European Journal of Business and Management
ISSN 2222-1905 (Paper) ISSN 2222-2839 (Online)
Vol.6, No.13, 2014
www.iiste.org

The Effect of Supply Chain Responsiveness on Competitive Advantage: A Field Study of Manufacturing Companies in Jordan

Dr. Kamel Mohammad Al-Hawajreh[1*] ,Dr. Murad Salim Attiany[2]
1.Assoc Prof of Business Administration, Middle East University, PO Box 1023 Amman 11623, Jordan
2. Assistant Prof of Business Administration, Middle East University, PO Box 1023 Amman 11623, Jordan
*E-Mail: hawajreh66@gmail.com

Abstract
The purpose of the study was to investigate the effect of supply chain responsiveness on competitive advantage in Jordanian Manufacturing Companies. It surveyed 269 responses by means of a questionnaire. Statistical techniques such as descriptive statistics, correlation, multiple regressions, were employed. To confirm the suitability of data collection instrument, a Kolmogorov-Smirnov (K-S) test, Cronbach's Alpha and factor analysis were used. The research findings supported the hypotheses that (SCR) positively impacts (CA) of companies.. The current study results showed that the main hypothesis was rejected and the alternative was accepted which states that the supply chain responsiveness variables (Operations System Responsiveness (OSR), Logistics Process Responsiveness (LPR) and Supplier Network Responsiveness (SNR) affect competitive advantage. The results also indicated that higher level of operations system responsiveness creates higher level of competitive advantage for companies, collectively based on low price, high delivery dependability, high product innovation, and low time to market. Also, it was uncovered that higher level of supplier network responsiveness creates higher level of competitive advantage for a company, collectively based low price and high delivery dependability. This study has some important implications for practitioners. This study provides suitable recommendations on the scope for improvement based on current levels of various specific impact supply chain responsiveness and its dimensions. Also the study provides suitable recommendations on the scope for improvement based on current levels of various predominant supply chain responsiveness criteria that directly impact competitive advantage of a company, so as to make the organizations more competitive.
Keywords: Supply Chain Responsiveness (SCR), Competitive Advantage (CA), Jordanian Manufacturing Companies (JMC).

1. Introduction

Nowadays organizations operate in a complex environment. In this context, the role of supply chain management has been changing within business practice. This can be noticed through the development of its Supply Chain Responsiveness (SCR) which can be defined as the capability of promptness and the degree to which the supply chain can address changes in customer demand (Holweg, 2005), . In a nutshell Supply chain responsiveness is the coordination of production, inventory, location, and transportation among the participants in a supply chain to achieve the best mix of responsiveness and efficiency for the market being served. In a rapidly changing competitive world Supply Chain Responsiveness (SCR) has become increasingly important that creates new competing opportunities. What was a theoretical process years ago is now a competitive weapon and there is a need to develop organizations supply chains that are significantly more flexible and responsive than the existing ones (Gould, 1997, James-Moore, 1996). It has become an important issue on investigating The impact of Supply Chain Responsiveness (SCR) on Competitive Advantage in from the perspective of supply disruption and customer changing needs.

2. Literature Review

Most companies understand the need for supply chain responsiveness (SCR) in order to increased customer expectations, fluctuating inventory levels, and reducing costs, Dan Gilmore (2006) breaks down supply chain flexibility into two types: ***(1)*** *Micro flexibility*: How fast a supply chain could detect and respond to issues and opportunities in the short term – maybe even right now. The truck is late, demand suddenly surges, a customer needs some sort of special packaging or handling: how fast and how effectively can this these changes and needs be managed***.*** ***(2)*** *Macro flexibility*: The speed at which a company's supply chain adapt and execute new strategies and programs to support changes in overall company strategies or market place changes. Some of the basic dimensions of manufacturing flexibility in the prior literature are – *volume flexibility*: the ability of the manufacturing system to vary aggregate production volume economically. (Slack,1983), *mix flexibility*: the ability of the manufacturing system to switch between different products in the product mix. (Browne et al.,1984) *new product flexibility*: the ability of the manufacturing system to introduce and manufacture new parts and products. (Browne et al.,1984), *process flexibility:* (the ability to change between the production of different products with minimal delay.(Parker and Wirth, 1999), and *material handling flexibility:* the ability of the material handling system to move material through the plant effectively. (Gupta and Somers,1992). Slack (1983,

1987), There is considerable disagreement among researchers on the definition of manufacturing flexibility. The fact that a large amount of literature is available on flexibility and responsiveness of manufacturing systems, yet there been very little discussion on the relationship between these two concepts has been criticized in literature (Kritchanchai and MacCarthy, 1999) . Some questions such as is a flexible manufacturing system also by default responsive, and what types of flexibility are needed for responsiveness have not been clearly addresses in prior literature (Holweg, 2005). This argument is also true for the distinction between supply chain responsiveness and supply chain flexibility. In this study we extend the definition of responsiveness to the supply chain level. The supply chain flexibility concept focuses on the ability of the firm / supply chain to adapt to changes in business conditions. Although the literature in the flexibility area (at logistics and supply chain levels) is accumulating over the past decade, including case study based research. Supply chain flexibility refers to the ability of the supply chain to adapt to internal or external influences, whereas supply chain responsiveness is the ability of the supply chain to rapidly address changes and requests in the marketplace (Holweg, 2005). Supply chain flexibility extends the concept of flexibility of manufacturing systems to the entire supply chain. It encompasses not only the manufacturing (operations) flexibility, but also the flexibility of the different supply chain functions and processes ex: supply, distribution and transportation (Lummus et al., 2003). Supply chain flexibility is a complex and multi-dimensional concept difficult to summarize (De Groote, 1994). The current study focuses on the speed of response in addition to the flexibility which is widely known as supply chain responsiveness.

With the proliferation of product varieties and the increased volatility of the global marketplace, responsiveness to customer requests is today a key competitive factor in the business environment. A responsive company is able to respond to short-term demand changes from the customer (Holweg, 2005; Reichhart and Holweg, 2007). Hallgren and Olhager (2009) consider responsiveness as the simultaneous achievement of flexibility and delivery performance. In particular, they analysed a large sample of manufacturing plants and found that responsive ones are those excelling both in delivery (ontime delivery and fast delivery) and flexibility performance (i.e. flexibility to change product mix, and flexibility to change volume). Yi et al. (2011) note that seminal studies on responsiveness treated it as the result of a single company's efforts on internal processes, while now scholars recognize that more participants are involved in physical and information flows across supply networks and, as a result, responsiveness can be improved also by involving suppliers and customers in integration efforts. Hence, literature agrees that SCI, both in terms of internal and external integration, can have a positive impact on responsiveness.

