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AN EMPIRICAL CROSS CULTURAL ASSESSMENT OF A LOGISTICS/SUPPLY CHAIN MANAGEMENT TYPOLOGY

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ABSTRACT

This manuscript compares the three dimensions (Process Strategy, Market Strategy, and Information Strategy) of the Bowersox Daugherty (1987) logistics strategy typology among five disparate countries by integrating the findings of previous empirical research. The appropriateness of the three Bowersox/Daugherty dimensions when combined into the construct Overall Logistic Strategy (OLS) are assessed. The role of OLS impact on Organizational Competitiveness (COMP) through two intervening variables LCE (Logistics Coordination Effectiveness) and CSC (Customer Service Commitment) is evaluated. The findings indicate that OLS is an appropriate descriptor of logistics/supply chain management in a wide range of cultures and that the integration of OLS, LCE, and CSC is useful in explaining COMP across cultures. The findings of this research are discussed in the context of earlier perspectives on organizational strategy and overall logistics strategy.

INTRODUCTION

The Bowersox/Daugherty (1987) typology has been the subject of study for over twenty years. Previous research has examined that typology in the United State and Canada, longitudinally in the United States, and comparatively in China, Ghana, Guatemala, and Turkey. Because of differences in cultures data collection methodologies have varied. This research posits that the Bowersox/Daugherty typology may be a robust framework for further study of logistics/supply chain management. This work is also useful in addressing the concerns of Luo, Van Hoek, and Ross (2001) that cross-cultural logistics research has lagged. Several recent studies have compared logistics/supply chain management strategies in China, Ghana, Guatemala, and Turkey with practices in the

United States. As a result, the authors believe that the examination of these studies would provide insights into the value of the Bowersox/Daugherty typology as a framework for studying, describing, and explaining logistics/supply chain management across cultures.

This manuscript is organized into seven sections. The first two sections contain the introduction and literature review, and they provide an overview of the conceptual framework for the study. Sections three and four contain the research methodology and data analysis and results. The fifth section discusses the findings while the sixth section presents the authors' conclusions. The final section provides implications for practitioners, teachers and researchers of logistics/supply chain management.

LITERATURE REVIEW

Researchers have found ample data to support the Bowersox and Daugherty (1987) logistics management decision-making typology (Clinton and Closs, 1997; McGinnis and Kohn, 1993, 1997 and 2002; McGinnis, Kohn, and Spillan, 2010). In addition there is an emerging body of research exploring this typology in different cultures (McGinnis, Harcar, Kara, and Spillan, 2011; McGinnis, Spillan, Kara, and Domfeh, 2012; and Spillan, McGinnis, Kara, Yi, 2013). However, there has been no substantive research focusing on the relevance of Bowersox/Daughterty typology in different cultural environments.

Bowersox and Daugherty (1987) completed a comprehensive study of logistics integration in 1987. In this research they identified three distinctly different logistics management strategy types that firms have used in their decision-making. They are summarized as follows:

- The objective of Process Strategy is to manage flows and control activities that “give rise to cost”. In current terminology they are referred to as “cost drivers.”
- The objective of Market Strategy is to reduce the complexity faced by customers. For example, this strategy may try to provide a single point of contact for customers that source multiple products from different divisions, or facilities, of the same firm.
- The objective of Information Strategy is to coordinate information flows throughout the channel of distribution that facilitates cooperation and coordination among channel (supply chain in today’s vocabulary) members.

The three components that comprise the Bowersox/Daugherty typology have been tested by McGinnis and Kohn (1993, 1997 and 2002)

in studies which sampled subjects from large U.S. manufacturing firms. They found that process and market strategies were emphasized when logistics strategies were intense. They also found that both strategies were present at moderate levels when firms used a balanced strategy approach, and both strategies were present only at low levels when firms used an unfocused strategy. These studies indicated that the three dimensions (logistics process strategy, market strategy and information strategy) have an important effect on a firm’s success. They did find that the three dimensions of logistics strategy would be more likely combined rather than used separately as Bowersox and Daughterty (1987) originally intended.

In 1997 Clinton and Closs sampled 818 U.S. and Canadian firms to assess the significance of the Bowersox/Daughterty typology. They concluded that there was a clear overlap of the three strategies (process, market, information) and that this is to be expected because logistics performs the same activities regardless of the overall logistics strategy.

Further research focused on small firms (Spillan, Kohn, and McGinnis, 2010). Small firms are the largest employer of human resources and rely on logistics to accomplish their goals. The authors concluded that the strategies of small and large U.S. manufacturing firms vary in degree more than on type. Market, Process, and Information strategies were present in both small and large firms. In addition, the authors concluded that the logistics strategy outcomes of small and large firms were similar. Finally, it was concluded that the Bowersox/Daughterty typology was applicable to United States manufacturing firms regardless of size.

