

ARE THE LEBANESE FIRMS COPYING WITH THE GLOBAL PRESSURE?

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ABSTRACT

Almost all business activities in Lebanon take the form of family owned small business type. Lebanon took advanced steps on globalization issues and entered into open trading activities, which makes its firms subject to global competition. In developed nation, small businesses are facing these challenges by lowering their cost, improving quality and adopting sophisticated high technology. Logistic strategies are one way these firms are using to overcome these challenges. The purpose of this paper is to explore the use and the role of logistic strategies by small businesses in Lebanon. It will focus on the way these businesses are adopting with the global requirements. Results showed evidence that the Lebanese small businesses exhibited a little use logistic strategies, which put them on a competitive disadvantage in facing the global challenges.

Keywords: Small business, global requirements, logistic regression, logistic strategies, technologies, logistic integration, logistic orientation, supply chain

INTRODUCTION

Researchers in a number of studies contested the effectiveness of logistic strategies used by small businesses in developed countries. The complexity of products and the demand for technologies increase (Makari, Hitti, & Peter, 2010; Momme & Hvolby, 2002) as consumers' demand for differentiated and better quality products increase (Piachaud, 2002). Consequently, it is becoming unusual for a firm to perform alone the complete product cycle that starts with the development and design, includes production, assembly, marketing, delivery to final user, as well as the after-sale service (Thohen & Jagdev, 2001). It is crucial for a manufacturing firm to position itself in the supply chain in order to create the best possible competitive advantage. This strategic positioning is set by deciding on activities that should be carried out internally along with other activities that should be carried out externally (Baines et al., 2005). Consequently, the success of the firms depends on strategic alignment and collaboration with other firms that have complementary competencies (Svensson, 2003).

This study explores the use and the role of logistic strategies by Lebanese firms in their process of adopting with the global requirements. It tests the significance of the use of logistic integration, competition and marketing, and warehousing in defining firms' logistic strategy. The next sections of the study deal with the review of literature, research methodology, data analysis, study limitations, implications of the study, and recommendation for future research.

REVIEW OF LITERATURE

Studies related to logistic integration started early in the 1970's (Lalonde, Grabnerr, Robeson, 1970; Lambert & Mentzer, 1980). The scope of these studies expanded with the emergence of new technologies, and accelerated with globalization. Firms are gaining access to new markets and they are also realizing greater production efficiencies (Makari, Hitti, & Peter, 2010). They are tapping technological competencies that were previously beyond their geographical borders (McFarlan, 1984; Bovet, 1991; Cooper, 1993; Fawcett, Birou, and Taylor, 1993). Moreover, firms have now established knowledge systems to acquire information and to manage data that describes logistics operations (Lalonde, Grabnerr, Robeson, 1970; Lambert & Mentzer, 1980).