Flynn et al. (2010) note that II breaks down functional barriers and engenders cooperation in order to meet the requirements of customers rather than operating within the functional silos associated with the traditional departmentalization. Information distortion leads to inaccurate demand forecasts and inefficient resource allocations

that result in longer delivery times, delays in deliveries and in turn lack of responsiveness. Reducing this distortion requires fast and accurate information sharing between business partners in the supply network and alignment of plans to final demand (Nurmilaakso, 2008). For instance, EI practices, such as Vendor Managed Inventory (VMI), Continuous Replenishment Programs (CRPs) and Collaborative Planning, Forecasting and Replenishment (CPFR), that are based on information sharing and the coordination of supply network members' production and distribution plans, can positively influence responsiveness (Dong et al., 2007; Yao and Dresner, 2008; Danese, 2011).

Based on Prater et al. (2001), Duclos et al. (2003), and Lummus et al. (2003) who have identified the various components of supply chain flexibility and agility, we extend and modify those components to develop the construct supply chain responsiveness. We identify operations system responsiveness, logistics process responsiveness, and supplier network responsiveness as the three main components of supply chain responsiveness. Literature (ex: Christopher, 2000), emphasizes the need for supply chains to be responsive in order to attain competitive advantage. This was the prime motivation behind this study of supply chain responsiveness. Aquilano et al. (1995) contend that "low cost, high quality and improved responsiveness (both delivery time and flexibility of product delivery)" (p. 447) are the three main strategic imperatives to stay competitive in this century (as cited in Duclos et al., 2003). Gupta and Goyal (1989), contend that being responsive is normally considered as an adaptive response to the environmental uncertainty. Bowersox et al. (1999) advocate the need for organizations to be responsive when the penalties associated with uncertainty are higher. The sub-constructs for supply chain responsiveness consist of::

Operations system responsiveness is defined as the ability of a firm's manufacturing system to address changes in customer demand. Operations system responsiveness includes both manufacturing and service operations. Duclos et al. (2003) and Lummus et al. (2003) in a conceptual study, emphasize that operation responsiveness at each node of the chain is an integral component of supply chain responsiveness. As supply chain can be a channel of knowledge transfer, which influences operational performances including supply chain flexibility (Blome, et al., 2013).They further argue that in order to meet the end customer's needs, each entity in the supply chain must deliver the product or service in a timely and reliable manner.

Logistics process responsiveness is defined as the ability of a firm's outbound transportation, distribution, and warehousing system to address changes in customer demand. The responsiveness in the logistic processes is a vital component in the success of a responsive supply chain strategy (Fawcett, 1992). Logistics and distribution management includes the activities of transportation of goods from suppliers to manufacturer to distribution centers to final point of consumption (Ricker and Kalakota, 1999; Duclos et al., 2003; Lummus et al., 2003).

Supplier network responsiveness (SNR) is defined as the ability of a firm's major suppliers to address changes in the firm's demand. A key to responsiveness is the presence of responsive and flexible partners upstream and downstream of the focal firm (Christopher and Peck, 2004). Companies the world over have tried every conceivable approach to react quickly to customer demand is dependent on the reaction time of suppliers to make volume changes.

*Competitive Advantage***:** there is no single agreed definition of competitive advantage it can be viewed as the unique position that the firm develops in comparison with competitors, The term 'competitive advantage has been discussed intensively in business strategy. Many researchers has defined the concept of competitive advantage, such as et at (2006) stated that competitive advantage is the capacity of an organization to create and maintenance defensible position over its competitors, Tracey et al. (1999) also suggested that the competitive Advantage comprises of distinctive competencies that sets an organization apart from competitors, thus giving them an edge in the marketplace. They further add that it is an outcome of critical management decisions. Competitive advantage traditionally involved the choice regarding the markets in which a firm would compete, defending market share in clearly defined segments using price and product performance attributes. competitive advantage involved the particular choice regarding the market in which a firm would compete, depending on market share in clearly defined segment using price and product performance attribute (Day, 1994). In a research framework, Koufteros et al. (1997) supply chain responsiveness the following five dimensions of competitive capabilities: competitive pricing, premium pricing, value-to-customer quality, dependable delivery, and product innovation. Based on these studies, the five dimensions of competitive advantage construct used in this study are price/cost, quality, delivery dependability, product innovation, and time to market and can be defined as: *Price/Cost*: "The ability of an organization to compete against major competitors based on low price" (Li et al., 2006, p. 120)., *Quality:* "The ability of an organization to offer product quality and performance that creates higher value for customers" (Koufteros, 1995)., *Delivery Dependability*: "The ability of an organization to provide on time the type and volume of product required by customer(s)" (Li et al., 2006, p. 120)., *Product Innovation*: "The ability of an organization to introduce new products and features in the market place" (Koufteros et al., 2002)., and *Time to Market*: "The ability of an organization to introduce new products faster than major competitors" (Li et al., 2006, p. 120).

3. Importance of Study

A better understanding of the effect of supply chain responsiveness elements on competitive advantage draws conclusions that can be beneficial not only for JMCs but also to other organizations, institutions and policy makers. The content also may be of an interest to academic studies related to the reporting and decision-making concerning supply chain responsiveness. The current study might be considered as initiative that presents the effect of supply chain responsiveness on competitive advantage in JMCs.

4. Study Purpose and Objectives

The current study attempts to investigate the impact of SCR on competitive advantage in JMCs. The main objective of this research is to provide sound recommendations about performance measurement within SCR context by identifying and defining the main attributes of operations system responsiveness, logistics process responsiveness and supplier network responsiveness of SCR.

5. Problem Statement

The main purpose of the current research is to investigate the relationship between SCR and competitive advantage, more specifically to answer the following question:

1) What are the key dimensions of supply chain responsiveness?
2) Is there a direct impact of SCR on competitive advantage in JMCs?
3) What supply chain responsiveness dimensions create competitive advantage for a company?