In recent years there have been three studies of comparative logistics. McGinnis, Harcar, Kara, and Spillan (2011) compared logistics strategies in the United States, Guatemala, and Turkey. In each case confirmatory factor analysis was used to assess the validity of OLS and SEM was used to test the validity of the overall model of OLS-

LCE-CSC-COMP. In all three countries OLS was supported but support for the overall model was mixed, with support for the United States and Guatemalan data but insignificant support for the Turkish data. In another study McGinnis, Spillan, Kara, and Domfeh (2012) compared United States and Ghana data and found that both OLS and the OLS-LCE-CSC-COMP model were supported. Finally, Spillan, McGinnis, Kara, and Yi (2013) compared Chinese and United States data and found the both the OLS and the OLS-LCE-CSC-COMP were supported.

As a result of the findings discussed in the previous paragraphs the authors concluded that an overall assessment of the Bowersox/Daugherty typology's robustness across cultures would be useful. A finding of robustness would suggest that the logistics typology (and logistics/supply chain management strategy) is not very "culturally bound." Conversely, a finding of a lack of robustness would suggest that cross-cultural logistics/supply chain management research should give greater consideration to the cultural issues of each country.

METHODOLOGY

Measures and Questionnaire

Briefly, the study questionnaire had three parts. In the first part, the overall logistics strategy of the companies were measured by three dimensions; process strategy, market strategy and information. Respondents were requested to determine their level of agreement with three statements for process, market, and information strategies for their company /division on a five point -type scale (1 = definitely agree, 5=definitely disagree). The second part of the questionnaire was designed to measure the relationships among logistics strategy constructs that are hypothesized to contribute logistics coordination effectiveness as measured by three statements. Similar Likert scale measures (1 = definitely agree, 5=definitely disagree) in the first section of questionnaire were used in the second section as well. In the third part of the

questionnaire, we included statements to measure customer service commitment and company division competitiveness using the same Likert Scale as previously used in the first and second part of questionnaire.

Data Collection

Bilingual associates translated the designed questionnaire into Turkish, Spanish, and Chinese. To ensure the quality of the translation, we used back translations to check for any discrepancies and translation errors in all countries. The questionnaires were pre-tested with a small group of participants in all countries before it was administrated. In all countries, the results were satisfactory with respect to the meaningfulness and the applicability of the questions in those country environments.

The data for USA was collected in United States manufacturing firms who were affiliates of the Council of Supply Chain Management Professionals (CSCMP) – previously the Council of Logistics Management (CLM). Respondents from manufacturing companies were titled managers or higher in logistics, distribution, or supply chain management and were sampled via mail questionnaires with a pre-notification letter, the questionnaire with a cover letter, and a follow-up letter.

Turkish data was collected by distributing the questionnaire to 500 SMEs (Small-Medium enterprises) operating in the manufacturing industry within the city of Istanbul in Turkey. This sample was selected randomly from the database of the Turkish Small Business Administration (KOSGEB). As of 2008, the KOSGEB database included a total of 12,270 SMEs in Istanbul, which accounts for nearly 28% of all SMEs registered throughout Turkey.

To collect the Guatemalan data, the researchers worked through the Ministry of Economics. Ministry of Economics staff were trained by the researchers on the objective of the questionnaire, what its contents were, how to complete the

survey and how to respond to questions from the respondents. Face-to-face interviews with logistics, distribution and supply chain managers from midsize and large companies located in nine major regional centers in Guatemala were conducted. Considering that the selection of businesses in this large geographic area is a substantial cross-section of the Guatemalan business sector and provides near representativeness of the sample data interviews took place in several different areas including Guatemala City, Escuintla, Villa Nueva, Quetzaltenango, Cobán, Salamá, Chiquimula, Sacatepéquez and Petén.

The Chinese data was gathered under the supervision of a local researcher who is a faculty member at a Chinese university, and is fluent in Chinese and “American” English. The questionnaire was then administered by students to a random sample of a wide variety of organizations, both large state-owned and small and medium enterprises (SME) located over a wide area of firms, mainly in northwest China. A total of three hundred and sixty-one usable questionnaires were obtained.

Data Analysis Approach

The data analysis process followed a five-step approach. First, selected characteristics of the five countries (China, Ghana, Guatemala, Turkey, and the United States) were compared. Inspection of Table 1 indicates that the five countries vary widely in terms of geographical size, population size, percentage of urban population, make-up of their work forces (in percentages in agriculture, industry, and service), GDP size, climate, transportation infrastructure, and public sector corruption. There were no apparent systematic patterns that suggested that there was homogeneity among nations.