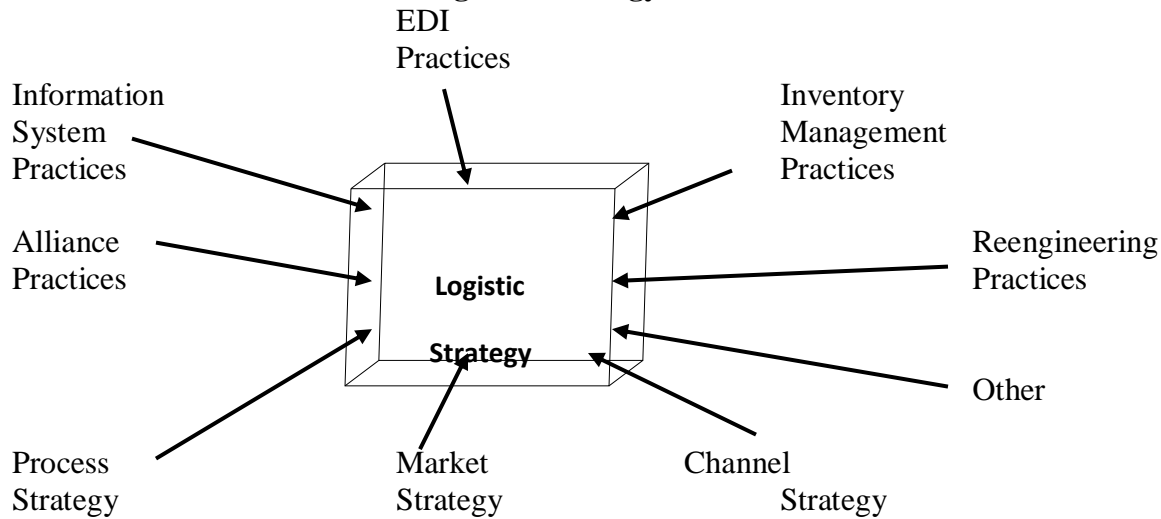
Sweet (2001) developed the concept of "strategic value configuration logics", which consisted of value-adding, value-extracting, value-capturing, and value-creating. He argued that the top priority of the new economy enterprises is to manage fundamental strategic value configuration well — and it should be possible to predict firms' logistic performance by evaluating their strategies. McGinnis and Kohn (2002) indicated the significance of marketing orientations on the logistics strategy. Porter (1985) talked about the role of the value chain in providing a framework for examining the role of logistics. He added that competitive advantage is assessed by evaluating the firm's five primary activities, which are inbound logistics, operations, outbound logistics, marketing and sales, and service. Wisner, Leong, and Tan (2005) emphasized that strategies must consistently aim at achieving low-cost as intermediate products and services are purchased, produced, and moved along the supply chain. In the same direction, Tzeng and Huang (2011) discussed the advanced field of global manufacturing and highlighted the characteristics of two logistics system designs, which are 1) Multiple Criteria Decision Making (MCDM) and 2) Decision Making Trial and Evaluation Laboratory (DEMANTEL). They concluded that a key success for modern globalized firm is by leveraging logistics systems to achieve higher quality, lower cost, and product differentiation.

Springinklee and Wallenburg (2012) addressed the issue of logistics' relationship with other departments. They showed evidence that the integration between production and logistics function serves as a pivotal capability element in the resource – capacity – value chain. Within this chain, effective working relationships are the strong drivers of achieved integration. Weijers, Glöckner, and Pieters (2012) examined the strategies of Dutch Logistic Service Providers. They found that their main strategy is to look for solutions to increase the efficiency, lower cost, and ensure sustainability. Zúñiga, Piera, and Narciso (2011) presented a new challenging model approach to increase the efficiency of logistic firms. The model is about solving problems for which no formula exists; it is based on informal methods or experience, and employing a form of trial and error iteration. They concluded that the model outperformed other approaches which have been suggested for the same type of problems.

Logistics has evolved to be critical within domestic and global operations. All enterprises rely on complex supply chain decisions and activities to achieve their goals. Mapping the relationships that exist among the factors that affect the strategy assists the analysis of the issues. Figure 1 demonstrates the interactive relationships that have a bearing on the effectiveness of any logistic strategy.

Figure 1

Logistics Strategy Determinants



Adapted from: Bowersox, Daugherty, Droge, Rogers, and Wardlow (1989) Leading Edge Logistics: Competitive Positioning for the 1990's.

Successful implementation of strategy requires specific functional strategies such as production, marketing, and logistics to complement each other and work together as one major strategy for the firm (Makari, Hitti, and Peter, 2010; Chow, Heaver, Henriksson, 1995). Only a few studies have tested the implementation of these strategies in developing countries. This study will explore the use of logistic strategies by Lebanese manufacturing firms and will test the effectiveness of logistic coordination by using three decision-making areas: (1) logistic integration strategy, (2) competition and marketing strategy, and (3) warehousing strategy as the predictors. In addition, this study explores the type of warehousing used by Lebanese firms. Types of are warehousing categorized into four options: (1) public warehousing, (2) private warehousing, (3) contract warehousing, and (4) some other form of warehousing.

