The Impact of Supply Chain Management Practices on Supply Chain Performance in the Jordanian Industrial Sector

Dr. Faisal Al-Madi

Business Administration Department, The Hashemite University, Jordan

Abstract

Purpose- The purpose of this paper is to investigate the impact of supply chain management practices on supply chain performance in the Jordanian Industrial Sector. Also, it aims at assessing the level of awareness and understanding of supply chain management concepts and practices in the Jordanian context.**Design/ methodology/ approach-** The research methodology involved the adoption of a survey as a research strategy and quantitative approach, utilized a self-administered questionnaire, to arrive at the major findings of the study. The type of research is a single cross-sectional design in which the collection of data from the respondents was carried out only once. Data was analyzed using the statistical package for social sciences (SPSS). **Finding-** The paper revealed that there is an impact of supply chain management practices on supply chain performance in the Jordanian Industrial Sector. It also revealed that there is a high level of awareness among the respondent about the supply chain management concepts. **Originality/ value-** As far as the researcher is aware, this paper is the first to investigate the impact of supply chain management practices on supply chain performance in Jordan; thus its finding will be an original contribution to the field of supply chain. Also, as there has been a shortage of research in the field of supply chain, generally in the Middle East countries, the researcher hopes that this paper will establish a foundation for further research in the region.

Keywords: Supply chain management practices (SCMP), supply chain Performance (SCP), Industrial Sector, Jordan

Introduction:

In an increasingly competitive global marketplace, most firms are competing with a high level of market pressure worldwide. To be successful, they need to develop a better way to ensure that customers are satisfied with high service levels at acceptable prices. Based on this strategy, the focus is now shifting towards effective supply chain management. Instead of doing business with other organizations one by one, firms need to manage a whole network of relationships to include logistics and other business processes, from suppliers to end users.

It is widely argued that competition is no longer between organizations, but among supply chains. Effective supply chain management (SCM) has become a potentially valuable way of securing competitive advantage and improving organizational performance (Li, et al. 2005).

A supply chain is a system of people, activities, information, and resources involved in creating a product and then moving it to the customer (Ketchen, D., et al., 2008). A supply chain consists of all parties involved, directly or indirectly, in fulfilling a customer request. The supply chain includes not only the manufacturer and suppliers, but also transporters, warehouses, retailers, and even customers themselves (Chopra and Meindl, 2007).

As supply chains became more extended, and more parties are involved in its activities- due to firms outsourcing many of its operations and concentrating on their core competences- the success of an organization is not dependent on its internal operations only, but to the extent to which better management of its entire supply chain is implemented also. The need arises for better understanding of supply chain management practices and its effect on improving supply chain performance, which will lead to improving performance not only for the focal company but for the entire supply chain partners.

The problem of the study:

The changes which happened in the last decade makes customers more demanding, they are not looking for quality in products only, but they are seeking higher quality in the same (if not less) prices. And in a matter of minutes and few clicks they can browse hundreds of Internet pages and compare different types, models, features, and prices of different products.

In Jordan, we are not isolated from the rest of the world, our industries are not immune from global competition. If our industries want to remain in the marketplace, it must adapt to the new conditions, learn the new rules, and develop methods to exploit our resources in a ways that will provide enduring existence in the world markets. The main problem can be expressed by the following question: Is there an impact of SCM practices and SC performance?

Study questions:

This study will try to answer the following questions:

1. Is there any impact of SCM practices on supply chain performance?
2. Is there any impact of Strategic supplier partnership practices on supply chain performance?
3. Is there any impact of internal supply chain management practices on supply chain performance?
4. Is there any impact of Customer relationship management practices on supply chain performance?

Literature Review:
Abdallah et al., (2014) found that supply chain management has a positive impact on an organizations performance and competitive advantage. They further highlights that the supply chain management practices do not only affect the flexibility performance but the levels of output and the performance of the resources available within the organization. Furthermore, they indicated that beside customer relations, all other components of the supply chain management positively affect the performance of the supply chain. According to Diab et al., (2015), due care on the part of the supplier affects the element of supplier partnership. Green purchasing is a relatively new concept and an additional element to the supply chain management. It entails the tendency of an organization to assess the practices adopted by their suppliers in their operations to ensure that they preserve the environment. Under supply chain management, green purchasing is defined as the environmental plans laid down by an organization to ensure a steady receipt of long term material and system requirements. Moreover, Diab et al., (2014) suggest that eco-designing and product packaging influences the relationships within the supply chain. This concept requires that suppliers or manufacturers adopt product designs that reduce the use of materials and energy. This means that some of the buyers will be inclined to engage suppliers who exercise this in the supply chain. Considering the growing trends of consumption of eco-friendly products and use of eco-friendly fuels, implementation of the eco-designs and packaging may result in improved performance of the supply chain and the organization as a whole.

According to Sabry (2015), material warehousing affects the nature and performance of the supply chain and supply chain management. In management of the materials requirements, managers aim at ensuring efficiency in filling of orders, reducing back logs and ineffective inventory levels and reducing the time need to market. A research highlighted in this article indicated that the indicators of inventory levels, that is, raw materials, final output and the volume of storage, and the time required for inventory turnover and filling of orders have a positive association with the supply chain management practices within an organization. These aspects of supply chain management have been in application for a while but the concept of green supply chain management as discussed by Diab et al. (2015) may be considered as being relatively new. Findings highlighted in the article by Diab et al. (2015) suggest that implementation of the green supply management results in improvement of environmental performance and improvement of an organization's economic and operational performance. The pertinent elements of supply chain management practices must be adhered to in order to realize positive performance in the supply chain.

Supply chain management has certainly become an important component for the profitability of any organization. It is important to highlight that there has been recent development in the supply chain management. Karimi and Rafiee (2014) identified that the most recent developments in supply chain management incorporate sharing of information technology, outsourcing practices, supplier partnership and continuous process flow. The SCM practices revolve around purchasing, customer relations and production of quality products to improve organizations core competencies. Additionally, the use of systems such as the EDIs, which are basically inter-organization systems, has become a prevalent practice about SCM as well as the tendency to eliminate excess inventory levels by delaying customization towards the end of the supply chain. Karimi and Rafiee (2014) further explains that the core aspects of supply chain management can be identified through factor analysis which entails the characteristics of the supply chain, supply chain integration, management of customer service, capabilities of just in time inventory systems and sharing of information. The relationship between the supplier and the buyer is measured using cross functional teams, levels of communication, the length of the relationship and the involvement of the supplier in the supply chain.

