

9-1-1996

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Recommended Citation

Min, Hokey & Galle, William. (1996). An examination of international logistics practices of U.S. logistics professionals. *Journal of Transportation Management*, 8(1), 43-53. doi: 10.22237/jotm/841536360

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AN EXAMINATION OF INTERNATIONAL LOGISTICS PRACTICES OF U.S. LOGISTICS PROFESSIONALS

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Over the last two decades, the growing interdependence of the world economy and the subsequent increase in foreign trade volume have contributed to the considerable expansion of global logistics activities. As global logistics operations became almost a daily routine for many logistics professionals, they have begun to search for adaptive logistics strategies to improve global competitiveness. To assist U.S. logistics professionals in fostering such strategies, this study empirically examines how the globalization of business has influenced the way U.S. logistics professionals adapt themselves to a dynamic international environment fraught with countless risks and complexities.

The world of the late 20th century is often characterized by the globalization of business activities. In the present era of globalization, multinational firms (MNFs) must re-formulate and re-orient their strategies to cope with the dynamics of a changing global environment. Otherwise, they may suffer from unexpected barriers or impediments stemming from differences in culture, business custom, language, tastes and preferences, laws, and ethics. These barriers may include unnecessary distribution bottlenecks at the importing/exporting ports, unwanted shipping damages during international transit, unacceptable delays at the customs office, and unprovoked miscommunication among shippers, carriers, and third-party logisticians.

To obviate these barriers, logistics professionals should develop innovative, flexible logistics strategies which help them adapt to the changing international environment and to respond effectively to their foreign customers' needs. Without formulating such strategies, they cannot gain the full benefits of international logistics. As such, the objectives of this study are to assist logistics professionals with the identification of

the main issues of international logistics and the formulation of effective international logistics strategies for their MNFs. First, the study investigates specific international logistics practices of firms engaged in international trade. Second, it explores the key factors affecting the movement of goods in international trade. To accomplish the study objectives, the authors have researched the prevalent practices of 63 MNFs located in the United States.

STUDY METHODOLOGY

A special questionnaire was developed to determine the ways U.S. logistics professionals have dealt with international distribution operations. The questionnaire (see Appendix) addresses the respondents' company profile, international shipping practices, international modal choice, international freight term negotiation process, overriding factors in international port selection and packaging, and important barriers to overcome in international logistics.

The questionnaire was mailed in April 1994 to approximately 800 U.S. logistics professionals randomly selected from the recent membership directory

of the Council of Logistics Management (CLM). Since we did not know ahead of time which respondents were genuinely involved in global trade, only those whose firms were actively engaged in international logistics were asked to respond. From this group, 63 responded. Although this response rate (7.9%) is relatively low, the low survey response rate is not unusual in the empirical studies¹ dealing with international logistics/sourcing issues. Another reason for a low response rate may be a lack of willingness of CLM members to respond to the high number of mail surveys that they receive each year. To extract more meaningful statistical information from this small sample, a test for non-response bias involving comparisons of "early" (e.g., responses received within three weeks of the initial mailing) and "late" respondents in terms of item responses could have been performed. However, only a very small number of late responses that we received precluded such a test. Thus, some caution should be exercised in generalizing our survey results due to a potential non-response bias.

Represented in our sample are many types and sizes of multinational firms. As expected, a majority (61.9%) of the responding firms are in the manufacturing sector (33.3% in consumer goods and 28.6% in industrial goods). Other major sectors include transportation and warehousing (12.7%), wholesale and retail trade (7.9%), and wholesale trade (7.9%). The remaining sectors are retail trade (4.8%) and other service sectors. Most of the sample firms (93.7%) had more than 100 employees; 72 percent had more than 500 employees. Ninety-five percent of the responding firms employed more than three logistics professionals. Thirty-five percent employed 5 to 20 logistics professionals, 7 percent had between 20 and 50 logistics professionals, and 46 percent employed fifty or more. Annual sales volumes of the most sample firms (95.2%) ranged from \$ 20 million to over \$ 1 billion. The majority were in the \$ 100 million to over \$ 1 billion range (74.2%). Finally, about three-fourths of the responding firms (75.4%)

indicated that at least 5 percent of their firm's 1993 total sales was overseas.