6. Study Hypotheses

Main Hypothesis Ho: Supply Chain Responsiveness do not have direct impact on competitive advantage in JMCs, at $\alpha \leq 0.05$.

Main hypothesis can be divided to sub-hypothesis as following:

Ho-1: Supply Chain Responsiveness do not have direct impact on price in JMCs, at $\alpha \leq 0.05$.

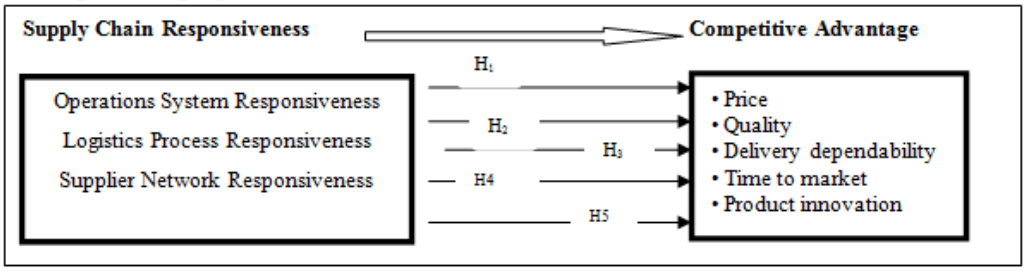
Ho-2: Supply Chain Responsiveness do not have direct impact on quality in JMCs, at $\alpha \leq 0.05$.

Ho-3: Supply Chain Responsiveness do not have direct impact on delivery dependability in JMCs, at $\alpha \leq 0.05$.

Ho-4: Supply Chain Responsiveness do not have direct impact on time to market in JMCs, at $\alpha \leq 0.05$.
Ho-5: Supply Chain Responsiveness do not have direct impact on product innovation in JMCs, at $\alpha \leq 0.05$.

7. Study Model

The model (Model 1) establishes direct, positive relationships between supply chain responsiveness and competitive advantage of a company.



Model (1): The Study Model: the Relationship between Supply Chain Responsiveness and Competitive Advantage.

8. Research Methodology

8.1 Study Population and Unit of Analysis

The primary data were collected from all JMCs in Sahib Industrial City. The unit of analysis consists from all mangers working at these companies. At the time of the study, there were (900) employees working in these companies. By systematic random sampling (300) employees were selected to complete the questionnaire.

8.2 Data Collection Method

Secondary data were collected from JMCs' annual reports and previous studies. The questionnaire was used to collect the primary data. Questionnaire's independent variables supply chain responsiveness: Operations System Responsiveness, Logistics Process Responsiveness and Supplier Network Responsiveness. Dependent variable: competitive advantage. All variables were measured by five-point Likert-type scale.

8.3Data Collection and Analysis

Questionnaires were delivered to 300 managers selected by systematic random sampling. Only 269 out of 300 returned questionnaires were suitable for further analysis and coded against SPSS-20.

8.4 Normal Distribution

Table (1) shows that K-S for all independent and dependent items and variables are more than (0.05). Therefore, they are considered acceptable.

Table (1): Normality Test: One-Sample Kolmogorov-Smirnov (Z) Test

Items	(K-S)Z	Sig.
Operations System Responsiveness	3.769	0.097
Logistics Process Responsiveness	2.337	0.105
Supplier Network Responsiveness	3.916	0.094
Price	4.567	0.224
Quality	3.428	0.257
Delivery dependability	2.311	0.084
Time to market	3.045	0.411
Production innovation	3.691	0.345

Sig. (2-tailed)

8.5 Reliability Test

Table (2) shows that the results of Cronbach's alpha for the research items were between 0.722 and 0.951which registered acceptable.

Table (2): Cronbach's Alpha for Research Studies Variable:

Variables	No. of Items	Alpha
Operations System Responsiveness (OSR)	7	0.722
Logistics Process Responsiveness (LPR)	5	0.951
Supplier Network Responsiveness(SNR)	6	0.882
Supply chain responsiveness (SCR)	18	0.761
Competitive advantage(CA)	14	0.833

8.6 Validity

Two methods were used to confirm validity: First, multiple sources of data were used and then factor analysis was carried out for all items. Table (3) shows that all items and variables were valid, since their factor loading values were more than 0.4.

Table (3): Factors Loading for Research Variable Items

Item	Extraction
Our operations system responds rapidly to changes in product volume demanded by customers	**0.833**
Our operations system responds rapidly to changes in product mix demanded by customers	0.778
Our operations system effectively expedites emergency customer orders	0.752
Our operations system rapidly reconfigures equipment to address demand changes	0.883
Our operations system rapidly reallocates people to address demand changes	0.708
Our operations system rapidly changes manufacturing processes to address demand changes	0.729
Our operations system rapidly adjusts capacity to address demand changes	0.692
Operations System Responsiveness	**0.850**
Our logistics system responds rapidly to unexpected demand change	0.771
Our logistics system rapidly adjusts warehouse capacity to address demand changes	0.649
Our logistics system rapidly varies transportation carriers to address demand changes	0.682
Our logistics system rapidly accommodates special or non-routine customer requests	0.736
Our logistics system effectively delivers expedited shipments	0.671
Logistics Process Responsiveness	**0.764**
Our major suppliers change product volume in a relatively short time	0.669
Our major suppliers change product mix in a relatively short time	0.732
Our major suppliers consistently accommodate our requests	0799
Our major suppliers provide quick inbound logistics to us	0.722
Our major suppliers have outstanding on-time delivery record with us	0.688
Our major suppliers effectively expedite our emergency orders	0.973
Supplier Network Responsiveness	**0.773**
We offer competitive prices	0.687
We are able to offer prices as low or lower than our competitors	0.681
We are able to compete based on quality	0.931
We offer products that are highly reliable	0.747
We offer products that are very durable	0.729
We offer high quality products to our customers	0.818
We deliver customer orders on time	0.881
We provide dependable delivery	**0.973**
We provide customized products	0.770
We alter our product offerings to meet client needs	0.774
We cater to customer needs for “new” features	0.665
We are first in the market in introducing new products	0.901
We have time-to-market lower than industry average	0.836
We have fast product development	0.766
Competitive Advantage	**0.898**

Principal Component Analysis.