Some other features evident within the supply chain such as cooperation, process integration, sharing of risks and returns and concurring on the supply chain leadership depict the supply chain management practices as being geared towards achieving an organization's goals and improving the overall organization performance. Further assessment by Karimi and Rafiee (2014) indicate that the supply chain management practices cover multiple sides of the supply chain. Strategic partnerships with suppliers covers the upstream and customer relations cover the downstream. The aspect of flow of information throughout the supply chain aims at identifying the extent and the quality of the shared information while the internal supply chain process focusses on postponement in the supply chain. It is important to note that these components of the supply chain cannot be regarded as conclusive given the dynamic nature of the supply chains and evolving business practices.

Lee et al. (2007) explored the relationship between supply chain linkages and supply chain performance in terms of supplier, internal, and customer linkages perspective. Performance of the participating firms (from a wide range of industries) was measured in terms of cost containment and performance reliability. The findings in

their study indicate that internal linkage is a primary determinant of cost containment performance. Supplier linkage is a key indicator of performance reliability as well as overall performance. They further identified that E-ordering system, reliable delivery system, and access to inventory information are primary determinants in the cost-containment model. Fast and easy ordering system, reliable delivery system, and user-friendly access to inventory system are primary factors, which determine performance reliability. These findings provide management with strategically important insights that e-ordering and a fast and easy ordering system in customer linkage is primary factors for enhancing SCM cost-containment and reliability performance, and reliable delivery in supplier linkage and user-friendly access to inventory information in internal linkage is key success factors for enhancing SCM performance.

Zhou and Benton (2007), studied 125 North American manufacturing firms to investigate the relationship between information sharing and supply chain practice, the influence of supply chain dynamism on information sharing and supply chain practice, and the impact of information sharing and supply chain practice on delivery performance. In their study, three categories of supply chain practice are considered: supply chain planning, just-in time (JIT) production, and delivery practice. A group of supply chain practice is regarded as effective supply chain practice if the selected best practices have been implemented.

Lenny et al. (2007) studied the relationships among SCM practices, operational performance and SCM-related organizational performance. Data for their study was collected from a sample of 203 manufacturing SMEs operating in the manufacture of fabricated metal products and general-purpose machinery within the city of Istanbul in Turkey. SCM practices were found to have direct positive and significant impact on operational performance; in contrast, SCM practices were not found to have a significant and direct impact on SCM-related organizational performance.

Their study identifies a set of 12 SCM practices: Close partnership with suppliers, Close partnership with customers, Just in time supply, Strategic planning, Supply chain benchmarking, Few suppliers, Holding safety stock, sub-contracting, E-procurement, Outsourcing, third party logistics and Many suppliers.

Kim S. W., (2006), examines the causal linkages among supply chain management (SCM) practice, competition capability, the level of supply chain (SC) integration, and firm performance. He found that, in small firms, the role of SC integration as a critical intervening variable between SCM practice or competition capability and firm performance is highly emphasized, while in large firms, the infrastructural role of SC integration which drives the strong interrelationship between SCM practice and competition capability is stressed. This means that large firms had already achieved considerable levels of SC integration, and, based on such high level of SC integration, closer interrelationship between SCM practice and competition capability and more significant direct effect of these two constructs on performance might be possible. It can be interpreted from his results that in small firms, efficient SC integration may play a relatively more critical role for performance improvement, while in large firms, the close interrelationship between SCM practice and competition capability may have more significant effect on performance improvement. This implies that, in early stages of SC integration process, the emphasis on systematic SC integration may be more crucial, and once SC integration has progressed somewhat, it may be advisable to focus on SCM practice and competition capability.

Li et al. (2006), utilized their instrument (developed in 2005) for measuring supply chain practices in studying the impact of SCM practices on organizational performance and competitive advantage, they find that SCM practices as a multidimensional concept cover upstream and downstream supply chain as well as internal supply chain. Also their study revealed a significant impact of SCM practices on organizational performance and competitive advantage. The results indicate that higher levels of SCM practice can lead to enhanced competitive advantage and improved organizational performance. Also, competitive advantage can have a direct, positive impact on organizational performance.

Tan et al. (2002) explores the relationships between supply chain management practices, supplier evaluation practices and organizational performance. They identify six aspects of SCM practices: supply chain integration, information sharing, supply chain characteristics, customer service management, geographical proximity and JIT capability.

They find out that geographical proximity was positively correlated to market share, which lead us to conclude that locating closer to suppliers or customers has a positive impact on market share. Also, they find a positive relationship between (overall product quality and JIT capability) and supply chain characteristics. JIT capability has the largest impact on performance. Correlation of supplier evaluation factors with performance indicates that product and delivery assessment is positively correlated to overall customer service level.

Their six aspects of SCM practices was identified through factor analysis of 24 supply chain practices, which are:

- Supply chain integration: Searching for innovative ways to integrate SCM activities, reducing response time across the SC, improving integration activities across SC, establishing more frequent contact with SC members and creating a compatible communication /information system.
- Information sharing: Use of formal information sharing agreements, determine customer's future needs,

use of information sharing, participate in the sourcing decisions of your suppliers and communicating customers' future strategic needs.
- Supply chain characteristics: Identifying additional SC, suppliers' on-time delivery directly to your points of use, communicating your future strategic needs to your suppliers and creating a greater level of trust among SC members.
- Customer service management: Your on-time delivery directly to customers' points of use, contacting the end users of your products to get feedback, extending SC beyond immediate suppliers and customers, involving SC members in your product/service/marketing plans and creating SCM teams to include different companies.
- Geographical proximity: Locating closer to your customers, requiring suppliers to locate closer to your firm and participate in the marketing efforts of your customers.
- JIT capability: Aiding your suppliers to increase their JIT capabilities and increasing your firms' JIT capabilities.

In the literature, various frameworks and models to classify SC performance measures have been proposed:
- Plan/source/make/deliver (Gunasekaran et al., 2004; Gunasekaran et al., 2001);
- Plan/source/make/deliver/return (Shepherd and Gunter, 2006);
- Scorecard approach (Brewer and Speh, 2000; Bullinger et al., 2002); and
- Qualitative and quantitative (Chan et al., 2003; Shepherd and Gunter, 2006).

There are many publications that have addressed performance measurement in SCM.

Beamon (1999) presents a framework for the selection of performance measurement systems for manufacturing supply chains. Three types of performance measures are identified as necessary components in any supply chain performance measurement system: resources, output, and flexibility.

Ramdas and Spekman (2000), defined six variables that reflect different approaches to measuring supply chain performance: inventory, time, order fulfillment, quality, customer focus, and customer satisfaction.

