INTERNATIONAL JOURNAL OF
SCIENCE ARTS AND COMMERCE

Influence of Lean Quality Management on Operational Performance of Third Party Port-Centric Logistics Firms in Kenya

Kingsford M. Rucha[1]
Prof. Robert Gichira, Ph.D[2]
Kenneth Wanjau, Ph.D[3]
James Muranga Njihia, Ph.D[4]
[1]College of Human Resource Development, Jomo Kenyatta University of Science and Technology (JKUAT), College of Human Resource Development, Kenya.
[2]Senior Lecturer, College of Human Resource Development, Jomo Kenyatta University of Science and Technology (JKUAT), College of Human Resource Development, Kenya.
[3]Senior Lecturer, School of Business, Karatina University, Kenya.
[4]Senior Lecturer, School of Business, Department of Management Science - University of Nairobi, Kenya.

ABSTRACT
This research paper largely explored lean quality as proposed by luminaries of lean concept. The study aim was to propose and test conceptual model of the relationship between lean quality and operational performance of third-party port-centric logistics (3PL) firms in Kenya. The objective was to determine the relationship between quality management and operational performance of third-party port-centric logistic firms in Kenya and test the hypothesis (H_0) that there is no significant difference in the relationship between quality management and operational performance of Third-Party Port-Centric Logistics firms in Kenya. Most studies in the area were done outside the African continent and dwelt largely on manufacturing firms. Port-centric logistics as logistics services providers are critical to any country since they are the interface between exporter and importer and the study put a lot of emphasis on finding out the relationship between quality management as a lean practice and operational performance of these firms. This is the gap this research sought to address. A survey based on stratified sampling with a disproportionate approach consisting of 164 firms (15% of the population) was used in data

collection using 164 questionnaires targeting 164 third party port-centric logistics firms. The response rate for this study was 75.6% (124 firms). Data analysis was carried out using moderated multiple regression (MMR) analysis where relationship between the two variables was determined. The relationship was determined and the tests of reliability using Cronbach alpha, normality using Q-Q plots and test of hypothesis conducted. The study found out that quality management variable is statistically and significantly related to the operational performance, contributing to the strength of the overall model (with adjusted R^2 of 46.9%) with a beta coefficient of .167. This was considered good enough link with an appreciation that operational performance is also affected by other organizational and management factors outside the model that may be internal or external to the organization. Consequently, this study immensely provides information and knowledge that will play a role in research agenda in this area of lean management in services, in operations performance and 3PL firms. The study proposes policy formulation that would support measures that will boost and graft-in both quality and best practices that will eventually poster excellency in operational performance by third party port-centric logistics providers not only in Kenya but in east Africa and Africa at large.

Keywords: Lean, Quality Management, logistics services providers, Operational performance

1. Introduction

Ohno (1988) at the Toyota Motor Company developed the lean strategy in 1950s. It is a business model that focuses on systematic identification and elimination of waste from a process and involves changing and improving processes (Motwani, 2003) while delivering quality products to the manufacturer and consumer at the lowest cost. Krafcik (1998) describes lean as an approach to a manufacturing that uses less of everything; half the human effort in the factory, half the manufacturing space, half the investment in tools, half the engineering hours to develop a new product in half the time. Lean also requires keeping far less than half the needed inventory on site, results in many fewer defects, and produces a greater and ever growing variety of products (Papadopoulou & Özbayrak, 2005).

This study was anchored on theoretical standpoints; Resource Based View (RBV) whose proponents argue that superior firm performance is the ability of firms to accumulate resources and capabilities that are rare, valuable and difficult to imitate (Barney, 2000); institutional theory which whose inquiry is on how organizations social structures are created, diffused, adopted, and adapted over space and time; and how they fall into decline and disuse (Scott, 2004) and finally customer value theory which maintains a firm's view that a market-oriented organization will carefully apply its resources and competencies to create superior innovative value propositions for its customers. The independent variable of this study was lean quality management and how it influences operational performance.