8.7 *Bivariate Pearson’s Correlation Coefficient*

The table (3) shows that the QMP variables significantly and strongly related to IKT. At the same time, QMP variables are strongly related to each other.

Table (3): Pearson’s Correlation (r) Among Independent Variables and with Dependent Variable

	OSR	LPR	SNR	Price	Quality	Delivery dependability	Time to market	Production innovation
Operations System Responsiveness (OSR)	**1**							
Logistics Process Responsiveness (LPR)	**0.25**	**1**						
Supplier Network Responsiveness(SNR)	**0.27**		**1**					
Price	**0.33**	**0.23**	**0.31**	**1**				
Quality	**0.28**	**0.33**	**0.30**	**0.17**	**1**			
Delivery dependability	**0.25**	**0.28**	**0.31**	**o.23**	**0.23**	**1**		
Time to market	**0.31**	**0.33**	**0.27**	**0.21**	**0.07**	**0.25**	**1**	
Production innovation	**0.10**	**0.07**	**0.12**	**0.09**	**0.11**	**0.05**	**0.09**	**1**

Correlation is significant at 0.05 level

9. Hypotheses Testing

Main Hypothesis Ho: Supply Chain Responsiveness do not have direct and significant impact on competitive advantage in JMCs, at α≤0.05. The R square value is 0.36; therefore, the model is regarded as being suitable to be used for multiple regressions with the data.

Table (4): Results of Multiple Regression Analysis: SCR Variables against Competitive Advantage

Variable	R	R^2	R^2 adj	ANOVA F-Value	Sig.
SCR Variable	0.537	0.362	0.351	58.32	0.000

Table (4) shows that the three variables together explained 36.0 percent of the variance, where (R2=0.36, F=58.32, Sig.=0.000). Therefore, the null hypothesis is rejected and the alternative hypothesis is accepted, which states that the SCR variables affect competitive advantage. The following table shows the significant effect of each variable within the SCR variables.

Table (5): Coefficients of Multiple Regression Model for SCR Variables on Competitive Advantage

SCR Variables	Un-Standardized Coefficients		Standardized Coefficients	t-value	P
Constant	B	Std. Error	Beta		
	0.121	0.288		0.305	0.650
OSR	0.141	0.090	0.329	5.686	0.000*
LPR	0.114	0.118	0.180	1.217	0.000
SNR	0. 354	0.096	0.354	6.677	0.002*

**Calculated less than 0.05*

The conclusion of table (5) shows that the (SNR) variable has the highest effect on JMCs, where (Beta=0.354, sig.=0.000). Followed by (OSR) variable, where (Beta=0.141, sig.=0.000), while (LPR) variable has the lowest effect on JMCs, where (Beta=0.114, sig.=0.000). The relationship between the dependent and independent variables derived by this model can thus be expressed as:

SCR = 0.121 + 0.351 (SNR) + 0.141 (OSR) + 0.114 (LPR).

Ho-1: Supply Chain Responsiveness do not have direct impact on price as a competitive advantage in JMCs, at α≤0.05.

The stepwise regression result for analysis of supply chain responsiveness dimensions (OSR, LPR, and SNR) on price is shown in Table (6).

Table (6): Results of Stepwise Regression Analysis: SCR Dimensions on Price

Variable	R	R^2	R^2 adj	ANOVA F-Value	Sig.
OSR	0.227	0.062	0.031	17.152	0.003

As observed in Table (6) the results are not significant (R2 adj = 0.031) to draw conclusions. It is desired that R2 adj be at least 0.10 so as to draw any substantial inferences. It is thus evident that none of the dimensions of SCR predict the 'price' dimension of competitive advantage, when considered by itself.

Ho-2: Supply Chain Responsiveness do not have direct impact on quality as a competitive advantage in JMCs, at α≤0.05.

Table (7): Results Model of Stepwise Regression Analysis: SCR Dimensions on Quality

Variable	R	R^2	R2 adj	ANOVA F-Value	Sig.
LPR	0.177	0.015	0.027	13.017	0.001

As observed in Table (7) the results are not significant (R2 adj = 0.027) to draw conclusions. It is desired that R2 adj be at least 0.10 so as to draw any substantial inferences. It is thus evident that none of the dimensions of SCR predict the 'quality' dimension of competitive advantage, when considered by itself.

Ho-3: Supply Chain Responsiveness do not have direct impact on delivery dependability as competitive advantage in JMCs, at α≤0.05.

Table (8): Results Model of Stepwise Regression Analysis: SCR Dimensions on delivery dependability

Variable	R	R^2	R^2 adj	ANOVA F-Value	Sig.
SNR	0.331	0.126	0.099	53.017	0.001
OSR	0.386	0.152	0.138	23.987	0.01

Table (9): Coefficients for SCR Dimensions (SNR and OSR) on Delivery Dependability

SCR Variables	Un-Standardized Coefficients		Standardized Coefficients	t-value	P
Constant	B	Std. Error	β		
	0.158	0.259		0.299	0.529
SNR	0.257	0.109	0.269	8.228	0.000
OSR	0.185	0.178	0.193	7.817	0.001

**Calculated less than 0.05*

From these results (Tables 8 and Table 9) it is clear that only two dimensions of SCR in the order SNR (β = 0.269) and OSR (β = 0.193), significantly predict 'delivery dependability'. However surprisingly, logistics process responsiveness (LPR) does not contribute significantly to the prediction of 'delivery dependability'. A plausible explanation to this is that, logistics process responsiveness is outside of the focal firm and a characteristic of the logistics provider. Thus LPR is not in direct control of the organization per se. However OSR is a characteristic within the organization. Also SNR has been found to be crucial to delivery dependability because, in order to address changes in customer demand in a timely manner by a firm, much relies on its suppliers' ability to address changes in its demand in a timely manner.

Ho-4: Supply Chain Responsiveness do not have direct impact on innovation as competitive advantage in JMCs, at $\alpha \leq 0.05$.

Table (10): Results Model of Stepwise Regression Analysis: SCR Dimensions on Product Innovation

Variable	R	R^2	R^2 adj	ANOVA F-Value	Sig.
OSR	0.309	0.065	0.068	25.827	0.003

As observed in Table 10 the results are not significant (R^2adj = 0.068) to draw conclusions. It is desired that R^2 adj be at least 0.10 so as to draw any substantial inferences. It is thus evident that none of the dimensions of SCR predict the 'product innovation' dimension of competitive advantage, when considered by itself.