Gunasekaran et al. (2001) developed a framework for measuring the performance from strategic, tactical and operational levels in supply chains; this framework mainly deals with suppliers, delivery performance, customer service, and inventory and logistics costs.

To answer the question: how should the performance of SCM be measured? Otto A.and Kotzab H., (2003) suggested six perspectives on SCM. Each perspective follows a particular set of goals, which consequently leads to a particular set of performance metrics. The various perspectives refer to these disciplines, which contributed the most to the development of SCM: Systems Dynamics, Operations Research/Information Technology, Logistics, Marketing, Organization and Strategy.

Gunasekaran et al. (2004) used the framework presented by Gunasekaran et al. (2001) in developing a survey used to study performance measures and metrics used in a supply chain environment, in which the participants were asked to rate the importance of each measure identified in their framework.

Their results are shown in the following table where the items in each cell are listed in the order of importance based on percentage importance ratings found on their survey.

Supply chain activity/ process	Strategic	Tactical	Operation
Plan	Level of customer perceived value of product, Variances against budget, Order lead time, Information processing cost, Net profit Vs productivity ratio, Total cycle time, Total cash flow time, Product development cycle time	Customer query time, Product development cycle time, Accuracy of forecasting techniques, Planning process cycle time, Order entry methods, Human resource productivity	Order entry methods, Human resource productivity
Source		Supplier delivery performance, supplier lead time against industry norm, supplier pricing against market, Efficiency of purchase order cycle time, Efficiency of cash flow method, Supplier booking in procedures	Efficiency of purchase order cycle time, Supplier pricing against market
Make/ Assemble	Range of products and services	Percentage of defects, Cost per operation hour, Capacity utilization, Utilization of economic order quantity	Percentage of Defects, Cost per operation hour, Human resource productivity index
Deliver	Flexibility of service system to meet customer needs, Effectiveness of enterprise distribution planning schedule	Flexibility of service system to meet customer needs, Effectiveness of enterprise distribution planning schedule, Effectiveness of delivery invoice methods, Percentage of finished goods in transit, Delivery reliability performance	Quality of delivered goods, On time delivery of goods, Effectiveness of delivery invoice methods, Number of faultless delivery notes invoiced, Percentage of urgent deliveries, Information richness in carrying out delivery, Delivery reliability performance

Table 1: Supply chain performance metrics framework
Source: Developed by the author

Gunasekaran and Kobu (2007), After reviewing recently published (1995 –2004) articles focusing on performance measurement system in SCM, they were able to reduce the measures used by authors to 27 measures called ''Key Performance Indicators (KPI)'', which are shown in table 2 below.

Phases in supply chain	Performance measures/metrics	
	Financial	Nonfinancial
Plan	Return on investment, Selling price	Labor efficiency, perceived value of product, product development cycle time, bidding management cycle time, compliance to regulations, forecasting accuracy, perceived value of product, supply chain response time
Source	Scrap/obsolescence cost, inventory cost, selling price of goods and service	Labor efficiency, product development time, lead time for procurement including supplier development time, delivery reliability, product and service variety
Make	Scrap/obsolescence cost, Overhead cost, inventory cost, selling price of goods/services, value added	Labor efficiency, Conformance to specifications, capacity utilization, lead-time for manufacturing, production flexibility, process cycle time, accuracy of scheduling, product and service variety, value added
Deliver	Overhead cost, value added, inventory cost, stock-out cost, transportation cost and warranty cost	Labor efficiency, Delivery reliability, perceived value of product, value added, product and service variety, perceived quality

Table 2. Key performance measures / metrics in logistics and SC environment.
Source: Developed by the author

Theoretical framework and Study Model:
SCM practices is the independent variable for this study and can be defined as the set of activities undertaken by an organization to promote effective management of its supply chain (Li et al. 2005). From the literature review, the most important dimensions that capture SCM practices construct have been chosen, which are: strategic supply partnership, internal supply chain management, customer relationship management.

Supply chain performance is the dependent variable for this study and can be defined as the set of criterion used to measure the extent to which supply chain is accomplishing its objectives. From the literature review, the most critical measure of supply chain performance was identified to include: plan, source, make and deliver.

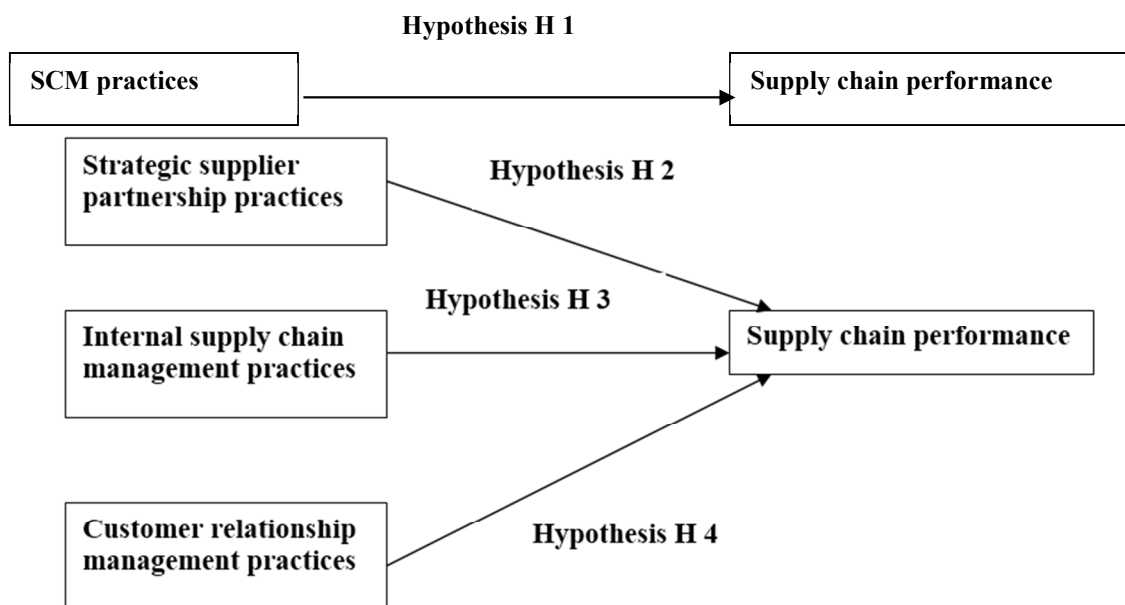Accordingly, the following model was developed.