Next, the cultural dimensions of the five countries were examined using Hofstede’s Cultural Dimensions (2001). As shown in Tables 2 and 3, there were no systematic patterns of cultural dimensions detected among nations. For example,

a score on Power Distance was not predictive of Uncertainty Avoidance, Individualism/Collectivism, or Masculinity/Femininity.

Taken together, the authors concluded that the five countries were heterogeneous in terms of size, population, economies, climate, transportation, culture, and level of corruption. As a result the authors felt that an assessment of the applicability of the Bowersox/Daugherty typology to these five countries would provide a suitable test for its robustness for studying logistics/supply chain management strategy across cultures.

ANALYSIS AND RESULTS

The first step was to check the construct reliabilities for all three countries. Table 4 shows comparative average construct reliability scores. While several of the reliabilities were below the 0.70 level commonly suggested, the scale items used in our study have been previously used in several studies, have considered having sufficient content validity (Kohn and McGinnis, 1997), and possess adequate levels of reliability.

Further, it was previously concluded that these scores are satisfactory for testing and validating the structure reported in McGinnis, Kohn, and Kara (2011).

Table 5 shows the mean scores for the constructs for all five countries, the results for KMO tests for sampling adequacy, and Bartlett’s test for sphericity for all five countries. These measures are used to determine the suitability of the data for factor analysis. The KMO are 0.832, 0.900, 0.663, 0.770, and 0.823 for the USA, Guatemala, Turkey, Ghana, and China respectively. All levels of significance for Bartlett’s test for sphericity are less than .005. Since all KMO results were above 0.5 (the minimum cut off for factor analysis) and all Bartlett results were $p < 0.0001$ it was concluded that all data was suitable for factor analysis.

TABLE 1
SELECTED COMPARISONS OF
THE UNITED STATES, CHINA, GHANA, GUATEMALA, AND TURKEY

Category	United States	Guatemala	Turkey	Ghana	China
Area (sq km/sq miles)*	9,826,675/3,807,983	108,889/42,042 (Slightly smaller than Tennessee)	783,562/302,533 (Slightly larger than Texas)	238,533/92,435 (Slightly smaller than Oregon)	9,596,961/3,705,383 (Slightly smaller than the United States)
Population* Percentage of Population Urban*	307,212,123 est. 82%	14,373,472 est. 49%	780,694,485 est. 70%	25,199,609 est. 51% (2010)	1,349,585,838 est. 47% (2010)
Make up of Labor Force*	Agriculture: 0.7% Industry: 20.3% Managerial/professional/ technical: 37.3% Sales & services: 41.8%	Agriculture: 38% Industry: 14% Services: 48%	Agriculture: 25.5% Industry: 26.2% Services: 48.4%	Agriculture: 56% Industry: 15% Services: 29%	Agriculture: 34.8% Industry: 29.5% Services: 35.7%
Gross Domestic Product*	\$15.66 trillion est.	\$78.42 billion est.	\$1.125 trillion est.	\$83.18 billion est.	\$12.38 trillion est.
Climate*	Varied	Tropical	Temperate	Tropical	Extremely Diverse
Railroads (km/miles)*	224,792/139,683	332/206	8,699/5398	947/588	86,000/53,439
Paved Roads (km/miles)*	4,374,784/2,718,438	4,863/3022	313,151/194,559	9,955/6,186	3,453,890/2,146,205
2011 Public- sector Corruption Index.	73 Higher number > less corrupt.	33 Higher number > less corrupt.	49 Higher number > less corrupt.	45 Higher number > less corrupt.	39 Higher number > less corrupt.

* Sources

- Categories "Area" through "Paved Roads": United States Central Intelligence Agency World Factbook (www.cia.gov, 2013). Accessed May 28, 2013.
- Categories "2012 Public-sector Corruption Index" (www.transparency.org). Accessed May 28, 2013.