These descriptive statistics indicate it is likely that most firms involved in international logistics will be large manufacturing firms, although the sample was represented by others including service sectors. This characterization is partially due to the fact that less expensive and perhaps better quality manufacturing parts and materials are often available from overseas sources; consequently, logisticians from these manufacturing firms are more likely to engage in shipping these parts and materials from overseas counterparts. As a result, the sample characteristics may disproportionately reflect the practices of large manufacturing firms and may not be completely generalizable to other industry groups. Nevertheless, a series of *t*-tests were performed to examine whether the international logistics activities of small firms are different from that of their large counterparts. A series of *t*-tests show that mean responses of the two groups are almost identical with the exception of modal and port selection practices: (1) small firms in our sample are less concerned about geographic coverage of transportation mode in selecting the mode than are the large firms and (2) small and large firm respondents did not agree on the perceived importance of inland modal transfer in choosing the international port. To obtain other statistical information from this sample, the authors coded and analyzed all the survey data using the Statistical Package for Social Scientists.²

INTERNATIONAL SHIPPING PRACTICES AND MODAL SELECTION

Generally speaking, international shipping requires more handling and transfers than domestic shipping as the cargoes pass through ports, bonded warehouses, free trade zones, and customs offices. It also usually entails lengthy transit distances which require better protection of cargoes. To investigate how these inherent characteristics change the ways in which an international transportation mode is selected, we asked respondents which determinants are most critical to

transportation modal selection in a global setting and how the importance of such determinants affects international freight term negotiation. Respondents identified transportation cost, average transit time, and transit time variability as the three most important attributes. Thus there appears to be no dramatic difference in the modal selection decision between domestic and international shipments.³

Bender⁴ noted that international transportation cost generally represents a much higher fraction of merchandise value than is the case in domestic transportation owing to longer distances involved and frequent modal transfers. Consequently, tight control of transportation cost is crucial for competitively serv-

ing world-wide markets because high transportation cost may negate other potential cost savings (e.g., cheaper labor or material cost) available through international trade. On the other hand, survey respondents identified speed as the second most important element affecting the modal selection decision, because a slow mode prolongs already lengthy cross-border movement, thereby increasing in-transit inventory carrying cost and the risk of cargo damage during the transit. Although transportation cost and speed are two primary concerns, respondents reported that consistent delivery service is also crucial for international modal selection, especially with the growing adaption of Just-In-Time (JIT) logistics principles.

TABLE 1
Determinants for
International Transportation Modal Selection

Factors	Degree of Importance, on Average	Rank
Transportation cost	1.690 (0.654)	1
Average transit time	1.702 (0.706)	2
Transit time variability	2.036 (0.860)	3
Convenient schedules	2.107 (0.824)	4
Geographic coverage	2.125 (1.010)	5
Shipment size	2.161 (1.092)	6
Cargo damage risk	2.589 (1.005)	7
Type of cargo being shipped	2.839 (1.092)	8
Insurance coverage	3.089 (1.032)	9
Types of cargo packages	3.089 (1.049)	10

Note: Numbers in parentheses represent standard deviations.

Scale for the Degree of Importance

- 1 = Extremely important
- 2 = Somewhat important
- 3 = Neither important nor unimportant
- 4 = Somewhat unimportant
- 5 = Not at all important

Also, this finding is consistent with the result suggesting that the two most important factors affecting international freight term negotiation are on-time delivery and freight rate (see Table 2). In other words, international freight term negotiation often focuses on the assurance that cargoes will arrive on time at the right cost.