Figure 1: Conceptual Framework of SCM practices and supply chain performance.
Source: Developed by the author

Methodology:
Study Population and Sample: The population of this study includes all the Jordanian industrial companies listed in Amman Stock Exchange. A sample of (150) was chosen guided by Sekaran (2003). The questionnaire had been administrated personally. (120) questionnaires were returned and analyzed; with a (80%) response rate.
Instrument Validity and Reliability:
Validity: The questionnaire was reviewed by four experts- whose knowledge and experiences were sufficient in this scope -to make sure that each item is measuring exactly what is intended to to be measured. Furthermore, a pilot study was conducted on 30 respondents to test the research instrument before distributing it to the whole sample. Upon the feedback of the experts and the pilot study the questionnaire had been amended taking into consideration their suggestions, comments, and directions to achieve the validity of the instrument.

Statement	No. of Questionnaires
Number of Questionnaires Distributed	150
Number of Questionnaires Retrieved	120
Response Rate	80%

Table 3: Response Rate of Questionnaire

Reliability: Reliability is the extent to which a variable (or set of variables) is persistent in what is intended to measure (Hair et al., 2005). The Cronbach's Alpha value used to test the reliability of the items measuring each variable. A reliability measure coefficient reflects how well items in a set are positively correlated to one another. Accordingly, the internal consistency method was used in this study to examine the reliability of each variable. Table 4 below shows that all the values of alpha are above 0.60, which are considered to be acceptable according to (Sekaran, 2003).

No.	Variables	Number of Items	Cronbach's Alpha	Mean	Std. Deviation
1	Strategic supplier partnership practices	12	.878	4.00	.878
2	Internal supply chain management practices	10	.929	4.44	.729
3	Customer relationship management practices	12	.881	4.02	.825
4	Supply chain performance	17	.880	3.975	.806
	Total	51	.789	4.108	0.892

Table 4: Summary of Reliability Analysis

K-S test (Kolmogorov-Smirnov)
To identify whether to use parametric or non-parametric test, K-S test was used to assess the normality of the data set. The K-S test is used to assess normality by comparing the empirical cumulative distribution of the data with the distribution suggested by the cumulative normal distribution. The results are shown below and they indicate that the data are normally distributed and parametric tests could be used safely. Also, a graphical analysis of the difference between the empirical distribution and the normal distribution to show their relative closeness is provided.

	y
Mean	3.975490196
Standard Error	0.04397645
Median	3.911764706
Mode	3.764705882
Standard Deviation	0.48173787
Sample Variance	0.232071375
Kurtosis	0.069972747
Skewness	0.463200051
Range	2.058823529
Minimum	2.941176471
Maximum	5
Sum	477.0588235
Count	120

Bin	Frquency	Midpoint	Bin-Sqrd
2.941176	3	1.470588	2.16263
3.191176	3	3.066176	9.401438
3.441176	3	3.316176	10.99703
3.691176	14	3.566176	12.71761
3.941176	49	3.816176	14.5632
4.191176	21	4.066176	16.53379
4.441176	6	4.316176	18.62938
4.691176	3	4.566176	20.84997
4.941176	12	4.816176	23.19556
5.191176	6	5.066176	25.66614

| Cum.	pct.	z-score	n.dist	Actual - NormDist
3	2.50%	-1.66122	0.048334	0.023334263
6	5.00%	-1.24837	0.105947	0.055947499
9	7.50%	-0.83552	0.201713	0.126712628
23	19.17%	-0.42267	0.336269	0.14460229
72	60.00%	-0.00982	0.496084	0.103915698
93	77.50%	0.403037	0.656539	0.118460602
99	82.50%	0.815889	0.792718	0.032281864
102	85.00%	1.228741	0.890416	0.040415518
114	95.00%	1.641593	0.949663	0.000337191
120	100.00%	2.054445	0.980034	0.019966317
120	100.00%		1	0
120	100.00%		1	0
		Max Value	0.144602	
		KS Stat	0.155	

Table 5: K-S results
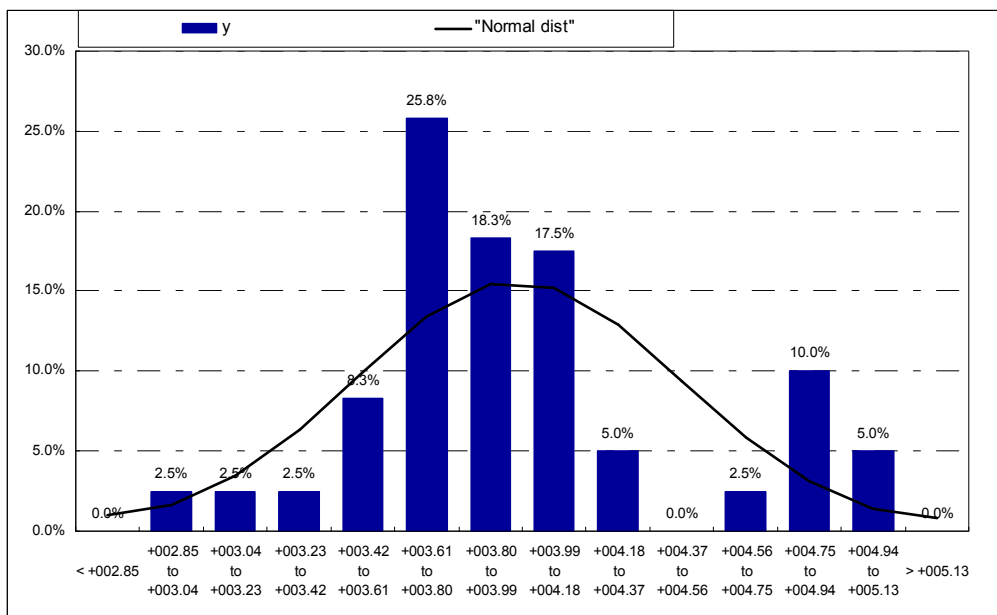
Figure 2: K-S results

Data Analysis and Findings
Descriptive Statistics of the Data:
SCM Practices: Strategic supplier partnership practices
Table 6 below depicts the Mean and Standard Deviation for SCM in terms of Strategic supplier partnership practices. The values were calculated based on the answers from the respondents.