TABLE 2
SUMMARY OF HOFSTEDE'S CULTURAL DIMENSIONS

Dimension Name and Brief Description	Example Attributes of a High Score	Example Attributes of a Low Score
Power Distance: The extent that those less powerful accept that power is distributed unequally.	More concentration of authority, tall organization pyramids, subordinates expect to be told.	Less concentration of authority, flat organization pyramids, subordinates expect to be consulted.
Uncertainty Avoidance: Extent to which members of a culture are comfortable or uncomfortable in unstructured situations.	Uncertainty avoidance. Not comfortable with ambiguity.	Uncertainty accepting. Greater degree acceptance of new ideas, new products, and a willingness to try something new or different.
Individualism and Collectivism: The degree of interdependence a society maintains among its members.	A loosely-knit society where peoples are more likely to look after themselves and their immediate families. Employees are expected to be self-reliant and display initiative.	People are more likely to act in the interest of the group and not necessarily themselves. Relationships are cooperative among in-groups but are cold or hostile to out-groups.
Masculinity and Femininity: The degree a society is "winner-loser" versus "caring for others and quality of life" oriented.	Masculine, the society is driven by competition, achievement and success. Success is defined as winner or best in field.	Feminine, the society has dominate values of caring for others and quality of life.
Long- Versus Short-Term Orientation: The degree to which members of a culture show a pragmatic future-oriented perspective rather than a short-term point of view.	Long-term orientation. Persistence and perseverance are normal. Relationships tend to be ordered by status.	Short-term orientation. Likely to be driven by short-term results, profit and loss statements offered frequently, striving for quick results and "absolute truth" in all matters.

Source: The Hofstede Center (www.geert-hofstede.com). Accessed May 29, 2013. See also Hofstede (2001)

TABLE 3
CULTURAL DIMENSIONS:
A SUMMARY OF AMERICAN, GUATEMALAN, TURKISH, GHANAIAN, AND CHINESE CULTURES

Dimension Index/ Interpretation	United States	Guatemala	Turkey	Ghana	China
Power Distance	40 (Low)	95 (High)	66 (High)	80 (High)	80 (High)
Uncertainty Avoidance	46 (Uncertainty accepting)	101 (Very high uncertainty avoidance)	85 (Uncertainty avoidance)	65 (Uncertainty Avoidance)	30 (Uncertainty accepting)
Individualism/ Collectivism	91 (Individualistic)	6 (Very collectivistic)	37 (Collectivistic)	15 (Collectivistic)	20 (Collectivistic)
Masculinity/ Femininity	62 (Masculine)	37 (Feminine)	45 (Middle)	40 (Feminine)	66 (Masculine)
Long-Term/ Short-Term Orientation	29 (Short-term oriented)	NA	NA	NA	118 (Long-term oriented)

Source: The Hofstede Center (www.geert-hofstede.com). Accessed May 28, 2013. See also Hofstede (2001)

TABLE 4
RELIABILITY SCORES OF INDEPENDENT AND DEPENDENT VARIABLES

		COUNTRIES			
		USA ¹	Guatemala ¹	Turkey ¹	China ³
INDEPENDENT VARIABLES*	Scale items				
	Scale 1: Process Strategy (PROCSTR)				
	1.1. In my company/division, management emphasizes achieving maximum efficiency from purchasing, manufacturing, and distribution.	0.651	0.524	0.856	0.678
	1.2. A primary objective of logistics in my company/division is to gain control over activities that result in purchasing, manufacturing, and distribution costs.				
	1.3. In my company/division, logistics facilitates the implementation of cost and inventory reducing concepts such as Focused Manufacturing and Just-in-Time Materials Procurement				
	Scale 2: Market Strategy (MKTGSTR)				
	2.1. In my company/division, management emphasizes achieving coordinated physical distribution to customers served by several business units.	0.741	0.624	0.894	0.626
	2.2. A primary objective of logistics in my company/division is to reduce the complexity our customers face in doing business with us.				
	2.3. In my company/division, logistics facilitates the coordination of several business units in order to provide competitive customer service.				
	Scale 3: Information Strategy (INFOSTR)				
	3.1. In my company/division, management emphasizes coordination and control of channel members (distributors, wholesalers, dealers, retailers) activities.	0.629	0.739	0.903	0.440
	3.2. A primary objective of logistics in my company/division is to manage information flows and inventory levels throughout the channel of distribution.				
	3.3. In my company/division, logistics facilitates the management of information flows among channel members (distributors, wholesalers, dealers, retailers).				

*Scales: 1 = Strongly Agree, 2 = Agree, 3 = Neither Agree nor Disagree, 4 = Disagree, 5 = Strongly Disagree.

¹McGinnis, Michael A., Talha Hancar, Ali Kara, and John E. Spillan (2011), "Cross-Cultural Validation of the Factorial Structure of a Logistics Strategy Model: A Three Country Study," *Journal of Transportation Management*, Vol.22, No. 2, pp.25-43.

²McGinnis, Michael A., John E. Spillan, Ali Kara, and King Obed Domfeh (2012), "A Comparison of Logistics Strategies and Integration in the U.S. and Ghana," *Journal of Transportation Management*, Vol. 23, No. 1, pp. 27-42.

³Spillan, John E., Michael A. McGinnis, Ali Kara, and George Liu Yi (2013), "A Comparison of the Effect of Logistics Strategy and Logistics Integration on Firm Competitiveness in the USA and China", *International Journal of Logistics Management*, Vol. 24, No. 1. In press.