In addition to the selection of international transportation mode, international shipment is accompanied by many complex tasks such as overwhelming paperwork requirements, various customs procedures, and foreign government restrictions. To effectively handle such complex tasks, a large number of firms often utilize the services of foreign intermediaries and import/export specialists.

With this in mind, respondents were asked to indicate who primarily assumes international cargo booking

responsibility. Similar to the most recent survey result on the use of third-party logistics services,⁵ a majority (71.9 %) of the respondents said they frequently use the services of third-party logisticians including foreign freight forwarders, brokers, non-vessel owning common carriers (NOVCCs), and shippers associations. As shown in Table 3, the most commonly used third party logistician turned out to be a foreign freight forwarder. This finding coincides with earlier reports that nearly every international company utilized the service of a foreign freight forwarder.⁶ The popularity of freight forwarders may be due to the fact that they can provide a variety of export shipping services such as necessary vessel-space booking, shipment consolidation, export documentation, legal counselling, and export packaging.⁷

TABLE 2
Determinants for
International Freight Term Negotiation

Agenda	Degree of Importance, on Average	Rank
On-time delivery	1.309 (0.540)	1
Freight rate	1.482 (0.660)	2
Mode of transportation	1.964 (0.744)	3
Shipment tracing	2.073 (0.813)	4
Containerization	2.127 (0.944)	5
Rate revisions	2.473 (0.813)	6
Damage claims liability and handling	2.500 (0.986)	7
Insurance coverage	2.945 (1.044)	8

Note: Numbers in parentheses represent standard deviations.

Scale for the Degree of Importance

- 1 = Extremely important
- 2 = Somewhat important
- 3 = Neither important nor unimportant
- 4 = Somewhat unimportant
- 5 = Not at all important

TABLE 3

International Cargo Booking Responsibility		
Responsible Party	Percentage of Respondents	Rank
Foreign freight forwarder	28.9%	1
Shippers themselves	28.1%	2
Broker	22.3%	3
Non-vessel owning common carriers	16.5%	4
Shippers association	4.1%	5

Typical Forms of International Intermodal Services		
Form	Percentage of Respondents	Rank
Landbridge	50.7%	1
Minibrige	31.3%	2
Microbridge	17.9%	3

In an effort to shorten transit time, any logistics managers involved in international shipping also consider substituting intermodal routes for all-water routes. For example, with the emergence of point-to-point freight rate quotes, the landbridge alternatives across Canada, U.S. and Mexico can bypass the Panama Canal and subsequently prevent delays and tolls imposed by the Panama Canal. Considering such convenience of a landbridge, the popularity of this alternative among the respondents is understandable.

OBSTACLES TO INTERNATIONAL LOGISTICS

While international logistics activities can offer a variety of opportunities, they also can pose a number of problems stemming from additional documentation requirements, foreign government regulations, trade/non-trade barriers, lengthy geographical distances, cultural differences and so forth. To identify the significance of such problems, respondents were asked to rate the seriousness of potential logistical problems involving export/import transportation on a Likert scale ranging from 1 (very serious) to 5 (no problem at all). The results, which are summarized in Table 4, indicate that the most serious obstacle to effective international logistics is documentation requirements. As a matter of fact, Davies⁸ noted that,

compared with domestic logistics, international logistics generally requires higher amounts of data for complete documentation, and subsequently, documentation cost is much higher. For example, the average cost of processing a single set of documents for a cross-border shipment of goods in 1982 was estimated to be \$395.⁹ Additionally, despite the continued effort to simplify documentation requirements, the number of documents ranging from 10 to over 100 are usually required for an export shipment.¹⁰ To further alleviate documentation problems, for example, 18% of the top 100 British firms have recently installed the software called "Exportmaster" that aimed to integrate and automate the necessary documentation procedures involving the entire export transaction cycle.¹¹