Quality is acknowledged as being critical to the value-adding process of product creation and delivery and in fact orders requiring rework have been estimated to cost in excess of eight times the cost of properly produced and delivered customer requirement (Bowersox et

al., 1985). In logistics, quality translates into strategies aiming at making order cycle times shorter and more predictable, as well as maintaining certain levels of in-stock availability and certain fill rates on customer orders. It has only recently been recognized that an essential ingredient of successful supply chain management is high quality logistics throughout supply networks (Choi & Rungtusanatham, 1999).

Evidence exist to suggest that improving the quality of all logistics operations and supply chain stages results in reduced costs, improved resource utilization, and improved system efficiency (Beamon & Ware, 1998). Further, quality practices are related to organizational performance and that companies should continue promoting quality management practices throughout their supply chains (Forker et al., 1997). As well, a significant relationship exists between level of quality practices and logistics outcomes, especially in the context of logistics operational performance and customer service (Jerman and Crum, 1998).On-time delivery, and order cycle are frequently cited in literature as critical measures of logistics performance (Rahman, 2006; Gunasekaran, Patel & Mcgaughey, 2003).A number of studies on quality management including studies by Rahman (2006) and Gunasekaran et al. (2003) show a great deal of support for the assertion that quality management as a lean practice play a major role in influencing operational performance, hence the the objective of the study which was: To determine the relationship betweenquality management and operational performance of third-party port-centric logistic firms in Kenya. This was guided by the null hypothesis of the study, which was:

H_0 There is no significant difference in the relationship between quality management and operational performance of Third-Party Port-Centric Logistics firms in Kenya.

2. Methodology

The research design for this study was a survey design coupled with cross-sectional approach. Therefore this was largely quantitative research that enabled identification of characteristics of a particular group, to measure attitudes and to describe behavioral patterns (Zikmund, Babin, Carr, & Griffin, 2012). In order to realize the objective of this study, positivism research paradigm was used which involves objective testing of empirical hypothesis that are formulated on the predictions of objected phenomena and which allowed operationalisation of the hypothesis and generalization of the results.

The population of study was all 1064 registered third party port-centric logistics firms in Kenya (KRA, 2016). The sampling frame listing was obtained from Kenya Revenue Authority (KRA). KRA is the sole entity that authorizes all third party port-centric logistics firms in Kenya. The choice of a sample size is always largely determined by the confidence one needs to have in the data, the margin of error tolerable, the types of analysis going to be undertaken and the size of total population from which the sample will be drawn (Saunders, Lewis & Thornhill, 2009). By considering these scholarly viewpoints, this study used a representative sample size of 164 third party port-centric logistics firms representing about 15% of the population (1064 firms).Table 1 indicates sample size determination.

Table 1 Sample Size Determination

Stratum (Location of 3PL Firms)	Pop. Proportion (3PL Firms)	3PL Firms in the Sample	% Stratum Proportion
Nairobi (Capital)	566	84	14.8%
Mombasa (Seaport)	491	73	14.9%
Nakuru	2	2	100%
Eldoret	3	3	100%
Kisumu	2	2	100%
Total	1064	164	

In the actual execution of the study, most of these firms were found to have an operations or logistics office in the seaport city. This study used a questionnaire as the data collection instrument. Saunders, Lewis and Thornhill (2009) asserts that a questionnaire is one of the most widely used data collection technique within the survey strategy and provides the most efficient way to collect responses from a large sample prior to quantitative analysis. Five-point likert technique was predominantly used for closed ended type of questions in this study. In order to analyse the data collected, a regression model was used for analysis of the relationship between lean quality and operational performance.

$$Y = \beta_{01} + \beta_1 X_1 + \xi_1$$

Where

Y = Dependent variable which represents the operational performance of fort centric third-party logistics firms in Kenya in the model

β_{01} = A constant factor which is also the value of the dependent variable when all the independent variables X_i assume any value, such as when $X_i = 0$

$\beta_1 X_1$ = Regression coefficient β_1 and the associated Quality Management (X_1) variable, a lean practice, the independent variable.