Statement – Strategic supplier partnership practices	Mean	Standard Deviation
We consider quality as the most important criterion in selecting our suppliers	4.525	0.6606
We consider lead time as the most important criterion in selecting our suppliers.	3.717	0.7580
We consider price as the most important criterion in selecting our suppliers.	2.942	1.0150
We have a formal supplier development program in our organization.	4.025	1.1410
The relationship between our key suppliers and our organization is a long-term relationship.	4.467	0.6852
We regularly solve problems jointly with our suppliers.	4.225	0.8144
Our suppliers keep us fully informed about issues that affect our business.	4.183	1.0207
We and our suppliers exchange information that helps establishment of business planning	4.183	0.7445
We and our suppliers keep each other informed about events or changes that may affect the other partners	4.075	1.0703
Information exchange between our suppliers and us is timely, accurate and complete	4.075	0.8615
Information exchange between our suppliers and us is adequate and reliable	4.158	0.6217
We actively involve our key suppliers in new product development processes and the improvement of our product quality	3.450	1.1512
Total	**4.002**	**0.0535**

Table 6: Descriptive statistics of Strategic supplier partnership practices

Based on the data collected from the respondents the mean of the data after the calculation was 4.002. This means the respondents demonstrate optimal level of attitude towards SCM in terms of Strategic supplier partnership. In other words, the respondents show positive attitude towards SCM.

Internal supply chain management practices

Table 7 below depicts the Mean and Standard Deviation for SCM in terms of internal supply chain management practices. The values were calculated based on the answers from the respondents.

Statement – Internal supply chain management practices	Mean	Standard Deviation
In our organization there is joint establishment of objectives between departments.	4.350	1.0261
In our organization there are joint decisions between departments about ways to improve work.	4.367	0.9521
In our organization all departments exchange information that helps establishment of business planning.	4.400	0.6404
In our organization all departments keep each other informed about events or changes that may affect the other departments.	4.317	0.8094
Information exchange between our departments is timely, accurate and complete	4.225	0.9025
Information exchange between our departments is adequate and reliable	4.483	0.6078
We consider quality as the most important ingredient of our organization.	4.600	0.5997
We have continuous quality improvement programs that include all departments.	4.533	0.6071
We have training programs for all employees	4.675	0.5371
Each employee in this organization takes appropriate type of training program.	4.517	0.6078
Total	**4.446**	**0.0532**

Table 7: Descriptive statistics of internal supply chain management practices

Based on the data collected from the respondents the mean of the data after the calculation was 4.446. This means the respondents demonstrate optimal level of attitude towards SCM in terms of internal supply chain management. In other words the respondents show positive attitude towards SCM.

Customer relationship management

Table 8 below depicts the Mean and Standard Deviation for SCM in terms of customer relationship management practices. The values were calculated based on the answers from the respondents.

Statement – Customer relationship management practices	Mean	Standard Deviation
The relationship between our organization and our main customers is a long-term relationship.	4.517	0.5498
We have a formal teamwork between our organization and our main customers.	4.125	0.9576
We regularly solve problems jointly with our main customers.	3.725	0.9435
We include our main customers in our planning and goal-setting activities.	3.458	0.9692
We actively involve our main customers in new product development processes.	3.333	0.8824
Our customers have helped us to improve our product quality.	3.892	0.7647
We have a formal system to handle customer's complaints.	4.342	0.8147
We inform our customers in advance about any issues that may affect their business.	4.125	0.9399
We and our customers keep each other informed about events or changes that may affect the other partners	4.092	0.8599
Information exchange between our customers and us is timely, accurate and complete	4.142	0.7136
Information exchange between our customers and us is adequate and reliable	4.325	0.7466
We frequently measure and evaluate customer satisfaction	4.225	0.7611
Total	**4.025**	**0.0501**

Table 8: Descriptive statistics of customer relationship management practices

Based on the data collected from the respondents the mean of the data after the calculation was 4.025. This means the respondents demonstrate optimal level of attitude towards SCM in terms of Customer relationship management. In other words the respondents show positive attitude towards SCM.

Supply chain performance

Table 9 below depicts the Mean and Standard Deviation for SCM in terms of supply chain performance. The values were calculated based on the answers from the respondents.

Statement – Supply chain performance	Mean	Standard Deviation
Our organization product development cycle time is short.	3.425	0.8760
Our organization compliance to regulations is very good.	4.617	0.5374
Our organization forecasting accuracy is high.	4.267	0.6447
Our organization Supply chain response time is very good.	4.275	0.7443
Our organization Lead-time for procurement is short.	3.383	0.9543
Our Suppliers provide a reliable delivery to our organization.	3.983	0.7777
Our organization offers a wide range of products and services.	3.383	1.1536
Our organization conforms to customer specifications.	4.367	0.7552
Our organization Capacity utilization is high.	4.508	0.6481
Our organization Lead-time for manufacturing is short.	3.775	0.9827
Our organization has high flexibility in its Production.	3.392	1.0232
Our organization Process cycle time is short.	3.417	0.9923
Our organization Accuracy of scheduling is high.	4.367	0.6342
Our organization provides dependable delivery.	4.542	0.6337
Our organization delivers customer orders on time.	4.283	0.7355
Our organization provides flexible delivery.	3.817	0.8094
Our organization Order lead-time is short.	3.783	0.8011
Total	**3.9754**	**0.0439**

Table 9: Descriptive statistics of supply chain performance

Based on the data collected from the respondents the mean of the data after the calculation was 3.97. This means the respondents positive attitude towards SC performance.

Correlation Analysis between SCM practices and Supply chain practices

Table 10 below depicts the relationship between SCM practices and supply chain performance. Based on the data collected from the respondents and after the analysis, one can say that all correlation statistics are significant. Thus, if we were to solely rely on correlation analysis to assess the strength of the relationship among the different variables, then we would conclude that Customer Relation, Internal Supply, and Strategic Supplies are all positively and strongly correlated to Supply Chain Performance

	Supply Chain p	Strategic Supplies	Internal Supply	Customer Relation
SupplyChainP	1			
StrategicSupplies	**0.467439**	1		
Internal Supply	0.575436	**0.803843**	1	
CustomerRelation	0.584962	0.759271	0.756579	1

**. Correlation is significant at the 0.01 level (2 - tailed).

Table 10: Correlation coefficients of SCMP and SCP

Multiple Regression Analysis:

The results of the regression analysis partly agree with those of the correlation analysis. More specifically, while the correlation analysis shows a strong positive relationship among all variables, the regression analysis highlights that only Customer Relation and Internal Supply are significantly related to Supply Chain Performance in a multi-variable regression.

The below figure shows us the multiple regression analysis details which indicate:

1. $R^2 = .39$, which means that 39% of the volatility and variability in supply chain practices is explained by strategic supplies, internal supply and customer relationship management.
2. The p-value analysis, as shown below, shows that only Internal Relation, denoted by x_2, and Customer Relation, denoted by x_3, are significantly important in predicting the variability in Supply Chain Performance. While the p-value of Strategic Supply Management, denoted by x_1, is 0.229 which renders it insignificant in the regression analysis.