Ho-5: Supply Chain Responsiveness do not have direct impact on time to market as competitive advantage in JMCs, at $\alpha \leq 0.05$.

Table (11): Results Model of Stepwise Regression Analysis: SCR Dimensions on Time to Market

Variable	R	R^2	R^2 adj	ANOVA F- Value	Sig.
Teamwork	0.285	0.075	0.078	23.870	0.000

**Calculated less than 0.05*

As observed in Table 7.1.3.15 the results are not significant (R^2 adj = 0.078) to draw conclusions. It is desired that R^2 adj be at least 0.10 so as to draw any substantial inferences. It is thus evident that none of the dimensions of SCR predict the 'time to market' dimension of competitive advantage, when considered by itself.

10. Discussion and Conclusions

The study provides a valid and reliable measurement for the supply chain responsiveness construct. The scale has been tested through rigorous statistical methodologies including confirmatory factor analysis, reliability, One-Sample Kolmogorov-Smirnov (Z) Test, Cronbach's Alpha and validity. The scale is shown to meet the requirements for reliability and validity and thus, can be used in future research. Such a valid and reliable scale has been otherwise lacking in the literature. The development of these measurements will greatly stimulate and facilitate the theory development in this field. This study provides supporting evidences to the literature on the relationships between supply chain responsiveness and competitive advantage (Lummus et al., 2003). The results demonstrate that a higher level of supply chain responsiveness will lead to a higher level of competitive advantage for a company. The empirical results reveal that the ability of the operations system of a company to rapidly respond to changes in product volume demanded by customers is the single most important measure of 'operations system responsiveness' that increases the competitive advantage of a company based on delivery dependability, as well as on an aggregate basis.

The results reveal that competitive advantage of a firm differs significantly both collectively and individually based on low price, high delivery dependability, high product innovation, and low time to market, for high and low levels of operations system responsiveness. That is, higher level of operations system responsiveness creates higher level of competitive advantage for a firm, collectively on four dimensions – low price, high delivery dependability, high product innovation, and low time to market - as well as individually on each of the said dimensions.

In the literature there have been arguments on both direct as well as inverse relationship between responsiveness and cost/price. The results of this research support Randall et al.'s (2003) argument about inverse relationship, that firms with more responsive supply chains will be more adaptive to demand fluctuations and will handle this uncertainty at a lower cost / price due to the shorter lead time. To confirm the results of this study, the

relationship between responsiveness and cost/price can be studied in greater depth in future research. Yusuf et al. (2003; 2004) found high correlation between the responsiveness and time to market, dependability, product innovation, and quality. This research partially supports the findings by Yusuf et al. (2003; 2004), as there was no support for the impact of operations system responsiveness on the ability of a firm to compete based on quality.

Secondly, the results disclose that competitive advantage of a firm differs significantly both collectively and individually based on low price and high delivery dependability for high and low levels of supplier network responsiveness. That is, higher level of supplier network responsiveness creates higher level of competitive advantage for a firm, collectively on two dimensions – low price and high delivery dependability - as well as individually on each of the said dimensions. However, there was no support for the impact of supplier network responsiveness on the ability of a firm to compete based on quality, product innovation, and time to market. The current study results showed that the main hypothesis was rejected and the alternative was accepted which states that the SCR variables affect competitive advantage. Finally, the ability of a firm's major suppliers to effectively expedite the firm's emergency orders is the single most important measure of 'supplier network responsiveness' that directly leads to higher levels of overall competitive advantage of a company.

11. Research Limitations/Recommendations

The use of one industrial area study design may limit its generalisability to other areas. The data is also limited to Jordanian organizations; therefore, generalizing results of Jordanian setting to other countries may be questionable. Extending the analyses to other settings represent future research opportunities, which can be done by the following ways: Further testing with larger samples within same industry is important, and including other industries will help mitigate the issue of generalizing conclusions on other organizations and industries. Moreover, further empirical researches involving data collection over diverse countries especially Arab countries are needed.

12. Contributions /Practical Implications

The research makes significant theoretical and empirical contributions to literature regarding influence of SCR on the organizations' competitive advantage. The research results might help both academics and practitioners to be more ready to understand the components of SCR and provide insight into developing and increasing them within their organizations. SCR are important source of organizations' performance and therefore it should be taken into serious consideration when formulating the JMCs strategy. This strategy formulation process can be enhanced by fully integrating SCR components into management practices. JMCs should coordinate different perspectives of SCR to improve competitive advantage and should assign scales for each of the three components of SCR. Finally, the data suggest that a similar set of SCR indicators could be developed for other organizations and industries whether government, public or private, profitable or non-profitable organizations. Moreover, responsiveness is needed for total responsiveness of the company. Supply chain responsiveness has been poorly defined and a high degree of variability (flexibility to agility) in people's mind about its meaning. The findings demonstrate to the practitioners the vital components of responsiveness, and ways of achieving them.

The study provides evidence to practitioners that by increasing the companies' operations system responsiveness, organizations can increase their capability to compete both collectively as well as individually based on low price, high delivery dependability, high product innovation, and low time to market. The study also provides evidence to practitioners that by increasing the companies' supplier network responsiveness, organizations can increase their capability to compete both collectively as well as individually based on low price, and high delivery dependability. This shall encourage companies, in this ever competitive business world, to boost their responsiveness, so as to attain higher competitive advantage, and stay ahead in business.

13. Future Research

The study takes a look at the supply chain responsiveness at the company level, by measuring the extent of a firm's ability on various dimensions to address changes in customer demand. The concept of supply chain responsiveness is difficult to measure; however, the degree to which demand changes are addressed at various nodes of a company can be used as an indirect measure of this concept. This measure is useful to researchers who are interested in measuring supply chain responsiveness but cannot specify a sampling frame of the supply chain. Measuring supply chain responsiveness at the firm level provides an alternate way to study supply chain outcomes. Secondly, the study provides a research framework that identifies positive and significant relationships between supply chain responsiveness and competitive advantage. This framework provides a foundation and insight for future researchers in the area of supply chain responsiveness.