3. Analysis of the Study Variables

The targeted respondents in the study were the third-party port-centric logistics firms in Kenya. A total of 164 questionnaires were administered, out of which 124 questionnaires were filled and returned. This represents a response rate of 75.6%. Quality management practice had 5 factors. To measure reliability of data collection instruments, an internal consistency technique using Cronbach's alpha was used in this study. Reliability and correlations of data was done on the pilot data to ensure the instruments were good to go before data collection and after data collection to confirm that the instruments remained as good with the actual field data. The overall test of reliability for all the variables produced

Cronbach's Alpha value of 0.947 based on standardized values. This was way above the threshold value of 0.75 (alpha>=0.75). This finding meant that the variables are very reliable and that the data collected and analysed for this study produces results that can be relied on and god enough for replication and generalization.

Table 2 Cronbach's Alpha for Final Analysis

Cronbach's Alpha	Cronbach's Alpha - Standardized Items	N of Items	N
.947	.949	5	124

On the correlations of paired variables in the final data analysis, the generated results indicated that the variables had positive correlations and with strong correlations (>0.5). The weakest paired correlation was between waste management and customer orientation (0.628) whereas the strongest paired correlation was between quality management and cost management (0.939).

3.1 Test of Normality

Normality test ascertain whether the data variables have a normal distribution (Paul & Zhang, 2010). There are different approaches to test for normality using SPSS. Some of the common ways to do this is via box plot, Q-Q Plot, and Skewness and Kurtosis. In this study normality test were done using Q-Q Plots, kurtosis and Skewness. Kurtosis is an indicator of a degree flattening of a distribution while Skewness is as a sign of asymmetry and deviation from a normal distribution. Skewness and kurtosis values that range from +/-3 (SE) are generally considered normal (Onwuegbuzie & Daniel, 2002).

Table 3 Normality Test Using Skewness and Kurtosis

Variables	N	Mean	Std. Dev	Variance	Skewness	Kurtosis
Quality Mgt	124	2.0740	.32766	.107	.046	.408
OpsPerf	124	2.3572	.27619	.076	.080	1.676
Valid N	124					

The results are presented in table 3. The skewness value are within the+/-3 range for all factors. We conclude that the data followed a normal distribution. Kurtosis and skweness was employed to test normality by Rocha, Farazi, Khouri and Pearce (2011) in their study on the status of bank lending to SMEs in the Middle East and North Africa.

To reinforce the two methods (skewness and kurtosis) Q-Q plots were also used as a graphical analytical tool and the results showed data distribution exhibiting normal characteristics in the normal Q-Q plot (figures 1), suggesting normal distribution (Hair, Tatham, Anderson & Black, 2006). In q-q plot, or the normal probability plot, the observed value for each score is plotted against the expected value from the normal distribution, where, a sensibly straight line suggests a normal distribution (Pallant, 2007). By and large, if the points in a q-q plot depart from a straight line, then the assumed distribution is called into question (Aas & Haff, 2006).

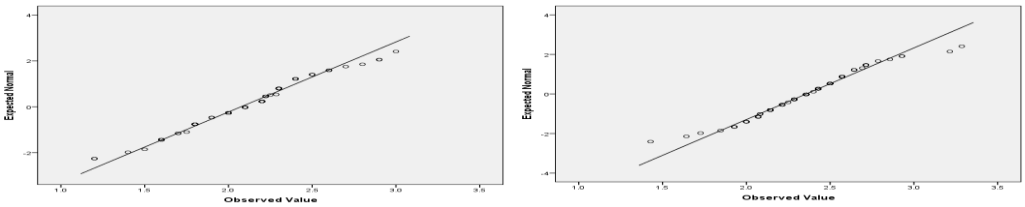

Figure 1 Q-Q Plot of Quality Management and Operational Performance

3.2 Test of assumptions of the Study

Chi-Square Test of Independence was used in this study to compare categorical variables. It was used to assess associations between categorical variables, although it provides no inferences about causation. The null hypothesis (H_0) and alternative hypothesis (H_1) of the Chi-Square Test of Independence/association was expressed as follows:

H_0: Variable Xi (independent) is independent of variable Y (dependent)
H_1: Variable Xi (independent) is not independent of variable Y (dependent)

Evidence of Heteroscedasticity is confirmed when the value of Prob > the computed value of the Chi-square is less than 0.05 (Park, 2008). Table 4 shows that the constant variance (Chi2 values are) are significant (P = 0.000). Since all the Chi2 (908.974, 421.873, 471.178 and 302.188) are greater than the corresponding probability values (.000, .014, .000 and .000), we reject the null hypothesis and conclude that there is a significant association between the independent variable quality management and the operational performance.