TABLE 4 (Continued)

Scale items	COUNTRIES			
	USA	Guatemala	Turkey	China
Logistics Coordination Effectiveness (LCE)				
4.1. The need for closer coordination with suppliers, vendors, and other channel members has fostered better working relationships among departments within my company.	0.609	0.733	0.818	0.551
4.2. In my company logistics planning is well coordinated with the overall strategic planning process.				
4.3. In my company/division logistics activities are coordinated effectively with customers, suppliers, and other channel members.				
Customer Service Coordination (CSC)				
5.1. Achieving increased levels of customer service has resulted in increased emphasis on employee development and training.	0.695	0.634	0.830	0.506
5.2. The customer service program in my company/division is effectively coordinated with other logistics activities.				
5.3. The customer service program in my company/division gives us a competitive edge relative to our competition.				
Company/Division Competitive Responsiveness (COMP)				
6.1. My company/division responds quickly and effectively to changing customer or supplier needs compared to our competitors.	0.733	0.532	0.907	0.695
6.2. My company/division responds quickly and effectively to changing competitor strategies compared to our competitors.				
6.3. My company/division develops and markets new products quickly and effectively compared to our competitors.				
6.4. In most of its markets my company/division is a very strong competitor.				

DEPENDENT VARIABLES*

TABLE 5
AVERAGE VALUES OF INDEPENDENT AND DEPENDENT VARIABLES:
USA, GUATEMALAN, TURKISH, GHANAAN, AND CHINESE FIRMS

Variables	USA Data Average 1990-2008 ¹	Guatemala Data Average, 2010 ¹	Turkish Data Average, 2010 ¹	Ghana Data, 2012 ²	China Data, 2011 ³
1. PROCSR*	2.332	2.245	2.071	3.54	2.24
2. MKTGSTR*	2.541	2.057	2.394	3.36	2.33
3. INFOSTR*	2.769	2.107	2.398	3.42	2.31
Dependent Variables					
1. LCE*	2.580	2.098	2.056	3.34	2.31
2. CSC*	2.5205	2.166	2.461	3.22	2.33
3. COMP*	2.3969	2.1090	2.6157	3.23	2.37
KMO Measure of					
Sampling Adequacy	0.832	0.900	0.663	0.770	0.823
Bartlett's Test of					
Sphericity	0.000	0.000	0.000	0.000	0.000

*Scales: 1 = Strongly Agree, 2 = Agree, 3 = Neither Agree nor Disagree, 4 = Disagree, 5 = Strongly Disagree.

¹McGinnis, Michael A., Talha Harcar, Ali Kara, and John E. Spillan (2011), "Cross-Cultural Validation of the Factorial Structure of a Logistics Strategy Model: A Three Country Study," *Journal of Transportation Management*, Vol.22, No. 2, pp.25-43.

²McGinnis, Michael A., John E. Spillan, Ali Kara, and King Obed Domfeh (2012), "A Comparison of Logistics Strategies and Integration in the U.S. and Ghana," *Journal of Transportation Management*, Vol. 23, No. 1, pp. 27-42.

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Confirmatory Factor Analysis

To confirm the underlying factor structure, the authors examined the CFA of all data sets. As shown in Table 6, five indices were used. They were: Chi-square, Root Mean Square Error of Approximation (RMSEA) Goodness of Fit Index (GFI), and Comparative Fit Index (CFI). The two-step approach suggested by Anderson and Gerbing (1988) was used to examine the measurement model and then the structural model. In the measurement model, the hypothesized relationship between the nine logistics strategic orientations and the three first order factors were examined to understand how well the relationships fit the data. In the structural model, we examined the relationship between the three first order factors (PROCSTR, MKTGSTR, and INFSTR).

The results of the estimation of the first order factor model revealed very strong results for all datasets used as indicated by several different measures ($X^2_{USA} = 31.058$, $X^2_{GUATEMALA} = 48.65$, and $X^2_{TURKEY} = 38.40$). As suggested by McGinnis, Kohn, and Kara (2011), we allowed two of the error terms to be correlated. Other fit indices also provided good levels of fit as shown below.

- $RMSEA_{USA} = 0.049$; $GFI_{USA} = 0.962$; $CFI_{USA} = 0.970$
- $RMSEA_{GUATEMALA} = 0.082$; $GFI_{GUATEMALA} = 0.940$; $CFI_{GUATEMALA} = 0.941$
- $RMSEA_{TURKEY} = 0.059$; $GFI_{TURKEY} = 0.962$; $CFI_{TURKEY} = 0.988$
- $RMSEA_{GHANA} = 0.082$; $GFI_{GHANA} = 0.954$; $CFI_{GHANA} = 0.917$; $RMSEA_{CHINA} = 0.014$; $GFI_{CHINA} = 0.985$; $CFI_{CHINA} = 0.995$.