Other serious problems include miscommunication, lengthy transit times, foreign government's regulations, and customs barriers. Despite great advances in today's communication technology, respondents reported serious difficulty in communicating with foreign trade partners because of differences in languages, business customs, communication devices, and time zones. Lengthy transit times created by distant cross-border movement extend lead times, thereby either reducing customer

TABLE 4
Major Obstacles to
Effective International Logistics

Variable	Degree of Seriousness, on Average	Rank
Documentation requirements	1.814 (0.973)	1
Miscommunication	2.052 (0.981)	2
Lengthy transit times	2.096 (0.864)	3
Foreign government's regulation	2.123 (1.001)	4
Customs barriers	2.241 (0.885)	5
Loading/unloading delays at foreign ports	2.684 (1.003)	6
EDI incompatibility	2.729 (1.064)	7
Damage claim disputes	2.741 (0.134)	8
Cultural differences	2.793 (1.120)	9
Modal incompatibility	2.911 (1.049)	10
Difficulty in freight rate negotiations	3.000 (0.955)	11
Global outsourcing	3.071 (0.988)	12
Cargo insurance arrangements	3.246 (0.912)	13

Note: Numbers in parentheses represent standard deviations of scales.

Scale for the Degree of Seriousness

- 1 = Very serious
- 2 = Somewhat serious
- 3 = Neither serious nor trivial
- 4 = Somewhat trivial
- 5 = No problem at all

responsiveness or increasing in-transit inventory carrying costs. Government regulations of other nations can also pose serious logistical problems, because such regulations often restrict the free flow of certain commodities. For instance, the Central Planning Commission and the National Ministry of Commerce in China used to limit the distribution of tightly-controlled goods such as cotton garments, petroleum, and cooking oils to other countries.¹² Although the wider acceptance of the General Agreement on Trade and Tariffs (GATT) may have alleviated customs barriers, the respondents still listed customs barriers as a somewhat serious obstacle. The rationale may be that customs procedures require time-consuming and expensive inspection of imported goods at the time of their entry which, in turn, can delay local shipment of imported goods.

INTERNATIONAL PORT SELECTION

Since selecting the wrong importing/exporting port can add extra time, risk, and expense to a global shipment's overall cost, port selection is one of the most important decisions in the international logistics arena.¹³ In particular, ports play a critical role in the success of international intermodal shipments, because they represent a convergence of intermodal interests.¹⁴ Table 5 shows the results of our survey on the factors affecting shippers' selection and evaluation of international port facilities. The respondents indicate that easy access to inland modal transfer is most important for selecting international ports. Since many ports serve as interchange points for international intermodal transfers, the ports should provide easy access for inland transportation modes such as barges, steamships, motor carriers, and rails. Otherwise, intermodal exchange delays and interruptions at the

TABLE 5
Key Factors that Affect International Port Selection

Factors	Degree of Importance, on Average	Rank
Easy access to inland modal transfer	1.889 (0.833)	1
Convenient pickup/delivery schedules	1.927 (0.920)	2
Faster loading/unloading services	2.145 (0.911)	3
Low freight handling charges	2.218 (0.994)	4
Cargo damage/loss protection	2.611 (1.036)	5
Special equipment availability	3.056 (1.265)	6
Facilities for large/odd-sized freight	3.685 (1.043)	7

Note: Numbers in parentheses represent standard deviations of scales.

Scale for the Degree of Importance

- 1 = Extremely important
- 2 = Somewhat important
- 3 = Neither important nor unimportant
- 4 = Somewhat unimportant
- 5 = Not at all important

ports can further increase transit times and cargo handling costs. As a matter of fact, Talley¹⁵ observed that a good choice of the port could lower logistics costs incurred by shipping lines and inland carriers in ports. Nevertheless, most U.S. ports still are not well-equipped to provide rapid sea-surface or air-surface transfers. In particular, most U.S. ports were reported lacking direct vessel-rail transfer facilities, because rail yards were often located outside the port areas and subsequently rail lines cannot get right-of-way into the ports.¹⁶ More recently, however, under the Intermodal Surface Transportation Act (ISTEA), some U.S. ports such as the Port of Oakland and some railroads such as the Southern Pacific Railroad and the Union Pacific Railroad have paved the way for the construction of Joint Intermodal Terminals which would lead the railroad to gain near-dock access to the port.¹⁷