References

1) Andries, B.L. and Gelders, L. (1995). Time-Based Manufacturing Logistics, *Logistics Information Management*, 8(6), pp. 25-31.
2) Aquilano, N. J., Chase, R. B., and Davis, M. M. (1995). *Fundamentals of Operations Management*, Irwin, Chicago, IL.
3) Blome, C., Schoenherr, T., and Eckstein, D. (2014). The Impact of Knowledge Transfer and Complexity on Supply Chain Flexibility: A Knowledge –based View, *International Journal of Production Economics*, 147, Part B, 307–316
4) Bowersox, D.J., Closs, D.J., and Stank, T.P. (1999). 21st Century Logistics: Making Supply Chain Integration a Reality", The Council of Logistics Management, Oak Brook, IL. Browne, J., Dubois, D., Rathmill, K., Sethi, S., and Stecke, K. (1984). Classification of FMS, *FMS Magazine*, 2(22), 114-117.
5) Browne, M. W. and Cudeck, R. (1993). *Alternative Ways of Assessing Model Fit*, In K. A. Bollen and J. S. Long (Eds.), Testing Structural Equation Models (pp. 445-455), Sage Publication, Newbury Park, CA.
6) Christopher, M. (1998). *Logistics and Supply Chain Management*, 2nd Ed., Financial Times/Prentice Hall, New York, NY Christopher, M. (1998), Logistics and Supply-Chain Management: Strategies for Reducing Cost and Improving Service, Prentice-Hall, London.
7) Christopher, M. (2000). The Agile Supply Chain, *Industrial Marketing Management*, 29(1), 37-44.
8) Christopher, M. and Peck, H. (2004). Building the Resilient Supply Chain, *International Journal of Logistics Management*, 15(2), 1-13.
9) Christopher, M. G. (1992). *Logistics and Supply Chain Management*, Pitman Publishing, London, UK.
10) Christopher, M., Lowson, R., and Peck, H. (2004). Creating Agile Supply Chains in the Fashion Industry, *International Journal of Retail & Distribution Management*, 32(8/9), 367-376.
11) Cunningham, J. (1996). Designing Flexible Logistics Systems: A Review of Some Singaporean Examples, *Logistics Information Management*, 9(2), 40-48.
12) D' Souza, D. E. and Williams, F. P. (2000). Toward A Taxonomy of Manufacturing Flexibility Dimensions, *Journal of Operations Management*, 18(5), 577-593.
13) Danese, P., Romano, P. (2011). Supply chain integration and efficiency performance: A study on the interactions between customer and supplier integration. *Supply Chain Management: An International Journal,* 16 (4), 220–230.
14) Daugherty, P., Gennain, R., and Droge, C. (1996). Predicting EDI Technology Adoption in Logistics Management: The Influence of Context and Structure, *Logistics and Transportation Review*. 31(4), 309-324.
15) Day, G. S. (1994). The Capabilities of Market-Driven Organizations, *Journal of Marketing*, 58(4), 37-52.
16) De Groote, X. (1994). The Flexibility of Production Processes: A General Framework, *Management Science*, 1994, 40(7), 933-945.
17) Dong, Y., Xu, K., Dresner, M.(2007). Environmental determinants of VMI adoption: an exploratory analysis. *Transportation Research Part E: Logistics and Transportation Review*, 43 (4), 355–369.
18) Duclos, L. K.., Vokurka, R. J., and Lummus, R. R. (2003). A Conceptual Model of Supply Chain Flexibility, *Industrial Management & Data Systems*, 103(6), 446-456.
19) Emerson, C. and Grimm, C. (1998). The Relative Importance of Logistics and Marketing Customer Service: A Strategic Perspective, *Journal of Business Logistics*, 19(1), 17-32.
20) Fawcett, S. E. (1992). Strategic Logistics in Coordinated Global Manufacturing Success, *International Journal of Production Research*, 30(5), 1081-2000.
21) Fawcett, S. E. and Smith, S. R. (1995). Logistics Measurement and Performance for United States-Mexican Operations under NAFTA, *Transportation Journal*, 34(3), 25-34.
22) Ferrin, B. (1994). Planning Just-In-Time Supply Operations: A Multiple-Case Analysis, *Journal of Business Logistics*, 15(1), 53-69.
23) Fisher, M. L. (1997). What Is the Right Supply Chain for Your Product?, *Harvard Business Review*, 75(2), 105-116.
24) Flynn, B.B., Huo, B., Zhao, X., (2010). The impact of supply chain integration on performance: a contingency and configuration approach. *Journal of Operations Management*, 28 (1), 58–71.
25) Fuller, J. B., O'Conner, J., and Rawlinson, R. (1993). Tailored Logistics: The Next Advantage, *Harvard Business Review*, 71(3), 87-98.
26) Gilmore, A. and Carson, D. (2006). Management Competencies for Services Marketing, *Journal of Services Marketing,* 10(3),39–57.
27) Garg, A. and Tang, C. (1997). On Postponement Strategies for Product Families with Multiple Points of Differentiation, *IEE Transactions*, 29, 641-650.
28) Germain, R. (1989). Output Standardization and Logistical Strategy, Structure and Performance, *International Journal of Physical Distribution and Logistics Management*, 19(1), 21-29.

