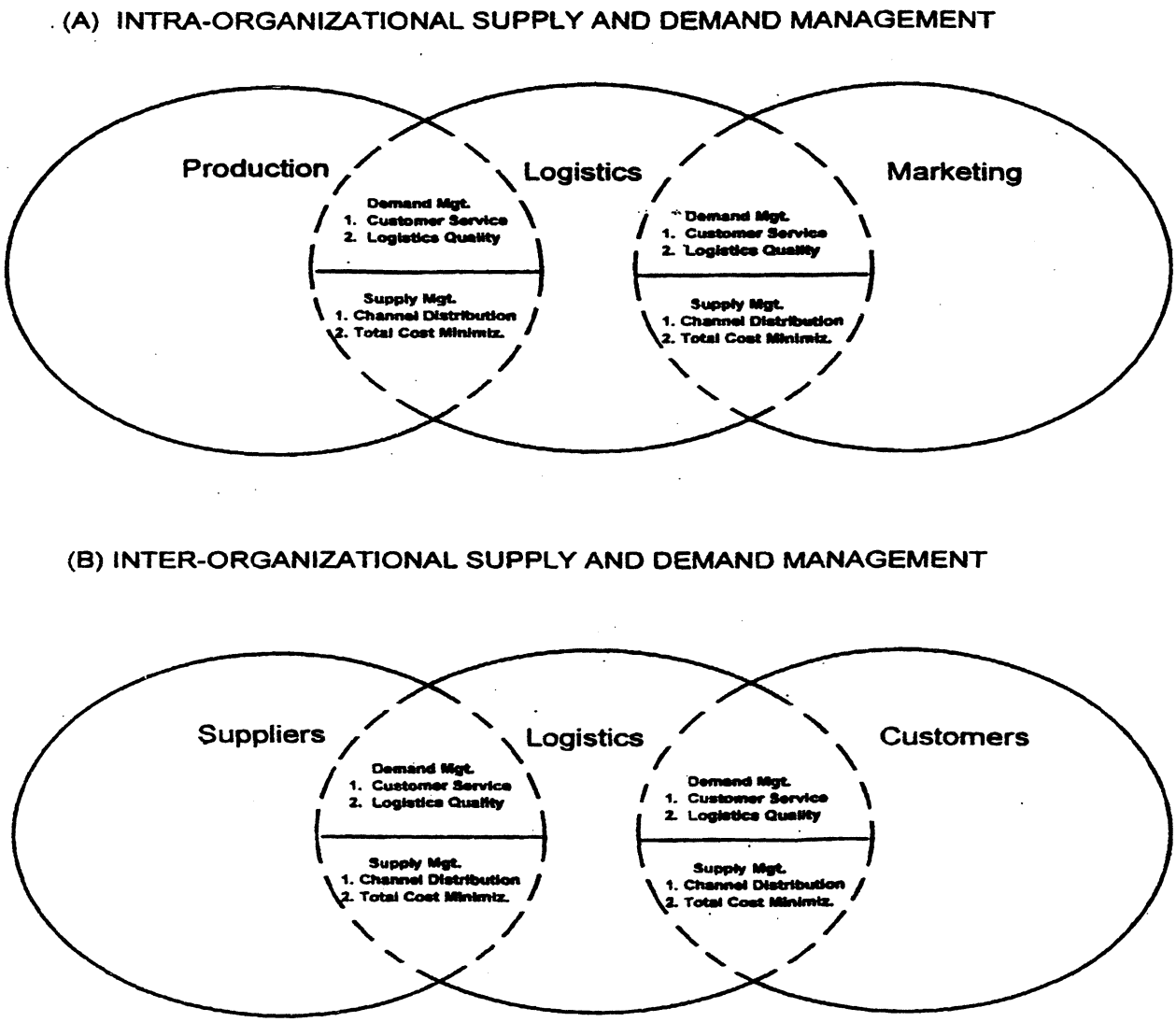
* Correlations are significantly different from zero at [1]$p \leq .0001$; [2]$p \leq .001$; [3]$p \leq .01$, [4]$p \leq .05$
[a] Item worded as increases relative to five years earlier.