Other factors perceived to be important are the convenience of pickup/delivery schedules and the speed of loading/unloading services, both of which greatly affect overall door-to-door transit times. Factors such as low freight handling charges and cargo damage/loss protection also received attention from the

respondents due to their impact on the overall international logistics cost. On the other hand, the least important port selection factors include special equipment availability and facilities for large/odd-sized freight. That is to say, congruent with Murphy and Daley's study,¹⁸ our respondents were less concerned about the provision of mere physical amenities in selecting the proper international port. This result, however, is contradictory to the similar study conducted earlier by Murphy et al.¹⁹ indicating that equipment availability was most important in port selection.

DETERMINANTS OF INTERNATIONAL PACKAGING

In contrast with domestic shipping, international shipping often poses greater risks of cargo damage. The potential causes of such risks include frequent weather changes, rough rides during long overseas transit, mishandling during frequent cargo transfers, and customs inspection for contraband. To make matters worse, the resolution of disputes over cargo damage may not be easily found. This is especially

true when the two parties involved in the damage arbitration are of different nationalities and consequently are operating under different national laws and jurisdiction.²⁰ Our current survey also indicates that cargo damage claim disputes are one of the important hurdles for international logistics (see Table 4). Considering the seriousness of cargo damage risk in international shipping, a key to successful international shipping is to develop effective packaging strategies that may prevent or alleviate the potential risk of cargo damage and pilferage. Furthermore, the degree/type of packaging affects the transportation modal choice and the effectiveness of cargo handling. For example, light-weight packaging is ideal for containerized shipments, whilst odd-shaped packages require additional handling arrangements and the subsequent freight surcharge.

With this in mind, each respondent was asked to rate the importance of attributes that may lead to effective international packaging on a Likert scale ranging from 1 (extremely important) to 5 (not at all important). The mean responses along with their standard deviations are presented in Table 6.

As Table 6 shows, the respondents replied that the four most important attributes are resiliency (prevention of handling damage), dimensions for the best use of space, weather protection, and package material cost. Our findings indicating the importance of resiliency to distribution packaging is consistent with two earlier reports on packaging design.²¹ Perhaps the importance of handling damage protection stems from both the shipper's and the carrier's concern that international shipments may be mishandled in break-bulk operations at inland modal exchange points, even if they are containerized. Dimensions for the best use of space can be the important packaging issue in a global setting, because cube utilization through reduced package size can help reduce overall logistics cost including transportation cost, handling cost, and storage cost. Considering that international consignments can be easily exposed to excessive heat and moisture resulting from sudden

climate changes during the cross-continental movement, the importance of weather protection to international packaging is understandable. Package material cost also can be a concern of international shippers due to its contribution to overall logistics cost. This is why more flexible but less expensive film-based packaging is gaining popularity among international shippers.

On the other hand, it is interesting to note that international shippers still show a lack of concern over the environmental friendliness of packaging, despite the fact that an increasing number of foreign countries such as Canada, Germany, Denmark, and Japan enacted tougher legislation to reduce packaging waste.²² However, as the Green Movement in Western Europe and Japan has become reality, the international logistics community will soon recognize the seriousness of packaging to environmental protection.

FINDINGS AND IMPLICATIONS

With the growing interdependence of nations and their economies, global logistics has become a necessity, requiring more adaptable logistics strategies that can deal with far more complex documentation, shipping, handling, and packaging procedures. Nevertheless, no literature to date has empirically investigated the prevalence of international modal, port, and package selection strategies employed by U.S. logistics professionals. In an effort to identify the consistency in the way U.S. logisticians cope with more challenging global operations, this study analyzed the empirical data obtained from 63 U.S. multinational firms which mostly represented the U.S. manufacturing sector. Several findings are noteworthy.