Although X^2 value for two of the datasets were significant at $\alpha < 0.05$, it was not considered to be major concern since the other fit indices showed strong model fit. The authors concluded that the relationships between the items and latent factors were confirmed by the five results obtained from the different countries.

The last step in the process to confirm the underlying structure of the model was to evaluate the relationship between the three first

order factors and a second order factor named “overall logistics strategy.” The purpose here is to understand how the three factors contributed to an overall construct. The results of the second order confirmatory factor analyses for all three datasets showed very good fit indices.

Structural Model

The structural model was used to test the hypotheses of all six factors tested in the measurement model. The conceptualized structural model for five data sets is shown as Figure 1. Inspection of Table 7 revealed that the all linkages were significant and the directions of relationships were as hypothesized for the US, Guatemala, Ghana, and China. Although the model fit is considered acceptable, only one of the hypothesized links for Turkish data was significant as shown in Table 8. It appears, in the case of Turkey, that OLS and LCE did not have any significant influence on CSC. However, CSC had significant influence on competitiveness of Turkish companies.

Overall, the data from all five countries support the conceptualization of the Bowersox/Daugherty typology (See Appendix 1). In addition, data from four of the five countries

support the conceptualized structural model of Overall Logistics Strategy (OLS) > Logistics Coordination Effectiveness (LCE) > Customer Service Commitment > Organizational Competitiveness (COMP), while Turkish data did not support the conceptualized structural model. While this may be due to some other factors not examined in the study, one could speculate that there might be fundamental differences among these constructs in the Turkish market environment. However, the

TABLE 6
SUMMARY OF FIRST ORDER FACTOR ANALYSIS OF OVERALL LOGISTICS STRATEGY (OLS):
USA, GUATEMALAN, TURKISH, GHANAIAAN, AND CHINESE FIRMS

Variables	USA Data Average 1990-2008 ¹	Guatemala Data Average, 2010 ¹	Turkish Data Average, 2010 ¹	Ghana Data, 2012 ²	China Data, 2011 ³
Chi-square	31.058	48.651	38.402	73.991	25.608
p-value	0.095	0.001	0.017	0.000	0.363
CFI	0.970	0.941	0.988	0.917	0.995
GFI	0.962	0.944	0.962	0.954	0.985
RMSEA	0.049	0.082	0.059	0.082	0.014

¹McGinnis, Michael A., Talha Harcar, Ali Kara, and John E. Spillan (2011), "Cross-Cultural Validation of the Factorial Structure of a Logistics Strategy Model: A Three Country Study," *Journal of Transportation Management*, Vol.22, No. 2, pp.25-43.

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TABLE 7
SUMMARY OF FIRST ORDER FACTOR ANALYSIS OF OVERALL LOGISTICS STRATEGY (OLS) AND FIRM
COMPETITIVENESS:
USA, GUATEMALAN, TURKISH, GHANAIAAN, AND CHINESE FIRMS

Variables	USA Data Average 1990-2008 ¹	Guatemala Data Average, 2010 ¹	Turkish Data Average, 2010 ¹	Ghana Data, 2012 ²	China Data, 2011 ³
Chi-square	125.971	192.600	170.718	162.867	154.474
p-value	0.022	0.000	0.000	0.000	0.000
CFI	0.960	0.910	0.962	0.935	0.936
GFI	0.916	0.867	0.912	0.941	0.949
RMSEA	0.043	0.081	0.061	0.045	0.040

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FIGURE 1
CONCEPTUALIZED STRUCTURAL MODEL

authors conclude that the agreement on the consistency of direction of the relationships in factor structures in all five datasets and support for hypothesized relationships in four out of five datasets provides persuasive support for (a) the applicability of the Bowersox/Daugherty typology in the assessment of logistics/supply chain management strategy across a wide range of economies and cultures and (b) provides insights into the stages linking logistics/supply chain management strategy to organizational competitiveness. The following section discusses relevance and implications of these results.