Regression Statistics								
Multiple R	0.625404473							
R Square	0.391130754							
Adjusted R Square	0.375384136							
Standard Error	0.38073017							
Observations	120							
ANOVA								
	df	SS	MS	F	Significance F			
Regression	3	10.80166	3.600553333	24.83903172	1.74236E-12			
Residual	116	16.81483366	0.144955463					
Total	119	27.61649366						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	1.611079156	0.281030097	5.732763767	7.96743E-08	1.054463639	2.167694673	1.054463639	2.167694673
x1	-0.131184168	0.108562452	-1.208375141	0.229360578	-0.346205784	0.083837447	-0.346205784	0.083837447
x2	0.327273381	0.108599476	3.013581572	0.00317107	0.112178434	0.542368328	0.112178434	0.542368328
x3	0.356309411	0.105441565	3.379212077	0.000990677	0.147469105	0.565149717	0.147469105	0.565149717

Table 11: Results of Regression analysis

To prove our assumption we run the regression analysis without the first variable **(strategic suppliers partnerships practices)** and it gives us almost the same result as it shown in the below figure. In fact, the f-test statistic for the second regression is higher than the first regression which provides us with a greater comfort for the fit of the entire model.

Regression Statistics								
Multiple R	0.619246724							
R Square	0.383466505							
Adjusted R Square	0.372927471							
Standard Error	0.381478157							
Observations	120							
ANOVA								
	df	SS	MS	F	Significance F			
Regression	2	10.59000031	5.295000156	36.38535579	5.15781E-13			
Residual	117	17.02649334	0.145525584					
Total	119	27.61649366						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	1.599847936	0.28142817	5.684746974	9.78379E-08	1.042494193	2.157201678	1.042494193	2.157201678
x2	0.256532815	0.091649332	2.799069107	0.005996174	0.075026115	0.438039515	0.075026115	0.438039515
x3	0.306813999	0.097351457	3.151611772	0.002062456	0.114014539	0.499613458	0.114014539	0.499613458

Table 12: Results of Regression analysis without strategic suppliers' partnership

Finally, the graph below shows the predictive power of the regression variables (x2, and x3) in forecasting the variability in Supply Chain Performance, denoted by "y" in the graph. The graph was constructed using the regression equation as shown above.
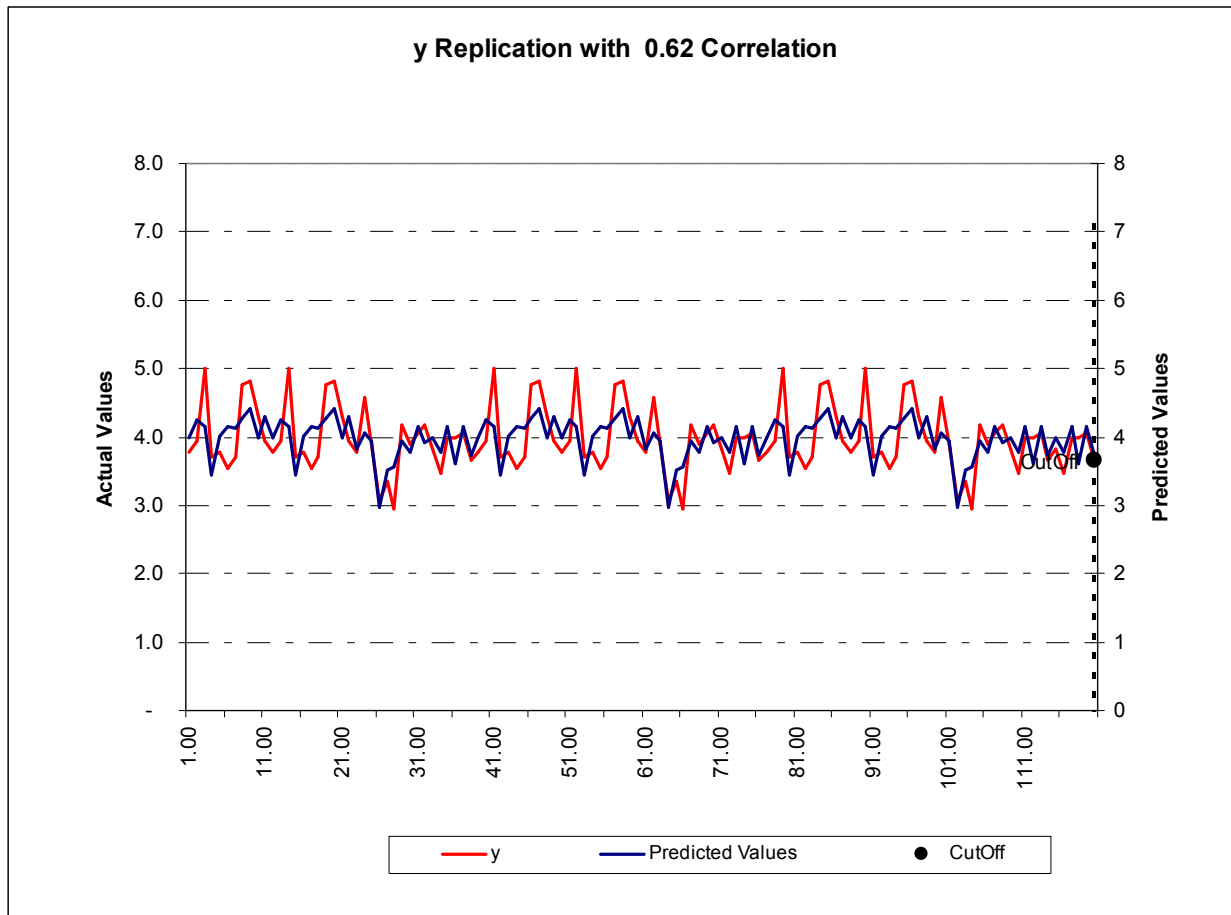
Figure 3: The predictive power of the regression variables

