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# **A Study of the Different Factors That Affecting the Supply Chain Responsiveness**

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## **Abstract:**

**Purpose:** supply chain management is a source of getting competitive advantage and sustainable growth for the firms on their rivals. Small and medium size industries in Pakistan and in other less developed countries are facing obstacles in responsive coordinated supply chain due to limited resources and improper guideline. The aim of this research is to test develop a theoretical framework to test it empirically to enhance the coordination in supply chain.

**Methodology:** SPSS software is use to evaluate the findings of this research. The results are found through regression analysis that helps to find weak factors of supply chain factors that are in interest of this study.

**Findings:** there are total 32 enablers that have developed on the base of literature review. These are further divided into six categories that are: top level commitment, mutual understanding, organizational factors, flow of information, relationship and decision making and supply chain responsiveness. This study has observed that all variable have significant relationship with supply chain coordination but top level commitment and flow of information have need to improve .

**Research limitations:** this study is conduct only three manufacturing firms in one city of Faisalabad, Pakistan. That further use for the whole firms in Pakistan for the betterment of supply chain coordination.

**Originality/Value:** the research paper evaluates the factors that help to build a responsive and coordinated supply chain in Pakistan's environment. Further these factors with improvement can enhance the supply chain coordination of the firms.

**Keywords:** Pakistan, SME's, supply chain responsiveness, supply chain management, coordination.

## **INTRODUCTION:**

Manufacturing is the use of equipments, tools and human resource to produce goods for sale and

use purpose. Normally, the manufacturing industry can be divided into three classifications, high technology manufacturing which includes electronic equipments, communication machines and computers. Aero space industry which produces the rockets, missiles, air craft and their engines. Other manufacturing industry includes clothing, metals processing, chemical, furniture, food and transportation equipments manufacturing.

Co-ordination is always considered as one of the key factor in checking the performance of supply chain in the last decade (supply chain co-ordination mechanism by Martin albrecht).

Supply chain management (SCM) is the balance of inventory flow, information and currency between the different drivers of supply chain (mentzer et.al 2001). The interdependency of supply chain factors can be seen with the assistance of co-ordination processes like raising supply chain undertakings, sharing of information, information technology, collaboration in decision making, and technical support (tsay, 1999, cochon& fisher, 2000, Disney and towill, 2003).

According to bowersox, (1990) a supply chain normally have many players start with supplier and consist of producer, distributor, retailer and consumer.

A firm should develop efficient co-ordination with in and out of its boundaries to maximize the potential of translating competitive advantage in to profit (Dyer and Singh, 1998). Effective co-ordination among units in a supply chain has a role in focusing on the development of new product, flexibility and speed necessary for competition globally (fisher 1997 lee 2002).

One result of the minimum supply chain co-ordination is bullwhip effect. The bullwhip effect disturbs demand information in the whole supply chain, with every stage having a different predictions of what demand is. (Supply Chain Management by Sunil chopra edition 4th). Lack of coordination maximizes the production cost, inventory cost, labor cost, transportation cost and also increase replenishment lead time (Supply Chain Management by Sunil chopra edition 4th). The main focus of co-ordination is to get collectively goals that individual members cannot attain. Allocation of right decision and information sharing put effect on coordination capability. (Anand& mend elson 1997)

Supply chain responsiveness is ability of the organizational department to react to changes in customer needs and wants or in market condition (Frey, 1988).

It is obvious that, if a firm wants to gain competitive advantage in its market, it is necessary for it to efficient its supply chain (Elkafi Hassini, 2008). Competition for market share is no longer between single firms but mostly between supply chains (Taylor, 2003).

According to Othman and ghani (2008), lean and Just in time (JIT) in supply chain practices can improve schedule for delivery, can eliminate the waste, and make close collaboration, rationalization and progress of effective suppliers.

The purpose of this paper is to develop a frame work for coordination in supply chain of manufacturing industry. These factors include top level management commitment, mutual understanding, flow of information, relationship and decision making, organizational factor and supply chain responsiveness. The purpose of this paper is to draw of frame work of this co-ordination factor to make supply chain in manufacturing industry responsive.

Supply chain management (SCM) is new appearing term that focuses on relation between different departments of organization like procurement, manufacturing, marketing and logistics. This brought opportunities for the firms by controlling their flow of logistics between company and its suppliers. It changed our inter-functional vision into inter organizational vision (Ballou et al 2000). Some aspects minimize the supply chain to only flow of material between different firms like someone said that supply chain is linkage of products, knowledge and money between