NS means correlation is not significant or correlation is less than .1

CONCLUSIONS AND IMPLICATIONS

Recent competitive strategy literature has highlighted the necessity of supply chains competing based upon a clearly articulated and focused value discipline (Global Research Team 1995; Treacy and Wiersema 1993, 1995). In addition to the competitive market strategy, a value discipline includes both a related value commitment to customers (e.g., minimum total cost, best total solution, best product, etc.) and the enabling supply chain structure intended to deliver that value (Treacy and Wiersema 1995; Morash, et al.1996). Two separate and major integrative value disciplines include supply chain operational excellence versus collaborative closeness. Simply put, an efficient supply chain is typically one of operational excellence

FIGURE 3
INTRA-ORGANIZATIONAL AND INTER-ORGANIZATIONAL SUPPLY AND DEMAND MANAGEMENT



while a responsive supply chain is usually one of collaborative closeness (Morash,et al. 1996; Fisher 1997).

Each supply chain type is thought to have unique integrative practices that should also be consistent across the supply chain. For example, the present study found that operational excellence is particularly characterized by just-in-time (JIT) production systems, process reengineering, and standardization of supply chain operations. In turn, collaborative closeness is especially indicative of firms sharing information with both customers and suppliers and forming strategic alliances with them. As predicted in management literature, the proper choice of a supply chain value discipline "shapes everything a company does, colors the whole organization, and defines the very nature of a company" (Treacy and Wiersema 1995). Consequently, the actual choice of a supply chain discipline necessitates a thorough strategic review of value attributes customers want, the supply chain culture and capabilities to deliver that value, competitors' capabilities on these value attributes, and the size and profitability of potential market segments.

A competitive market strategy of total cost reduction is thought to be best supported by an operationally excellent supply chain while differentiation is best supported by collaborative closeness with customers and partners (Treacy and Wiersema 1995; Morash, et al. 1996, 1997). The present study did find stronger statistical relationships between each corporate market strategy and the expected supply chain integrative approach. However, this finding does not necessarily imply a total mutual exclusivity between operational excellence and collaborative integration. Although managerial literature recommends that a supply chain be focused on one value discipline, it also recommends meeting minimum industry standards on the other value discipline (Treacy and Wiersema 1993, 1995). The present research did find that while firms tend to specialize on one discipline, they also exhibit lower mean levels of performance in other areas as well.

Nevertheless, the lack of supply chain focus and consistency is a real danger and can occur in several ways. First, there can be a mismatch between the market strategy and the supply chain integrative approach; e.g., differentiation supported primarily by operational integration or cost reduction supported mainly by collaborative integration. Some of this study's lower correlational results between corporate strategy and supply chain practices could be interpreted in this manner, although these marginally significant correlation coefficients are generally at much lower levels than for matched relationships. A second type of inconsistency relates to strong mismatches across supply chain practices. While this study found significant evidence for consistency across supply chain practices (e.g., at the strategic, tactical, and operational levels), the results are not completely uniform which suggests that some firms may have mismatches.

It is not difficult for a supply chain to drift away from its primary value discipline. For example, the same product such as automobiles can be sold either on a cost basis or a differentiated basis (Fisher 1997). There may be a tendency to be "all things to all people" rather than constantly improving on practices for the supply chain's primary discipline. Employees may also be overzealous in trying to improve a secondary value discipline practice. All of these errors can waste time, money, and other resources; dilute the supply chain's image, and send mixed signals to key customers. Thus, the greatest challenge for leadership is "to sustain the focus, to drive the strategy relentlessly through the organization, and to develop internal consistency" (Treacy and Wiersema 1993).

Figure 3 can be used to explain some of the additional country related findings and to suggest future areas for research. This study's findings indicate that countries differ in their relative application of supply chain integrative approaches. Initially, it appears that newly developed countries (e.g., Korea) stress intra-organizational integration such as cross-functional process integration (top panel of Figure 3) over inter-organizational integration (bottom panel). This finding is consistent with stage theories which predict greater initial attention and development to intra-organizational integration before inter-organizational integration (e.g., Stevens 1990; Kanter 1994; Bowersox and Closs 1996).