Simple Regression Analysis:
The graphs below show the results of regressing the Supply Chain Performance with Internal Supply, denoted by x2, and Customer Relation, denoted by x3. Based on the multi-variable regression above, both of these factors are significantly important in predicting the variability and direction of the Supply Chain Performance. The single-variable regression model is shown in each graph.
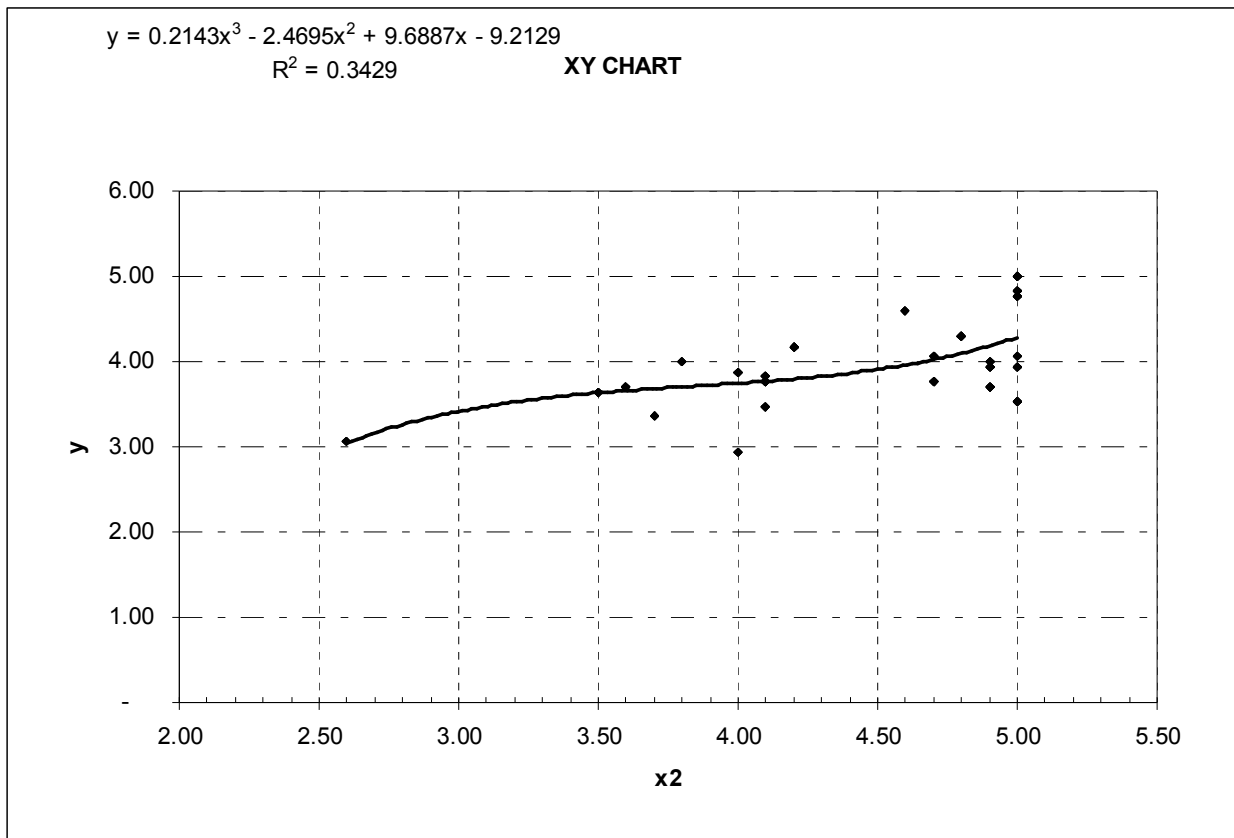
Figure 4: The results of simple regression of Internal Supply Chain Management Practices
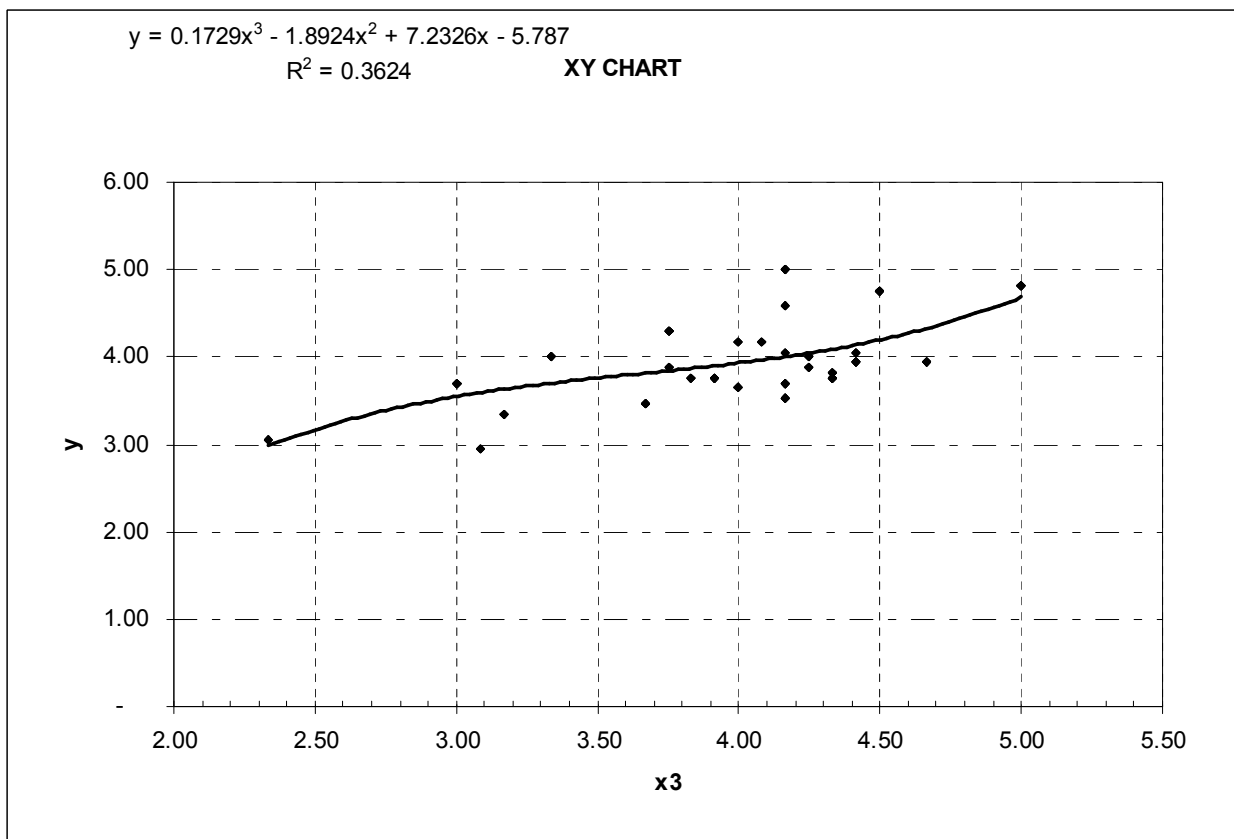

Figure 5: The results of simple regression of Customer Relationship Management Practices

Results and Conclusion:
The influence of Strategic supplier partnership practices on Supply chain performance.
The results are a bit mixed with regard to this variable. While the correlation analysis shows a significant positive correlation between the variable and Supply Chain Performance, the regression analysis does not support this relationship. It could be that Strategic Supplier Partnership is not a significant factor overall. The regression analysis is a more stringent procedure to test for significance

The influence of Customer relationship management practices on Supply chain performance.
The results showed that Customer relationship management practices positively affect Supply chain performance (p< .001). Therefore, H3 is supported. This means that any increase in Customer relationship management practices will increase the supply chain performance.
The influence of internal supply chain management practices on Supply chain performance. The results showed that supply chain management practices positively affect Supply chain performance (p< .001). Therefore, H4 is supported. This means that any increase in Customer relationship management practices will increase the supply chain performance.