Table4: Test of Heteroscedasticity

	Value of Pearson Chi-Square	df	Asymp. Sig. (2-sided)
OpsPerf_Agg * Quality Mgt	908.974[a]	504	.000

Variance Inflation Factor (VIF) test and the associated tolerance were used to determine correlations among the variables in this study. VIF values captures the variance of variable coefficients and how they are increased because of collinearity and a VIF value greater than five implies presence of multicollinearity, further indicating the inappropriateness of the variables (Cohen, Cohen, West & Aiken 2013). Tolerance measures the impact of collinearity among the variables in a regression model and is computes using the expression ($1 - R^2$). The VIF values for this study had a value of 4.556 and therefore it can be said that the presence of multicollinearity amongst the two variables largely lacked evidence. Chang, Liao, Yu, and Ni (2010) tested multicollinearity using the VIF and tolerance approach.

Table 5: Multicollinearity Test

Variables	VIF (1/1-R2)	Tolerance (1-R2)
Quality Mgt	4.556	.216

3.3 Kaiser-Meyer-Olkin and Bartlett's Test

In order to test sampling adequacy or suitability of data used in the study, Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity were used. KMO value gives index which explains the degree of variances in the study variables that eminates from the underlying factors. KMO value approaching 1 (<=1) implies that factor analysis would work for the data, a good indicator that the factors used in the study are good enough (Pallant, 2010). For Bartlett's Test of Sphericity tests is an indicator of whether variables used in the study related/unrelated positing suitability of structure detection. The results of this test for this study indicate a strong result of sampling adequacy where KMO value is 0.805, a value close to 1. The Bartlett's Test of Sphericity Test, with $p < 0.05$ is an indication of suitability of data for structure detection. These tests therefore confirm that the data set used in this are suitable for the analyses in this study.

Table6: KMO and Bartlett's Test

KMO Test of Sampling Adequacy	Bartlett's Test of Sphericity
.805	Approx. Chi-Square - 885.059;
	df. 15
	Sig. 0.000

4 Influence of Lean Qualityon Operational Performance

In order to realize objectives I-IV, which were to determine the effect of quality management, waste management, and customer orientation and cost management respectively as lean practices on operational performance of third-party port-centric logistic firms in Kenya, regression analysis was carried out using the model:

$$\mathbf{Y=\beta_{01}+\beta_1 X_1+\xi}$$

Where Y is the dependent variable representing the operational performance of third- party port-centric logistics firms in Kenya in the model, β_{01} is a constant factor which is also the value of the dependent variable before any of the independent variable X_i assumes any value, such as when $X_i=0$, $\beta_1 X_1$ is the regression coefficient (β_1) and the associated Quality Management (X_1) variable, which is one of the lean practices being studied in this research. ξ is the stochastic or random disturbance term which addresses the random error or all other minor inconsequential effects on the model and which have not been captured. Using the data that was collected for this study, regression analysis was conducted and a regression matrix was obtained as shown in table 7. It indicates that there was 46.9 % positive variations in operational performance index due to changes in independent variables and 53.1% variation of the dependent variable due to other factors not in the model. This meant that the model less than convincingly suitable for (less than the requisite threshold of about 60%-100% for a good fit) explaining quality management practice entirely affecting the organizational performance of the third-party port-centric logistics firms in Kenya.

The correlation coefficient R represents the strength of the relationship between the variables. The study found out that the correlation coefficient was 0.697 thus there was strong positive correlation between quality and operational performance. A study on the effect of relationship banking and entrepreneurial orientation on financial performance of manufacturing firms in Kenya produce the adjusted value of R^2 of 0.212 indicating that the model only explained 21.2% of the variations in the dependent variable (Rotich, 2016) and considered good enough due to many other factors outside the model that affected the relationship. In another study by Rahman, Laosirihongthong and Sohal, (2010) on the impact of lean strategy on operational performance done amongst Thai manufacturing companies, the adjusted value of R2 for SMEs was found to be 0.371 (37.1%) and 0.222 for Large Enterprises. The findings were considered good enough since there are a myriad of other factors outside lean strategy that affect operational performance. The findings of these studies resonate well with the findings of the study at hand and indeed are comparable.