DISCUSSION

The perspectives of three earlier writers clarify the roles of logistics/supply chain management in contributing to the competitiveness of organizations. James D. Thompson (1967) modeled the organization as having three layers. First, the Technological Subsystem was most like a closed system that needed to be isolated from the environment in order to perform well on hard measures of performance. This isolation, or buffering, could be achieved via sealing (isolating the organization from the external environment), buffering (stockpiling materials, planned maintenance, training), smoothing (forecasting and reducing fluctuations in sales via scheduling and sales promotions), adapting (planning), and rationing (prioritizing customers, establishing priorities, and setting rules). The second layer is the Institutional Subsystem which deals with the external environment, which is most like an open system that has to respond to generalized, often difficult to measure, norms. This means that the Institutional Subsystem must be able to interact naturally with its external environment with the goal being the long-term well being of the organization. The third layer, the Administrative Subsystem, mediates between the Technological and Institutional subsystems, simultaneously seeking flexibility from the Technological Subsystem (to permit administrative discretion) and commitment from the Institutional

APPENDIX 1
COMPARISON OF RELIABILITY COEFFICIENTS (Alphas) FOR
OVERALL LOGISTICS STRATEGY (OLS):
USA, GUATEMALA, TURKEY, GHANA, AND CHINA

Overall Logistics Strategy (OLS) Variables (from Exhibit 4)		USA	Guatemala	Turkey	Ghana	China
		1990 N = 59 $r^2=0.722$	2010 N = 179 $r^2=0.722$	2011 N = 216 $r^2=0.825$	2012 N = 350 $r^2=0.773$	2012 N = 361 $r^2=0.699$
1.	In my company/division, management emphasizes achieving maximum efficiency from purchasing, manufacturing, and distribution.					
2.	A primary objective of logistics in my company/division is to gain control over activities that result in purchasing, manufacturing, and distribution costs.	1994 N = 91 $r^2=0.812$				
3.	In my company/division, logistics facilitates the implementation of cost and inventory reducing concepts such as Focused Manufacturing and Just-in-Time Materials Procurement.	1999 N = 169 $r^2=0.775$				
4.	In my company/division, management emphasizes achieving coordinated physical distribution to customers served by several business units.	2006 N = 112 $r^2=0.847$				
5.	A primary objective of logistics in my company/division is to reduce the complexity our customers face in doing business with us.					
6.	In my company/division, logistics facilitates the coordination of several business units in order to provide competitive customer service.	2008 N = 49 $r^2=0.789$				
7.	In my company/division, management emphasizes coordination and control of channel members (distributors, wholesalers, dealers, retailers) activities.					
8.	A primary objective of logistics in my company/division is to manage information flows and inventory levels throughout the channel of distribution.					
9.	In my company/division, logistics facilitates the management of information flows among channel members (distributors, wholesalers, dealers, retailers).					

Subsystem (to permit technological achievement). This creates a “paradox of administration” where the organization simultaneously seeks to reduce uncertainty in the short-run in order to score well on technological measures of performance while achieving flexibility in the long run for greater control in a dynamic environment.

These insights from Thompson (1967) provide perspectives on the three components of Overall Logistics Strategy (OLS) and the conceptualized structural model. For example, Process Strategy (PROCSTR) emphasizes the importance of cost management and efficiency, which are primarily Technical Subsystem concerns. Market Strategy (MKTGSTR) focuses on simplifying transactions to reduce complexity faced when doing business with the organization, which might be considered as primarily Administrative Subsystem concerns. Information Strategy (INFOSTR) focuses on cooperation and coordination among channel members, which appears to be primarily an Institutional Subsystem priority. As a result, the role of Overall Logistics Strategy (OLS) can be thought of as being one aspect of managing the “paradox of administration” where its three components (PROCSTR, MKTGSTR, and INFOSTR) interact to balance the need for efficiency and for flexibility. While the generalizations stated in the previous sentences may oversimplify the roles of PROCSTR, MKTGSTR, and INFOSTR, one can begin to see that OLS must constantly balance the need for efficiency and cost management with flexibility and responsiveness in a dynamic organizational environment.

In a similar manner, the insights from Thompson (1967) provide a perspective on the structural model shown in Figure 1. With the exception of the Turkish data, the path coefficients indicate that the $OLS > LCE > CSC$ network contributes to Organizational Competitiveness (COMP). Here, in the authors’ opinion, the primary focus of LCE is on execution (Technical subsystem issue) while CSC is on coordination within the channel (Administration and Institutional

subsystem issues) which enables the firm to respond (COMP) to the external environment.

Shapiro and Heskett (1985) summarized logistics management as characterized by a dichotomy similar to that discussed by Thompson (1967). On one hand the logistics manager must pay attention to the day-to-day details (summarized as tactical, short-term, quantitative, and detailed) while being able to see the big picture (summarized as broad, qualitative, long-term, and strategic). Here the paradox is captured by PROCSTR, MKTGSTR, and INFOSTR. Each has a primary focus on the execution of day-to-day details. However, LCE and CSC indicate that the logistics/supply chain manager not become so focused on the details of PROCSTR, MKTGSTR, and INFOSTR that they cannot respond to the dynamics of the big picture.