Based on the above mentioned results it could be concluded that all the three variables have some degree of influence on Supply Chain Performance. However, additional tests and data collections will be needed to come to a more conclusive result as to whether Strategic Partnership is an important factor in analyzing supply chain performance.

References
Abdallah, A., Obeidat, B., & Aqqad, N. (2014). The Impact of Supply Chain Management Practices on Supply Chain Performance in Jordan: The Moderating Effect of Competitive Intensity. *IBR*, *7*(3). http://dx.doi.org/10.5539/ibr.v7n3p13
Beamon, M.B. (1999), "Measuring supply chain performance", International Journal of Operations & Production Management, Vol.19 No. 3, pp 275-292.
Brewer, P.C. and Speh, T.W. (2000), "Using the Balanced Scorecard to measure supply chain performance", Journal of Business Logistics, Vol. 21, No.1, pp. 75-93.
Bullinger, H.-J., Kuhner, M. and van Hoff, A. (2002), "Analysing supply chain performance using a balanced measurement method", International Journal of Production Research, Vol. 40,No. 15, pp. 3533-43.
Chan, F.T.S., Qi, H.J., Chan, H.K., Lau, H.C.W. and Ip, R.W.L. (2003), "A conceptual model of performance measurement for supply chains", Management Decision, Vol. 41/7, pp. 635-42.
Chopra, S., Meindl, P., (2007). Supply Chain Management: Strategy Planning and Operation. Pearson education,Inc, Upper Saddle River, NJ.
Diab, S., AL-Bourini, F., & Abu-Rumman, A. (2015). The Impact of Green Supply Chain Management Practices on Organizational Performance: A Study of Jordanian Food Industries. *Journal Of Management And Sustainability*, *5*(1). http://dx.doi.org/10.5539/jms.v5n1p149
Gowen C. R. and Tallon W. J., (2003), "Enhancing supply chain practices through human resource management", Journal of Management Development, Vol. 22, No. 1, pp. 32-44
Gunasekaran, A., Patel, C. and McGaughey, R.E. (2004), "A framework for supply chain performance measurement", International Journal of Production Economics, Vol. 87 No. 3, pp. 333-47.
Gunasekaran, A., Patel, C. and Tirtiroglu, E. (2001), "Performance measures and metrics in a supply chain environment", International Journal of Operations & Production Management, Vol. 21 Nos 1-2, pp. 71-87.
Gunasekaran A. and Kobu B.(2007), "Performance measures and metrics in logistics and supply chain management: a review of recent literature (1995–2004) for research and applications", International Journal of Production Research, Vol. 45, No. 12, pp 2819–2840.
KARIMI, E., & RAFIEE, M. (2014). Analyzing the Impact of Supply Chain Management Practices on Organizational Performance through Competitive Priorities (Case Study: Iran Pumps Company). *IJARAFMS*, *4*(1). http://dx.doi.org/10.6007/ijarafms/v4-i1/503
K. Lenny , D. Mehmet, B. Erkan , T. Ekrem, Z. Selim (2007), "The impact of supply chain management practices on performance of SMEs", Industrial Management & Data Systems Vol. 107 No. 1, 2007 pp. 103-124.
Ketchen, D., Rebarick, W., Hult, G. T., & Meyer,D.(2008). Best value supply chains: A key competitive weapon for the 21st century. Business Horizons 51, 235-243
Kim S. W.,(2006), "Effects of supply chain management practices, integration and competition capability on performance", Supply Chain Management: An International Journal, Vol. 11 · No. 3 · pp. · 241–248
Lee C.W., Kwon I.G. and Severance D. (2007), "Relationship between supply chain performance and degree of linkage among supplier, internal integration, and customer",Supply Chain Management: An

International Journal Vol. 12 No. 6, pp. 444–452

Li, Suhong, Ragu-Nathan, B., Ragu-Nathan, T.S. and Rao, S.S. (2006), "The impact of supply chain management practices on competitive advantage and organizational performance", Omega, Vol. 32, pp. 107-124.

Otto A.and Kotzab H. ,(2003) "Does supply chain management really pay? Six perspectives to measure the performance of managing a supply chain", European Journal of Operational Research Vol.144 pp. 306–320

Sabry, A. (2015). The Impact of Supply-Chain Management Capabilities on Business Performance in Egyptian Industrial Sector. *IJBM*, *10*(6). http://dx.doi.org/10.5539/ijbm.v10n6p251

Sekaran, U. (2003). "*Research Method in Business*", 4th ed, John Willy&Son, Inc.

Shepherd, C. and Gunter, H. (2006), "Measuring supply chain performance: current research and future directions", Journal of Productivity and Performance Management, Vol. 55 Nos 3/4, pp. 242-258.

Suhong Li , S. Subba Rao , T.S. Ragu-Nathan , & Bhanu Ragu-Nathan (2005). Development and validation of a measurement instrument for studying supply chain management practices. Journal of Operations Management 23 618–641

Tan, K.C., Kannan, V.R., Handfield, R.B.and Ghosh S., (1999), "Supply chain management: an empirical study of its impact on performance", International Journal of Operations & Production Management, Vol. 19 No. 10, 1999, pp. 1034-1052.

Tan, K.C., Lyman, S.B. and Wisner, J.D., (2002), "Supply chain management: a strategic perspective", International Journal of Operations and Production Management, Vol. 22 No. (6), pp.614–631.

Ramdas K. and Spekman R. E.(2000), "Chain or Shackles: Understanding What Drives Supply-Chain Performance",Interfaces,Vol30 No. 4, pp 3-21.

Rao T. V.M., Phillips C. L.M. and Johnson M. (2006), "Assessing supply chain management success factors: a case study", Supply Chain Management: An International Journal, Vol.11 No.2, pp. 179–192.

Zhou H. and Benton W.C. Jr. (2007), "Supply chain practice and information sharing", Journal of Operations Management Vol. 25, pp 1348–1365