29) Gerwin, D. (1987). An Agenda for Research on the Flexibility of Manufacturing Processes, *International Journal of Operations and Production Management*, 7(1), 38-49.
30) Gerwin, D. (1993). Manufacturing Flexibility: A Strategic Perspective, *Management Science*, 39, 395-409.
31) Goldman, S., Nagel, R., and Preiss, K. (1994). *Agile competitive strategies*, Agility Forum, Bethlehem, PA.
32) Gosain, S., Malhotra, A., and El Sawy, O. A. (2004). Coordinating for Flexibility in e-Business Supply Chains, *Journal of Management Information Systems*, 21(3), 7-45.
33) Gould, P. (1997). What is Agility, *Manufacturing Engineer*, 76(1), 28-31.
34) Gunasekaran, A. and Yusuf, Y. Y. (2002). Agile Manufacturing: A Taxonomy of Strategic and Technological Imperatives, *International Journal of Production Research*, 40(6), 1357-1385.
35) Gupta, A. K. and Souder, W. E. (1998). Key Drivers of Reduced Cycle Time, *Research Technology Management*, 41(4), 38-43.
36) Gupta, D. and Buzacott, J. A. (1996). A 'Goodness Test' For Operational Measures of Manufacturing Flexibility", *International Journal of Manufacturing Systems*, 8, 233-245.
37) Gupta, Y. and Somers, T. M. (1992). Measurement of Manufacturing Flexibility, *European Journal of Operational Research*, 60(2), 166-182.
38) Gupta, Y. P. and Goyal, S. (1989). Flexibility of Manufacturing Systems: Concepts and Measurements, *European Journal of Operations Research*, 43(2), 119-135.
39) Gupta, Y. P. and Somers, T. M. (1996). Business Strategy, Manufacturing Flexibility, and Organizational Performance Relationships: A Path Analysis Approach, *Production and Operations Management*, 5, 204-233.
40) Hallgren, M., Olhager, J.,(2009). Lean and agile manufacturing: external and internal drivers and performance outcomes. *International Journal of Operations & Production Management*, 29 (10), 976–999.
41) Holweg, M. (2005). An Investigation into Supplier Responsiveness, *International Journal of Logistics Management*, 16(1), 96-119.
42) Holweg, M. and Pil, F. K. (2001). Successful Build-To-Order Strategies Start with the Customer, *MIT Sloan Management Review*, 43(1), 74-84.
43) Holweg, M. (2005). The three dimensions of responsiveness. *International Journal of Operations and Production Management,* 25 (7), 603–622.
44) Huber, G. P. (1984). Nature and Design of Post Industrial Organizations, *Management Science*, 30(8), 928-951.
45) Hyun, J. H. and Ahn B. H. (1992). A Unifying Framework for Manufacturing Flexibility, *Manufacturing Review*, 5(4), 251-260.
46) James-Moore, S. M. R. (1996). Agility is Easy; But Effective Agile Manufacturing is not, *IEE Colloquium (Digest)*, 179, 1- 4.
47) Juga, J. (1996). Organizing for Network Synergy in Logistics: A Case Study, *International Journal of Physical Distribution and Logistics Management*, 26(2), 51-67.
48) Kessler, E., and Chakrabarti, A. (1996). Innovation Speed: A Conceptual Mode of Context, Antecedents, and Outcomes, *The Academy of Management Review*, 21(4), 1143–1191.
49) Koste, L. L., Malhotra, M. K., and Sharma, S. (2004). Measuring Dimensions of Manufacturing Flexibility, *Journal of Operations Management*, 22(2), 171-196.
50) Koufteros, X. A. (1995). *Time-Based Manufacturing: Developing a Nomological Network of Constructs and Instrument Development*, Doctoral Dissertation, University of Toledo, Toledo, OH.
51) Koufteros, X. A., Vonderembse, M. A., and Doll, W. J., (1997). Competitive Capabilities: Measurement and Relationships, *Proceedings Decision Science Institute 3*, 1067-1068.
52) Koufteros, X. A.; Vonderembse, M. A., and Doll, W. J. (2002). Examining the Competitive Capabilities of Manufacturing Firms, *Structural Equation Modeling*, 9(2), 256-282.
53) Kritchanchai, D. and MacCarthy, B. L. (1999). Responsiveness of the Order Fulfillment Process, *International Journal of Operations and Production Management*, 19(8), 812-834.
54) Lee, H. L. (2002). Aligning Supply Chain Strategies with Product Uncertainties, *California Management Review*, 44(3), 105-119.
55) Lee, H. L. (2004). The Triple-A Supply Chain, *Harvard Business Review*, 82(10), 102-112.
56) Li, S., Ragu-Nathan, B., Ragu-Nathan, T. S., and Rao, S. Subba (2006). The Impact of Supply Chain Management Practices on Competitive Advantage and Organizational Performance, *Omega*, 34(2), 107-124.
57) Lummus, R. R. and. Vokurka, R. J. (1999). Defining Supply Chain Management: A Historical Perspective and Practical Guidelines, *Industrial Management & Data Systems*, 99(1), 11-17.
58) Lummus, R. R., Duclos, L. K., and Vokurka, R. J. (2003). Supply Chain Flexibility: Building a New Model, *Global Journal of Flexible Systems Management*, 4(4), 1-13.
59) Matson, J. B. and McFarlane, D. C. (1999). Assessing the Responsiveness of Existing Production