First, because longer distance deliveries are more common to foreign customers, both transportation time and cost have become overriding factors for selecting international transportation modes. As such, international logistics professionals are addressed always to carefully scrutinize the potential impact of modal choice on transportation cost and time. In

particular, considering different transportation pricing methods, services and modal availability in different countries, the international modal selection decision must consider the tariffs, classifications, rate negotiability, inland transportation networks, routes, and outsourcing opportunities in the destination country. Furthermore, beyond the understanding of the aforementioned logistics complexities, logistics professionals must fully understand the wide range of exogenous variables that vary from country to country. These variables include language, culture, regulations, geography, and political structure.

Second, reflecting the significance of transportation cost and time to global logistics operations, the assurance of timely delivery services and inexpensive freight rates has emerged as the most important agenda for international freight term negotiation. The establishment of a world-wide information network is strongly suggested in order to give international shippers substantial bargaining strength, because it will enable the shippers to access up-to-date information about foreign freight rates and service performance history of available modes around the world. That is

to say, international strategy should coordinate information flows around the world, while controlling the corresponding physical flows.

Third, irrespective of the size of firms, excessive paperwork needed for exporting/importing has become the biggest stumbling block for international logistics. Although familiarity with country-unique trade rules, regulations, and specifications may ease the headache created by document preparation, unsuspected errors in documentation can still lead to costly shipping delays and financial penalties. Perhaps one of the most effective ways of minimizing such errors is to utilize the services of third-party logisticians such as foreign freight forwarders, customs house brokers, and overseas distributors who can undertake the necessary paperwork accompanying international shipments. In addition, the use of a world-wide communication and information system similar to the one proposed by Min and Eom²³ may not only simplify export/import documentation through "paperless" data transmission, but also enhance communication with foreign business partners through data sharing.

TABLE 6
Attributes Leading to Effective International Packaging

Attribute	Degree of Importance, on Average		Rank
Prevention of handling damage (resiliency)	1.455	(0.633)	1
Dimensions for best use of space	2.038	(0.898)	2
Weather protection	2.115	(1.114)	3
Package material cost	2.189	(0.833)	4
Meeting carriers' requirement	2.630	(1.051)	5
Conform to regulations on hazardous items	2.685	(1.540)	6
Weight distribution for containerization	2.698	(1.067)	7
Package disposal cost	2.755	(0.979)	8
Reusability	3.113	(1.031)	9

Note: Numbers in parentheses represent standard deviations of scales.

Scale for the Degree of Importance

- 1 = Extremely important
- 2 = Somewhat important
- 3 = Neither important nor unimportant
- 4 = Somewhat unimportant
- 5 = Not at all important

Fourth, to prevent shipping delays and interruptions at intermodal exchange points, international shippers tend to choose the destination port located near to inland waterways, railways, or highways. In other words, unless the connecting ports are heavily congested and ill-equipped for containerization, international intermodal traffic tends to gravitate toward seaports or airports which are geographically positioned by most effective transport links.

Finally, despite the frequent use of well-protected containers in international shipping, the most important function of international packaging appears to be damage protection (resiliency). Therefore, international shippers tend to favor more protective packages often made of corrugated, palletized, and film-based materials that can withstand mishandling, rough rides, excessive heat and high humidity, while not increasing package material cost. However, considering that much of the recent environmental legislation across the world is directed toward distribution packaging, logistics professionals should develop an effective green packaging strategy by utilizing more innovative packages such as high density polyethylene pallets and moisture absorbing desiccant packets.

ACKNOWLEDGEMENTS

The authors would like to thank Ms. Corinne Waskow, Director of CLM (Council of Logistics Management) Membership Services, for her help and support for the research. Special thanks go to all the CLM members who willingly responded to the mail questionnaires and provided valuable data for this research.

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