Lebanese Manufacturing Firms

Table 1 shows Lebanese manufacturing firms are all of traditional type, where 20 % of the industry is in food production, 20% textile, 17% furniture, and 16% metal production. Family businesses constitute 73% of the 22,000 firms. Total revenues of the industry are \$3.65 billion, of which 26% comes from food production, 24% rubber and plastic, and 15% metal production. Almost 50% of the production is exported. More than 50% of the exports head to the Arab countries, 15% to Europe, 10% to North America, with the remaining to other countries (Lebanese Ministry of Industry, 2010).

Table 1
Industry Type

Economic Activity in Lebanon	# of firms	% of total	Revenues	% of total
Food products and beverages	4,480	20	950,585	26
Leather and textile	4,358	20	404,184	11
Paper products	947	4	273,887	8
Rubber, plastic and chemical products	3,305	15	830,455	24
Fabricated metal products	3,559	16	544,425	15
Furniture and wood products	3,643	17	397,874	8
Other	1,734	8	249,973	8
Totals	22,025	100%	3,651,383	100%

Appendix 1 lists the questions concerning the Logistic Integration issue and Appendix 2 presents the survey inquiries about each firm's Logistics Strategies or priorities. These have been tested in previous research. This study posed the following Research Questions:

1. Do firms' logistic strategies affect their income?
2. Do logistic integration, competition and marketing, and warehousing play a significant role in defining firms' logistic strategy?

RESEARCH METHODOLOGY

The research model uses Logistic regression to test the effectiveness of logistic strategies. Logistic integration, strategic orientation, and process strategic orientation are used as independent variables. The following steps are applied in developing the research methodology:

Research Model

The purpose of the study is to test the effect of logistic strategies on Lebanese firms' income and to test the role of logistic integration, competition and marketing, and warehousing in shaping firms' logistic strategies. Logistic regression (Hair et. al, 2010) is used because of its ability to identify two groups of firms (dependent variable). In the first research question, dependent variable stands for the level of income with zero stands for low income and 1 stands for high income. As for the second research question dependent variable, 0 stands for efficient logistic strategy and 1 stands for inefficient logistic strategy. The independent variables for both research questions are logistic integration, competition and marketing, warehousing, warehousing type, and the size of the enterprise. Logistic regression is superior to linear regression model where normality assumptions of the independent variables are not met (Ryan, 2011). It is simpler to read and to interpret because its values are bound to range between zero and one (Hair et al. 2010; Tsun-Siou, Yin-Hua & Rong-Tze, 2003). Regression equation takes the following form:

$$Y (0-1) = A + B_1X_1 + B_2X_2 + B_3X_3 + \dots + B_nX_n$$

Reliability of the Model

In testing the reliability of the model two measures are used which are the following:

Coefficient of Determination: is similar to that of the ordinary least squares (OLS) regression:

$$R^2_{\text{Logit}} = 1 - (2LL_1 / 2LL_0)^{1/2}$$

$-2LL_0$ is the log-likelihood (represents unexplained variations) of the model without independent variables. $-2LL_1$ is the log-likelihood of the research model based on the independent variables that remained in the model and exhibited significant power in explaining the two stock groups. N is the sample size. In general, the interpretation of R^2_{logit} is similar to coefficient of determination R^2 in the multiple regressions (Ryan, 2011). It has a value that ranges between 0 and 1. When R^2_{logit} approaches 0, the model is poor. R^2_{logit} approaches 1, the model is a perfect predictor (Hair et al., 2010).

Hit Ratio: A *Z test* is performed to test the significance of hit ratio (percentage of correctly classifying the cases). The following formula is applied:

$$Z \text{ test} = [P - 0.5] / [0.5 (1 - 0.5) / N]^{1/2}$$

Where P = hit ratio = proportion correctly classified results, N = sample size.

The “Z-test” tests the significance of the hit ratio (Ryan, 2011). The hit ratio measures the percentage of times the model accurately classifies the cases into the two strategy groups i.e. if the model completely explains the dependent variable, the overall hit ratio would be 100% (Lohr, 2010).

Both measures are tested using a level of significance of 5%.

Cross Validity of the Model

Testing the cross validity of the model is done by applying it in different countries or different time periods.