Operations, *International Journal of Operations & Production Management*, 19(8), 765-785.
60) Meehan, S. and Dawson, C. (2002). Customer Responsiveness: Getting It Fast and Right through Impatience and Intolerance, *Business Strategy Review*, 13(4), 26-37.
61) Narasimhan R. and Das A. (2000). Manufacturing Agility and Supply Chain Management Practices, *The Journal of Enterprise Resource Management- Australasian Production and Inventory Control Society*, 3(3), 11-17.
62) Narasimhan, R. and Das, A. (1999). An Empirical Investigation of The Contribution of Strategic Sourcing to Manufacturing Flexibilities and Performance, *Decision Sciences*, 30(3), 683-718.
63) Narasimhan, R. and Das, A. (1999). Manufacturing Agility and Supply Chain Management Practices, *Production and Inventory Management Journal*, 40(1), 4-10.
64) Nurmilaakso, J., (2008). Adoption of e-business functions and migration from EDI-based to XML-based e-business frameworks in supply chain integration. *International Journal of Production Economics*, 113 (2), 721–733.
65) Olhager, J. (1993). Manufacturing Flexibility and Profitability, *International Journal of Production Economics*, *Special Issue*, 30/31, 67-78.
66) Parker, R. and Wirth, A. (1999). Manufacturing Flexibility: Measures and Relationships, *European Journal of Operational Research*, 118(3), 429-449.
67) Prater, E., Biehl, M., and Smith, M. A. (2001). International Supply Chain Agility, *International Journal of Operations & Production Management*, 21(5/6), 823-840.
68) Randall, T. R., Morgan, R. M., and Morton, A. R. (2003). Efficient versus Responsive Supply Chain Choice: An Empirical Examination of Influential Factors, *Journal of Product Innovation Management*, 20(6), 430-443.
69) Reichhart, A., Holweg, M.,(2007). Lean distribution: concepts, contributions, conflicts. *International Journal of Production Research*, 45 (16), 3699–3722.
70) Ricker, F. and Kalakota, R. (1999). Order Fulfillment: The Hidden Key to E-Commerce Success, *Supply Chain Management Review*, 11(3), 60-70.
71) Sanchez, A. and Perez, M. (2005). Supply Chain Flexibility and Firm Performance: A Conceptual Model and Empirical Study in the Automotive Industry, *International Journal of Operations and Production Management*, 25(7), 681-700.
72) Sanchez, R. (1999). Modular Architectures in the Marketing Process, *Journal of Marketing*, 63, 92-111.
73) Sanchez, R. (2000). Modular Architectures, Knowledge Assets and Organizational Learning: New Management Processes for Product Creation, *International Journal of Technology Management*, 19(6), 610-629.
74) Sanchez, R. and Collins, R. P. (2001). Competing - and Learning - in Modular Markets, *Long Range Planning*, 34(6), 645-667.
75) Sanchez, R. and Mahoney, J. T. (1996). Modularity, Flexibility, and Knowledge Management in Product and Organization Design, *Strategic Management Journal*, 17(4), 63-76.
76) Sarker, B.R., Krishnamurthy, S., and Kuthethur, S.G. (1994). A Survey and Critical Review- of Flexibility Measures in Manufacturing Systems, *Production Planning and Control*, 5(6), 512-523.
77) Sethi, A. K. and Sethi, S. P. (1990),"Flexible Manufacturing: A Survey, *International Flexible Manufacturing Systems*, 2, 289-328.
78) Slack, N. (1983). Flexibility as a Manufacturing Objective, *International Journal of Production Management*, 3(3), 4-13.
79) Slack, N. (1987). The Flexibility of Manufacturing Systems, *International Journal of Operations & Production Management*, 7(4), 35-45.
80) Slack, N. (1991). *The Manufacturing Advantage*, Mercury Books, London.
81) Suarez, F. F. and Cusumano, M. A. (1996). An Empirical Study of Manufacturing Flexibility in Printed Circuit Board Assembly", *Operations Research*, 44(1), 223-240.
82) Taymaz, E. (1989). Types of Flexibility in a Single-Machine Production System, *International Journal of Production Research*, 27(11), 1891-1899.
83) Towill, D. and Christopher, M. (2002). The Supply Chain Strategy Conundrum: To be Lean Or Agile or To be Lean And Agile?, *International Journal of Logistics: Research & Applications*, 5(3), 299-309.
84) Tracey, M., Vonderembse, M. A., and Lim, J. S. (1999) Manufacturing Technology and Strategy Formulation: Keys to Enhancing Competitiveness and Improving Performance, *Journal of Operations Management*, 17(4), 411-428.
85) Upton, D. M. (1994). The Management of Manufacturing Flexibility, *California Management Review*, 36(2), 72-89.
86) Van Hoek, R. (2001). The Rediscovery of Postponement a Literature Review and Directions for Research, *Journal of Operations Management*, 19, 161-184.

87) Van Hoek, R. I. (1998). Measuring the Unmeasurable - Measuring and Improving Performance in the Supply Chain, *Supply Chain Management*, 3(4), 187–192.
88) Vokurka, R. and Fliedner, G. (1998). The Journey Toward Agility, *Industrial Management and Data Systems*, 98(4), 165-171.
89) Vokurka, R. J., Zank, G. M., and Lund III, C. M. (2002). Improving Competitiveness through Supply Chain Management: A Cumulative Improvement Approach, *Competitiveness Review*, 12(1), 14-25.
90) Waller, M., Dabholkar, P., and Gentry, J. (2000). Postponement, Product Customization, and Market-Oriented Supply Chain Management, *Journal of Business Logistics*, 21(2), 2000.
91) Ward, P., Mccreery, J., Ritzman, L., and Shamia, D. (1998). Competitive Priorities in Operations Management, *Journal of Operations Management*, 29(4), 1035-1046.
92) White, G. P. (1996). A Meta-analysis Model of Manufacturing Capabilities, *Journal of Operations Management*, 14(4), 315-331.
93) Williamson, P. J. (1991). Supplier strategy and customer responsiveness: Managing the links, *Business Strategy Review*, 2(2), 75-91.
94) Yao, Y., Dresner, M., (2008). The inventory value of information sharing, continuous replenishment, and vendor-managed inventory. *Transportation Research Part E: Logistics and Transportation Review*, 44 (3), 361–378.
95) Yi, C.Y., Ngai, E.W.T., Moon, K.-L.(2011). Supply chain flexibility in an uncertain environment: exploratory findings from five case studies. *Supply Chain Management: An International Journal*, 16 (4), 271–283.
96) Yusuf, Y. Y., Adeleye, E. O., and Sivayoganathan, K. (2003). Volume Flexibility: The Agile Manufacturing Conundrum, *Management Decision*, 41(7), 613-624.
97) Yusuf, Y. Y., Gunasekaran, A., Adeleye, E. O., and Sivayoganathan, K. (2004). Agile Supply Chain Capabilities: Determinants of Competitive Objectives, *European Journal of Operational Research*, 159(2), 379-392.
98) Zhang, Q. Y. (2001). *Technology Infusion Enabled Value Chain Flexibility: A Learning and Capability-Based Perspective*, Doctoral Dissertation, University of Toledo, Toledo, OH.
99) Zhang, Q., Vonderembse, M. A., and Lim, J. S. (2003). Manufacturing Flexibility: Defining and Analyzing Relationships among Competence, Capability, and Customer Satisfaction, *Journal of Operations Management*, 21(2), 173-191.
100) Zhang, Q., Vonderembse, M. A., and Lim, J. S. (2005). Logistics Flexibility and its Impact on Customer Satisfaction, *International Journal of Logistics Management*, 16(1), 71-95.

The IISTE is a pioneer in the Open-Access hosting service and academic event management. The aim of the firm is Accelerating Global Knowledge Sharing.

More information about the firm can be found on the homepage:
http://www.iiste.org

CALL FOR JOURNAL PAPERS

There are more than 30 peer-reviewed academic journals hosted under the hosting platform.

Prospective authors of journals can find the submission instruction on the following page: http://www.iiste.org/journals/ All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Paper version of the journals is also available upon request of readers and authors.

MORE RESOURCES

Book publication information: http://www.iiste.org/book/

Recent conferences: http://www.iiste.org/conference/

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digtial Library , NewJour, Google Scholar