However, judging by the survey response levels on intra-organizational integration, developed countries such as Japan and the U.S. must still pay attention to internal cross-functional integration. This ensures that external supply chain requirements are matched and absorbed to their proper intra-organizational location which creates consistency and "fit." A logistical customer example is segmenting and targeting markets precisely, and then tailoring offerings to exactly match the demand. Some respondents to this study's subsequent in-depth interviews also stated that some contemporaneous attention must be given to both intra-organizational and inter-organizational integration to ensure that they will both "fit" together in the future. Further, current management practice suggests that intra-organizational barriers continue to be the major impediment to fully achieving the benefits of inter-organizational supply chain integration (Sabath 1995, Meachum 1996). Since a supply chain "touches" all functions of an organization, it can only be as strong as the weakest link. Normatively speaking, this is why the top panel in Figure 3 should be a mirror image of the bottom panel except for the corresponding supply chain participants.

Beyond minimum thresholds on supply chain requirements, a country's firms are free to choose a particular supply chain approach based on whether they seek a competitive advantage primarily through cost or differentiation. Related to this, Figure 3 also shows the boundaries between demand management and supply management which is a current management concern and a promising area for future research. For example, the supply and

demand balance can reflect an increased demand focus on greater customer benefits and value added services at higher cost, or an increased supply focus with less benefits but at lower cost. If firms seek competitive advantages primarily through collaborative closeness, then the horizontal boundaries in Figure 3 will likely be lowered to provide a greater surface area and managerial attention to demand management. This demand management reflects a supply chain's value commitment to customers to deliver a combination of benefits and demand-oriented attributes such as greater customer service, quality, flexibility, customization, and special requests. This implies a greater managerial focus and commitment to demand management for differentiation purposes. In turn, if firms pursue strategic advantages primarily through operational excellence, then the horizontal boundaries will likely be raised in Figure 3 to provide a greater surface area and managerial emphasis for supply management. This supply management emphasis reflects a supply chain's commitment to deliver customers a combination of attributes related to price, reliability, availability, convenience, and speed. This supply management focus should properly reflect the total cost of ownership in Figure 3 since total cost for a customer includes price, less-than-perfect product reliability, and costs from logistical delays and service failures. Again, what is being stressed here is a balance or boundary between supply and demand management rather than mutual exclusivity. All firms must at least meet minimum industry standards on their non-core attributes to remain order qualified.

Additional research also needs to be directed at confirming this study's supply chain implications in other settings including other countries and regions. Relationships between each supply chain integration approach and different types of cost and differentiation strategies also need to be investigated. This would necessitate more detailed measurement of expanded typologies of marketing strategies, as well as detailed stages of country development. The effects of different integration approaches including their supporting capabilities on firm success also need to be addressed. Similarly, the impact on corporate financial performance of interactions between different supply chain integration approaches and different marketing/corporate strategies should also be researched. In conclusion, it is hoped that the present research makes an initial contribution towards a better understanding of managerial supply chain practices by testing and developing supply chain theory in the global arena.

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AUTHOR BIOGRAPHY

Edward A. Morash (Ph.D., University of Maryland) is a professor of Marketing and Supply Chain Management in the Eli Broad Graduate School of Management at Michigan State University. He has held management and marketing positions in several of the supply chain and service industries. His teaching and research focus on service and organizational issues, quality, logistics, and supply chain management. He has published over 100 refereed articles in marketing, logistics, and transportation. He has received numerous awards for his teaching and research and is on the editorial review and policy boards of several journals. He is co-author of the award-winning book "World Class Logistics: The Challenge of Managing Continuous Change."

AUTHOR BIOGRAPHY

Steven Clinton (Ph.D., Michigan State University) is an assistant professor of marketing at the University of New Orleans. He has management experience in import/export distribution and warehousing. His teaching and research interests include international logistics, logistics strategy and performance, international marketing, customer service and satisfaction, and information utilization. He has published work in the *Journal of Business Logistics, Transportation Journal, International Journal of Physical Distribution and Logistics Management, Production and Inventory Management Journal,* and *International Marketing Review.* He is co-author of the award-winning book "World Class Logistics: The Challenge of Managing Continuous Change."