Table 7: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.697[a]	.486	.469	.20126

a. Predictors: (Constant), Lean Cost Management, Lean Waste Management, Lean Customer Orientation Management, Lean Quality Management

The Significance F in table 7 demonstrates the usefulness of the overall regression model at a 5% level of significance. Since the p-value of the F test is less than alpha ($0 < 0.05$), it was concluded that there was a significant relationship between the dependent and independent variables used in the study. The findings in table 8 also clearly indicate that the relationship only accounts for a less than dominant number of variations in operational performance of third party port-centric logistics firms, that is 4.562 (45.6 %) out of 9.382, the rest of the variations being accounted for by other factors external to the model (Residual) as indicated by the sum of the squares (Rahman, Laosirihongthong and Sohal, 2010). Residual (or error) represents unexplained (or residual) variation after fitting a regression model. It is the difference (or left over) between the observed value of the variable and the value suggested by the regression model.

Table 8: Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.562	4	1.141	28.157	.000[b]
	Residual	4.820	119	.041		
	Total	9.382	123			

a. Dependent Variable: Operational performance

b. Predictors: (Constant), Lean Cost Management, Lean Waste Management, Lean Customer Orientation Management, Lean Quality Management

Table 8 depicts the numerical relationship between the independent variable and the predictor (independent) variables in the following resultant equation:

$$\text{Operational Performance} = 0.911 + 0.167X_{1i}$$

This model equation implies that when quality management practice increases by one unit, operational performance increases by 0.167 units. The findings of this study are comparable to the results of the study by Chavez et al (2013) on internal lean practices and operational performance with a perspective of industry clock speed. In this study all the variables had positive correlations and fostered a positive effect on the relationship between independent and dependent variables. However, the study found out that when analyzing lean practices, some of the variables (quality, flexibility and cost) indicated that the industry type where these firms operated had a negative beta coefficients of -0.039, -0.07 and -0.058 respectively. Similar studies where the variables were positively correlated and produced positive beta coefficients are studies by Rotich (2016) and Rahman, Laosirihongthong and Sohal (2010). Table 9 shows the correlation of quality management operational performance. From this data, there is a positive significant relationships between quality management (QM), the study found out that operational performance was positively correlated to Quality Management with a correlation value of 0.627.

Table9: Coefficients of the Model

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	.911	.139		6.568	.000
Quality Management	.167	.171	.198	.977	.330
a. Dependent Variable: Operational performance					

5 Summary of Findings

This study reconnoitered and anchored on both theoretical and empirical studies on lean practices, lean management and therefore on this standpoint, a conceptual model that helped in realizing this study was developed. Further, the hypothesized relationships based on the relationship of independent and dependent variables were tested and conclusions made thereof.

In order to conduct successful empirical test, several assumptions of the study variables were tested and which were positive thereby supporting the credibility, applicability and generalizability of this study. These tests were; normality tests, multicollinearity, heteroscedasticity test, linearity, outliers, and sampling adequacy test. With a response rate of 75.6%, and with many firms stating they were in third party port-centric logistics business the study was largely successful.

This study found out that there was a strong positive relationship between quality management as a lean practice with operational performance. This implies that when third party port-centric logistics firms that implemented lean quality, then end result is improved performance. This led to the rejection of the hypothesis (H_{01}) that there is no significant

difference in the relationship between quality management and operational performance of third party port-centric logistic firms in Kenya. One of the most critical journey a firm that is operations oriented can make and which considerably tilts performance positively, is the quality journey.

When logistics firms ensure all issues touching on operations are sensitively taken care of by ensuring that, equipment breakdowns does not escalate to the point of affecting performance, that policies such as 'no excess handling' and 'no wrong placements', then superior performance is bound to happen. Third party port-centric logistics firms that embraced formal quality approaches impacted on operational performance in a greater way than those that did not.