two parties. But (Ballou et al 2000) said it refers to all those functions that are related with the stream of products and services, considering the knowledge flow, from obtaining raw material to consumer. Management include combining all functions that are within the firm or are out of the firm.(Ballou et al 2000) also described three sides of SCM which he named as intra functional, organizing inter functional works and handling inter firms activities that occur between different firms like between this enterprise and its raw material provider. Managing goods flow has extended different firms in the area in which they can find improvements in minimizing cost and maximizing services. If the drivers of supply chain tries individually they cannot find any model for that but together they can find a model for betterment in the sector of cost and service. When a model is made the every manager of the firm can alter it to financial benefits. Then, their every decision will be clean and they need only a little adjustment and they get very good results in ordering quantities and their pricing strategies. It will give benefit to everyone who is involved in supply chain. If all parties deals with each other in better way every time the profit will continue to grow and they will get it for the maximum time. In contrast if this coordination gives benefit to only few parties and gives loss to others then there is fault in supply chain. The members are like partners if the manage their corporation with each other better it will also increase their relationship with each other. They deal with the policy of inventory management to reach at maximum level of supply chain instead of their own maximum. Good supply chain mean order level by every retailer is best suitable for every member of supply chain rather than his own maximum level of orders. Supply chain management increase relationship with business partner .These relationship between business partner locally or from globally and the result is that information asymmetry also increased. (terleak and king, 2006). Due to expand relationship the responsibility of the partner also increase, companies are tremendously throw by the customer, NGO media and pressure group, poor the human rights and also work on the protection of the environment. The start of these social and environment issue is reason of increase information in supply chain and also increases the searching cost because the numbers of partner are high (commission of European communities, 2001). The CRS issue introduced imposes in supply chain, that is way reduce that information asymmetry, the contracts are not regulate in supply chain accurate way, the trust base on that governance between partner (Ouchi, 1980). The trust build in far a time at that level where facilitates governance between partners in chain. For this situation code, is beneficial instrument (Denlieger, 2006).

Codes define the different rules and principle for business partner and operation to storry the control of rules. the purposes of this paper define the importance of SA 8000 and how this code facilitates the company to enhance the information gap trough the supply chain thus decreasing information asymmetry, enhance trust between partners player and in last to improve coordination in supply chain the object of this paper is small and medium size enterprise (SMEs) That adopt SA 8000 with its supply chain in developing countries .

The two reason which took small& medium size enterprise in developing country .first SMEs constitute the largest part of the European union (eu)(observatory of European SMEs,2003).Second is the practices of CSR in SMEs is very different from developed countries and multination companies . the reason is that SMES have different feature, for example most SMEs controlled by owners and that owner linked to business partner and local community and also have minimum resources to and help the CSR .

## **LITERATURE REVIEW:**

Supply chain can be physical which deals with storage and flow of goods or it can be information which treats with the knowledge related to these physical goods. Now, the managers of the supply chain are rapidly understanding the need to finish supply chain in capabilities and allocating the decisions among the partners of trading. (Simchi-levi et al,2003). Information sharing enhances the capability of supply chain to respond to quick changes and to changing environment of demand (lee et al, 2000). Information sharing also improves effectiveness and competitiveness.

Information technology (IT) can increase coordination in SC by minimizing less certainty and maximizing communication and decision making between members of supply chain (Sheomba, 1997), because it is easy to treat with information instead of physical goods.

The replenishment of inventory can be accurately and timely done under the capability of increasing communication and visibility given by latest technology and latest system of information. (handfield 1994; shapiro et al 1993)

Logistics are main source of gaining competitive advantage for any organization. And it is main reason to better inter organizational system. Logistics include the content flow of goods and information that is associated with it within or among the different organizations.

Supply chain responsiveness can be constant stream of information and stream of goods should be at the right time in the supply chain.

Some negative results of less coordinated supply chain can be maximization of inventory cost, increasing delivery times, the cost of transportation can be higher, the level of damage and loss can be high, and the service level given to customer can be low (lee et al,1997).

The commitment at the top level management is very important to make supply chain responsive because their decision and strategies put effect on whole supply chain. If they are not committed the overall coordination in supply chain cannot achieved. Decisions related to resources and IT is also taken by Top Management. Culture of organization and training of employees and lean production are some organizational factors that affect coordination. Trust, mutual understanding, risk and reward sharing also effect coordination are Supply chain. Lack of collaborative decision making also put effect on coordination. (Rajesh k Singh, 2011)

Supply chain players or members doing different types of activities like the logistics, holding, ordering, managing, inventory coordinative decision making forecasting and product design making the transform of goods, money and information in supply chain management. Every supply chain member performs its duty individually independently in traditional supply chain. If these various activities of supply chain coordinate each other then supply chain member earn more. Organizations that are member of supply chain get more benefits/profit by coordinating the supply chain function activities.

Logistics means a process of planning, implementing and controlling the efficient transfer of products/ services and related activities /transformed from product point to consumption point. Inventory management that the define the quality of order , timing of order and also define there again order and replenishing of stock. Supply chain management may be defined as the coordinating of divided decision making of firm or company transfer of material, information transferred flow of human and transfer of cash in supply chain systematically(xue et al,2003).