Sample and Data Collection

A questionnaire was developed to collect data for the study. A logistics survey consisting of four sections or four different sets of scales (a) logistics integration, (b) logistics strategies and priorities, (c) company competitiveness, and (d) private warehousing investment decisions was the source of the data for this study. Most of the strategies related questions were structured in a Likert scale model (ordinal level data) with 1 = strongly agree, 2 = agree, 3 = neither agree nor disagree, 4 = disagree, and 5 = strongly disagree, as the choices. The remaining sets of questions were ratio level variables. The study’s participants were Lebanese manufacturing firms. A random sample was selected from the Directory of Manufactures. Interviews were conducted with fifty firms. The response variable — logistic strategy — is found by taking the mean values entered by firms in this section of the survey.

DATA ANALYSIS

Stage one of data analysis summarizes the descriptive measures of the variables. Table 2 displays the descriptive statistics of the response variable logistic integration. The survey responses were on a Likert scale from 1 to 5 (1 = strongly agree, 2 = agree, 3 = neither agree nor disagree, 4 = disagree and 5 = strongly disagree). Variable 1 is the minimum value, which indicates heavy use of strategy, while variable 5 is the maximum value representing no use of strategy. In the survey, a score of 1.1 was the minimum value reported by firms and 4.3 was the maximum value reported. The mean is equal to 3.2 and the median is equal to 3.0; both values are close with a standard deviation of 1.3. Checking the observations, few enterprises reported low values, which indicate that logistic strategies are not clearly visible. The histogram and probability plot displayed a relatively bell shape with no indication of outliers. The first and third quartile lie within the values 2 and 3. The first quartile value is 2.6 and the third quartile is 3.5 and the interquartile range is spread over 0.9 points (i.e. middle 50% of the data is spread over 0.9 points).

Table 2
Descriptive Statistics of Logistic Strategy

Variable	N	Mean	St. Dev	Minimum	Q1	Median	Q3	Maximum
log strategies	50	3.2	1.3	1.1	2.6	3.0	3.5	4.7

Table 3 displays the descriptive statistics behind the Company/Division Competitiveness variable, which deals with competition and market strategy. There are only four questions in this section to evaluate competition and market strategy. The minimum value found is 1.03 with a maximum value of 3.5. The highest reported value of 3.5 means that none of the surveyed firms consider themselves weak. The median is 2.3, and the mean is 2.5 with a standard deviation of 0.52. The approximately equal values of mean and median indicate a relatively symmetric distribution in the data. The first and third quartile values are 2.1 and 3.2; thus, interquartile range is spread over 1.1 points (i.e. middle 50% of the data is spread over 1.1 points).

Table 3
Descriptive Statistics of Competition and Market

Variable	N	Mean	St. Dev	Minimum	Q1	Median	Q3	Maximum
Comp & Market	50	2.5	.52	1.03	2.1	2.3	3.2	3.50

Private Warehousing Investment Decisions variable is the last continuous independent variable. The warehousing variable evaluates the importance of private warehousing. The variable was created by taking the mean of the answers to six questions. Table 4 output results show that a minimum value of 2.2 and a maximum value of 5 were reported. The median found is 3.2. The mean is 3.6 with a standard deviation of 0.7. These high values reflect the marginal effect of warehousing as perceived by the Lebanese firms.

Table 4
Descriptive Statistics of Warehousing

Variable	N	Mean	St Dev	Minimum	Q1	Median	Q3	Maximum
warehouse	30	3.6	0.4	2.2	2.8	3.2	3.8	5

In the second stage of the study, Logistic Regression is used in two separate models to assess the relationship between a dependent, categorical variable, and various predictors. In the first model, the relationship between income (as the dependent variable) and six independent variables was tested. These independent variables are Logistic Strategy, Logistic Integration, Competition/Marketing, Warehousing, Warehousing Type, and Enterprise Size. The income variable was recoded as a categorical response with only two values. The values are (0) five million dollars and under or (1) greater than five million.