The findings of this study are in consistency with the findings of a study done by Bowersox et al (1985) on materials logistics management that found that orders requiring reworking before quality implementation were estimated to cost in excess of eight times the cost of properly produced items after adhering to quality standards. There is evidence to suggest that improving the quality of all logistics operations and supply chain stages results in reduced costs, improved resource utilization, and improved system efficiency, this is according to a in process quality model for the analysis, improvement and control of supply chain systems (Beamon & Ware, 1998).

Rahman (2006) in a study on quality management in logistics, examined industry practices and observed that managers described quality in logistics, and the respondents ranked on-time delivery, which is one of the quality issues in this study at 82.7 per cent, total support of customer needs at 53.8 per cent, and consistency of order cycle 40.4 per cent as the most important quality factors which positively supports the findings of this study. On-time delivery, and order cycle are frequently cited in literature as critical measures of logistics performance (Gunasekaran et al., 2001).

On the effect of regulations on the relationship between quality and operational performance of third party port-centric logistics firms in Kenya, it was found that regulations significantly moderates this relationship. Whether there was high or low intervention of the regulation agency the performance was in decline or increase. In the context of this study, all third party port-centric logistics firms for instance must operate within the law. Being the link between the exporter and importers, these firms play a critical role in the economic performance of the country and therefore on the side of the government would be a great risk. However, the regulations by these agencies largely affects the performance of these logistics firms.

5.3 Conclusions of the Study

The analysis of the data collected and analysed on third party port-centric logistics firms in Kenya revealed that quality management the relationship between quality management and operational performance was statistically significant. The firms that implement quality measures as a lean practice have better operational performance evidenced by its effect on operational performance. Any logistics service provider must institutionalize quality practice as informed by the institutional theory of management so that through organizational mechanisms the firm can create a common set of quality values, norms and rules to support the practice and boost performance.

The study was generally successful and relationship between quality management as a lean practice was demonstrated to be associated with operational performance. The model seemed weak but actually based on other studies it was a strong one owing to the fact that operational performance is affected a myriad of many other factors. For instance, a study by Rahman et al (2010) on the extent of lean practice on operational performance explained by lean strategy variables to between 21% and 29.3%.The results, scope and deliberations of this study also opens a new axis through which lean practices, lean thinking or even lean philosophy can be interrogated in any context at large, and in a specific way in services particularly in logistics services.

6 Recommendations

Supply chain management success in any organization depends on the effectiveness and excellence through which all the chain activities, whether primary activities or support activities are carried out. Amongst the primary activities are inbound logistics, in the upstream supply chain and outbound logistics in the downstream supply chain. The main objective of any supply chain is to deliver value to the customers in the most economical and efficient way.

Quality is one of this value package or proposition promised and must be delivered through the supply chain from the initial trigger activity upstream through logistics (inbound) to production and through physical distribution (outbound) of the finished product to the ultimate customer and consumer at the end of the chain. This study found out that quality management critically influences operational performance, whether these firms are regulated or not. Third party port-centric logistics services providers in Kenya therefore must not only continue embracing quality management systems but also formalize quality systems and integrate it into the organizational culture. This will not only foster and improve operational performance but as well boost the overall firm performance effectively expanding the fundamentals of these firms.

7 Further Research

The study concentrated on only four variables; quality management, waste management, customer orientation and cost management. In future, there is need to replicate this study in other service industries with expanded variables and compare the results with other studies. Third party logistics providers business is also largely dependent on other critical players such as regulators, port operations, providers of financial services, amongst others. An industry wide study can be conducted on all these firms and bring in more moderators and test the relations and the impact of all these on logistics services operational performance.

8 References

Aas, K. and Haff, I. H. (2006). The generalized hyperbolic skew Student's t-distribution. *Journal of Financial Econometrics*, 4(2), 275-309.

Barney, M. B. (2000). Measuring Supply Chain Performance. *International Journal of operations & Production Management,* 19(3), 275-92

Beamon, B. M., Ware, T. M. (1998). A process quality model for the analysis, improvement and control of supply chain systems. *Logistics Information Management,* 11(2), 105-13.