Finally, Autry, Zacharia, and Lamb (2008) used the responses of 254 respondents to create their taxonomy of logistics strategy. Their findings identified two logistics strategies that supported the summarization stated in the previous paragraph by Shapiro and Heskett (1985). Autry, Zacharia, and Lamb’s Strategy 1, Functional Logistics Strategy (FL), emphasized maximum efficiency. The emphasis of this strategy includes inventory and order management, order processing, procurement and storage within the firm. Strategy 2, Externally Oriented Logistics Strategy (FOL) emphasized the ability to respond quickly and efficiently to changing needs. FOL’s focus was on inter-firm coordination, social responsibility, strategic distribution planning, and leveraging technology and information systems. Both strategies focused on customer service, operational controls, and transportation management. Here the authors provided a third framework on which to evaluate OLS and the conceptual structural model shown as Figure 1. As a direct comparison, PROCSTR could be classified as relating to FL while MKTGSTR and INFOSTR could be classified as relating to FOL.

In any event, the authors see no inherent conflict between the results of this research and the work of Thompson (1967), Shapiro and Heskett (1985), and Autry, Zacharia, and Lamb (2008). All three provide insights that enhance the understanding of the Bowersox/Daugherty typology. However, the authors conclude that the typology and structural model presented in this manuscript provide a sound model for understanding logistics and supply chain management.

CONCLUSIONS

The purpose of this study was to explore whether the Bowersox/Daugherty typology is a useful instrument for examining logistics strategies in countries of different sizes, cultures, and economic systems. With logistics/supply chain management as a major component in business activity, it is imperative that managers understand the role logistics/supply chain management play in achieving organizational competitiveness (COMP) as part of the overall efforts of the firm. While a wide range of other strategy considerations (such as product features, promotional activities, pricing decisions, channel of distribution choices, and technological capabilities) play major roles in competitiveness, it is crucial that the role logistics/supply chain management plays in the overall organizational strategy be fully understood. With supply chain management at the center of business activity, it is imperative that managers find and use new ideas that will help them become more competitive in highly competitive markets. Finding new insights into how they can manage their manufacturing and supply chains is essential for goal attainment, profitability and sustainability.

The Bowersox/Daugherty typology provides a useful instrument for examining logistics/supply chain management strategies in a wide range of countries regardless of the geography, the characteristics of the population, the nature of the economy, the culture, and the level of corruption. While this statement may not be

universally true in all situations, the results presented in this manuscript indicate that OLS>LCE>CSC>COMP is applicable in a wide range of situations when conducting comparative research into logistics/supply chain management in a wide range of cross-cultural scenarios. The extent to which this conclusion holds will be supported or revised by future research.

IMPLICATIONS

The research synthesized in this manuscript has logistics/supply chain management implications for practitioners, teachers, and researchers. Because the Bowersox/Daugherty typology, presented as Overall Logistics Strategy (OLS) has been successfully used as a framework for research into logistics/supply chain management over time and in comparative culture research using an array of data gathering methodologies it is robust. This means that the insights gained from the typology should be useful with a wide range of audiences. For practitioners, the concept of OLS>LCE>CSC>COMP provides a straightforward framework for understanding logistics/supply chain management as part of the overall management of the firm and as a tool for explaining that process to those in other areas of the organization. The concept is also useful for orienting those new to logistics/supply chain management at the entry, middle, and upper management levels so that they develop an understanding of its context.

For those teaching in logistics/supply chain management, the OLS>LCE>CSC>COMP concept provides a generalized framework that provides a foundation for the specific topics offered at the entry, advanced, MBA, and graduate levels. The importance of understanding the dichotomy of logistics/supply chain management, discussed earlier, provide a framework for helping students at all levels understand the “paradox of administration” as it applies to this area of expertise.

For logistics/supply chain management researchers, the Bowersox/Daugherty typology provides a framework that has been successfully used in research for over twenty years. While there are other models that may be useful, the robustness of this typology provide one basis for comparing future research results with previous work.

Future research into logistics/supply chain management should seek opportunities to explore practices in other countries/cultures. Little is known of comparative logistics/supply chain management in the various countries of Asia and the subcontinent of India. Further, logistics and supply chain management practices, and their impact on customer service and organizational competitive responsiveness have not been systematically studied. In addition, research into logistics and supply chain management may benefit from expanding the understanding of logistics/supply chain management decision making by including antecedents and moderating factors (such as competition, market turbulence, and differences in business environment) into the design. Finally, further study of logistics/supply chain management in other nations/cultures could be gained by examining the relevance of the Bowersox/Daugherty typology in nonmanufacturing industries including retailing, healthcare, financial services, transportation firms, and food service. These industries may provide a different perspective on the process, market, and information strategy in their different environments.

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