The first step in the analysis was done by studying the analysis sample using the forward stepwise procedure of logistic regression. This procedure allows only those variables that exhibit significant predictive power to enter into the model. At a level of significance of 5%, of the six independent variables that were in the model, only two entered into the model. These variables are Competition / Marketing and Enterprise size. The summary output of the SPSS showed the following hit ratio results:

Table 5
Factors Influencing Income

	Predicted - 0	Predicted - 1	Correctly classified %
Observed – 0	19	14	57.6%
Observed – 1	04	13	76.5%
Overall Hit Ratio			64.0 %

The model correctly classified small income group 57.6% and misclassified the same group 32.4%. As for large income group, the model correctly classified 76.5% and misclassified 23.5%. The overall hit ratio (average) is 64%, which means that the model correctly classified 64 % of the cases and misclassified 36% of them. Testing the reliability of the model was done by using two measures.

Coefficient of determination (R^2) represents the proportion of the total variation that is explained by the independent variables. The model's coefficient of determination is 37.3%, which is significant.

Testing the significance of the hit ratio is done by using the Z distribution.

$$Z\text{-test} = [P - 0.5] / [0.5 (1 - 0.5)/N]^{1/2}$$

$Z = [0.64 - 0.5] / [0.5(1-0.5) / 50]^{1/2} = 1.98$. The Z critical value at the 5% significance level = 1.96, which implies that the hit ratio is slightly significant.

Results of the regression show that income is affected by competition/ marketing strategies and by the size of the firm, but the hardly significant results (low validity) reflects that the income is obviously affected by other variables that are not in the model. On the other hand, the insignificance of logistic integration and logistic strategies over the income might as reflected in the model be explained by the fact that Lebanese firms have not yet felt the heat of globalization.

In the second step, Logistic regression was used to assess the relationship between logistic strategy (dependent variable) on one hand and the other predictors, which are logistic integration, competition and marketing, warehousing, warehousing type, and the size of the enterprise on the other hand. The logistic strategy (dependent) variable was recorded as a categorical response with only two values. The values are (0) less than or equal to a logistic

strategy score of 2.5 or (1) greater than a logistic strategy score of 2.5. Zero indicates a relatively strong use of logistic strategy, one indicates a weak use of logistic strategy.

The forward stepwise procedure of logistic regression was applied. At a level of significance of 5%, of the five independent variables, only two entered into the model. These variables are Logistic Integration and size of enterprise. The summary output of the SPSS showed the following hit ratio results:

Table 6
Factors Affecting Logistic Strategy

	Predicted - 0	Predicted - 1	Correctly classified %
Observed - 0	06	05	54.5%
Observed - 1	11	28	71.8%
Overall Hit Ratio			68.0%

The model correctly classified strong strategy users group 54.5% and misclassified the same group 45.5%. As for weak strategy users group the model correctly classified 71.8% and misclassified 22.2%. The overall hit ratio (average) is 68.0%, which means that the model correctly classified 68.0 % of the cases and misclassified 32.0% of them.

Testing the reliability of the model was done by using two measures, these are the following:

1- Coefficient of determination (R^2), which represents the proportion of the total variation that is explained by the independent variables. The model's coefficient of determination is 38.4%, which is significant.

2 - Testing the significance of the hit ratio is done by using the normal distribution.

$$Z\text{-test} = [P - 0.5] / [0.5 (1 - 0.5)/N]^{1/2}$$

$Z = [0.68 - 0.5] / [0.5(1-0.5) / 50]^{1/2} = 2.55$. The Z critical value at the 5% significance level = 1.96, which implies that the hit ratio is significant.

Analysis of this step validates the theoretical correlation between Logistic strategies on the one hand and logistic integration on the other hand. In addition, results show that 71.8% of Lebanese firms were identified as weak users of logistic strategies, which reflects the fact that such issues are not yet explored well within the Lebanese industries.

LIMITATIONS OF THIS STUDY

The limitations of the study are made of the following points: 1- data is a primary one; 2- it is based on a relatively small sample; 3- external validity is not addressed; 4- model's predictive power is relatively weak with a coefficient of determination of 38.4%.