Bhasin, S. (2008). Lean and performance measurement. *Journal of Manufacturing Technology Management,* 19(5), 670-84.

Bhasin, S. (2011). Performance of organisations treating lean as an ideology. *Business Process Management Journal,* 17(6), 986 – 1011.

Bowersox, D. J., Carter, P. L., Monczka, P. (1985). Materials logistics management. *International Journal of Physical Distribution & Logistics Management*, 23(5), 46-51.

Choi, T.Y., Rungtusanatham, M. (1999). Comparisons of quality management practices: across the supply chain and industries. *The Journal of Supply Chain Management,* 35(1), 20-27.

Cohen, J., Cohen, P., West, S. G. & Aiken, L. S. (2013). *Applied Multiple Regression / Correlation Analysis for the Behavioral Science.* Routledge, New York.

Forker, L. B., Mendez, D., Herhauser, J. C. (1997). Total quality management in the supply chain: what is its impact on performance? *International Journal of Production Research*. 35(6), 1681-1701.

Gunasekaran, A., Patel. A., & Mcgaughey, R. E. (2003). A framework for supply chain performance measurement. *International Journal of Production Economics*. 87(3), 333-347.

Hair, J., Black, B. Babin, B., Anderson, R. & Tatham, R. (2006). *Multivariate Data Analysis* (6th ed.). Upper Saddle River, NJ: Prentice-Hall.

Krafcik, J. F. (1998). Triumph of the lean production system. *Sloan Management Review*. 30(1), 41-52.

MIT (2000). Transitioning to a Lean Enterprise: A Guide for Leaders. 1/2/3. Retrieved at: http://lean.mit.edu/Products/TTL/TTL-vol1.pdf

Motwani, J. (2003). A business process change framework for examining lean manufacturing: a case study. *Industrial Management & Data Systems.* 103(5), 339-46.

Ohno, T. (1988). *Toyota Production System - Beyond Large Scale Production.* Productivity Press. Cambridge. MA.

Onwuegbuzie, A. J., & Daniel, L. G. (2002). A framework for reporting and interpreting internal consistency reliability estimates. *Measurement and Evaluation in Counseling and Development,* 35(2), 89-103.

Pallant, J. (2007). *SPSS Survival Manual: A Step by Step Guide to Data Analysis using SPSS for Windows* (3rd ed.). Open University Press.

Papadopoulou, T. C. & Ozbayrak, M. (2005). Leanness: experiences from the journey to date. *Management Journal,* 16(7), 784-807.

Park, H. M. (2008). Univariate Analysis and Normality Test Using SAS Stata and SPSS, A Working Paper. *The University Information Technology Services (UITS) Center for Statistical and Mathematical Computing.* Indiana University.

Rahman, S. (2006). Quality management in logistics: an examination of industry practices. Supply Chain Management. *An international Journal.* 11(3), 233-40.

Rahman, S., Laosirihongthong, T., & Sohal, A.S. (2010). Impact of lean strategy on operational performance: a study of Thai manufacturing companies. *Journal of Manufacturing Technology Management.* 21(7), 839 - 852.

Rocha, R., Farazi, S., Khouri, R. & Pearce, D. (2011). *The status of bank lending to SMES in the Middle East and North Africa region : the results of a joint survey of the Union of Arab Bank and the World Bank*. Policy Research working paper ; no. WPS 5607. Washington, DC: World Bank. ttp://documents.worldbank.org/curated/en/443431468046484153/The-status-of-bank-lending-to-SMES-in-the-Middle-East-and-North-Africa-region-the-results-of-a-joint-survey-of-the-Union-of-Arab-Bank-and-the-World-Bank

Scott, W. R. (2004). *Institutional theory*. Encyclopedia of Social Theory. CA: Sage. 408-14

Sohal, A. S., Millen, R., Maggard, M. & Moss, S. (1999). Quality in logistics: a comparison of practices between Australian and North American/European firms. *International Journal of Physical Distribution and Logistics Management.* 29(4), 267-80.

Xu, L. & Beamon, B. N. (2006). Supply chain coordination and cooperation mechanisms: an attribute-based approach. *Journal of Supply Chain Management.* 42(1), 4-12.