CONCLUSIONS AND IMPLICATIONS OF THIS STUDY

The results of this exploratory study are significant. It sheds light on the use of logistic strategies in Lebanon – a developing nation and highlighted the unique features of Lebanese firms. Results showed the significant effect of the size of the Lebanese firms on both the level of

income and logistic strategies. This has a clear explanation. First, the firm's capabilities play a major role in setting the level of income. An increase in resources would naturally increase the firm's ability to increase income. Second, the effect of the firm's size on logistic strategies, as the firm's size increases, the need to plan, set targets, and coordinate activities increases. Finally, the warehousing strategies, results reflect that these strategies are not common among Lebanese firms. This is supported by the high scores of warehousing strategies (low use of strategies) and the exhibit of the insignificant relationship with the level of income and logistic strategies. Results suggest that Lebanese firms should focus on logistic integration to develop greater opportunities and efficiencies.

RECOMMENDATIONS FOR FUTURE RESEARCH

It is recommended to 1) apply the model in other developing countries to address model's external validity and 2) add other variables to the model to increase its predictive power.

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APPENDIX

Appendix 1 -- Logistic Integration Questions

Specific Integration Issues

- I expect increased emphasis on integrated computer systems/electronic interchange between my firm and customers, suppliers and other channel members
- Much progress has been achieved in my company regarding integrated computer systems/electronic data interchange with customers, suppliers, and other channel members
- The need for closer coordination with suppliers, vendors and other channel members has fostered better working relationships among departments within my company
- In my company or division logistics activities are coordinated effectively with customers, suppliers and other channel members
- In my company or division logistics activities are coordinated effectively with customers, suppliers and other channel members
- Achieving increased levels of customer service has resulted in increased emphasis on employee development and training.
- The customer service program in my company or division is effectively coordinated with other logistics activities
- The customer service program in my company or division gives us a competitive edge relative to our competition.
- Computers in the logistics area are increasingly communicating with computers in other areas of my firm.
- Computers in the logistics area are increasingly communicating with suppliers, customers, and other channel members
- My company/division responds quickly and effectively changing customer or supplier needs compared to our competitors
- Competition and Markets
- My company/division develops and markets new products quickly and effectively compared to our competitors.
- In most of its markets my company/division is very strong competitor, moderately strong competitor or a weak competitor.
- Competition in the markets served by my company/division is severe
- In the markets my company/division serve, the firm that eases up loses markets/customers to its competitors.

Appendix 2 -- Logistics Strategies or Priorities

Specific Strategies or Priorities:

- In my company/division, management emphasizes achieving maximum efficiency from purchasing, manufacturing and distribution.
- A primary objective of logistics in my company/division is to gain control over activities that result in purchasing, manufacturing, and distribution costs.
- In my company/division logistics facilitates the implementation of cost and inventory reducing concepts such as focused manufacturing and Just-In-Time Materials Procurement
- In my company/division, management emphasizes achieving coordinated physical distribution to customers served by several business units.
- A primary objective of logistics in my company/division is to reduce the complexity our customers face in doing business with us.
- In my company/division, logistics facilities there is the coordination of several business units in order to provide competitive customer survive.
- In my company/division, management emphasizes coordination and control of channel members (distributors, wholesalers, dealers, retailers) activities.
- A primary objective of logistics in my company/division is to manage information flows and inventory levels throughout the channel of distribution.
- In my company/division, logistics facilitates the management of information flows among channel members (distributors, wholesalers, dealers, retailers).
- Formal cost analysis is tempered by other subjective factor before final decisions are made in my company/division.

Warehousing

- Formal capital budgeting techniques, such as discounted cash flow, net present value, and or payback period dominate the decision of whether to invest in private warehouse capacity.
- Strategic considerations dominate the decision whether to invest in private warehouse capacity in my company/division
- Market and or product mix uncertainties make it difficult to plan for future private warehousing needs.
- My company/division explicitly considers subjective, hard to measure, service issues when considering whether to invest in private warehousing.
- The use of contract ware housing by my company/division is limited by the number of good providers that are available
- Decisions whether to invest in private warehousing are increasingly intermingled with decisions in other logistic activities.