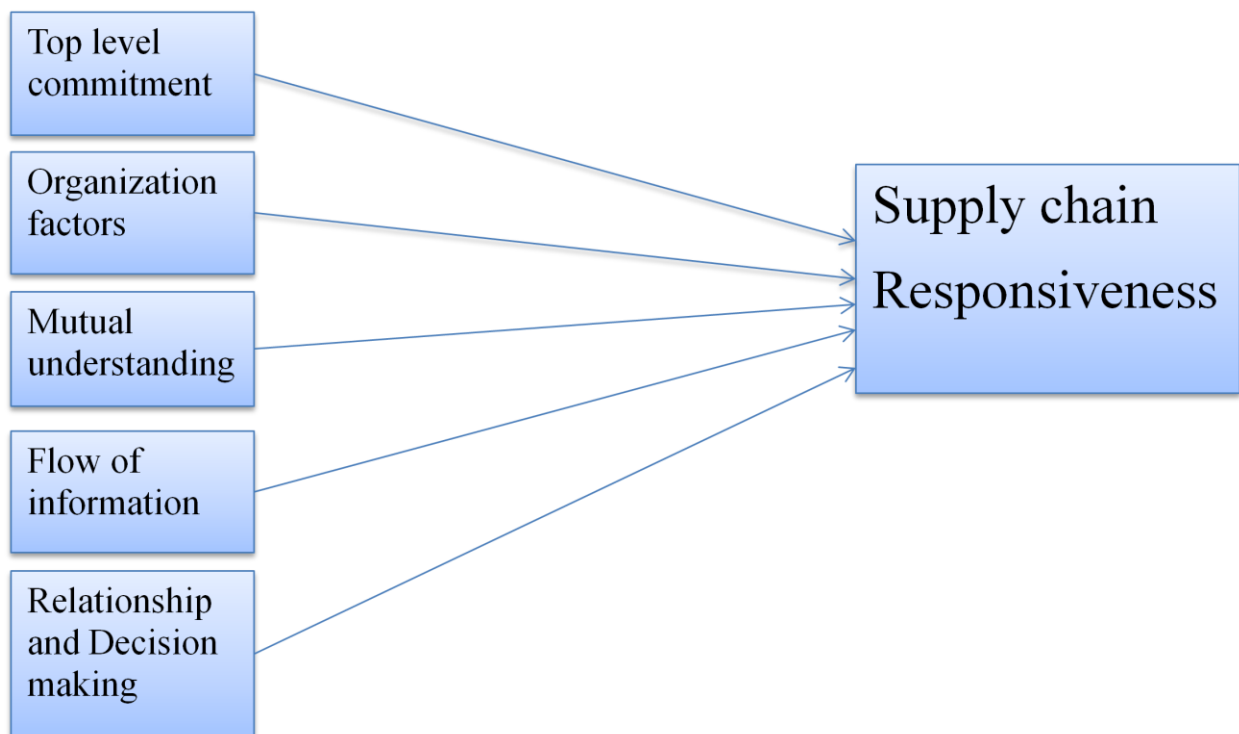
Coordination in decision making in supply chain management is cause of reducing inventory cost, reducing information asymmetry improves customer service and also cause to improve the efficiency of replenishment system (Arshinder et al,(2007)Petersen et al,2005).

It argues that abilities of supplier are essential in coordinating the product or service design system with supplier. The coordination of supplier or product design stage give better design

of product and also improved the financial performance that may be achieved when suppliers have enough knowledge about design of the product. The factor that which effect the coordination is communication, communication with manufacturer and supplier also play important role when coordinating with producer (Arshinder et al. 2008). In supply chain management a firm is effective in coordination when more emphasis on developing its human resources/ employees through training-(Gowen and Tallon, 2002).

Supply chain activities integrated each other's thus result in better coordination. Coordination is important to enhance performance and integration of different departments of organization(Soroor et al 2009). Coordination is also including every effort in developing delivering and producing a product or service to customer ( Lao et al 2008). The processes of coordination between different firms can be defined by monitoring the performance, exchanging the information and by making effective system of communication (Stank et al, 1999). In SCM different independent players make efforts for the common goal of profitability of supply chain in various market conditions. The coordination will be effective if there is quality, innovation and satisfaction of customer. Risk and reward, relationship, strategies, human resources, technology is some basic factors to get coordination.

### **THEORETICAL FRAME WORK:**



#### **Top management commitment:**

The support from top management is necessary for coordination of different department within an organization for training of employees, development of suppliers ( Genesan and Saumen 2005) commitment from top management is key for responsive supply chain. Strategies for material, technology, time, money, and power also imposed by top level authority (Shin et al 2000). Top level management commitment also gives facilities of software applications, intranet

and internet and other support systems (Stanley et al,2009). They also play a vital role in supply chain strategy formulation, because effective strategies make supply chain successful.

**Organizational factors:**

Different organizational factors like organization structure, organizational culture, training of employees. Some companies are working on JIT system in which raw material is provided at the time of production. Some others are working on the concept of mass customization, Dell computer corporation is one of them, which requires one original part manufacturer.

**Mutual understanding:**

The trust between firms takes a key part in strategy formulation. It is a thing by which the cost of SC can be reduced. Actually it is mutual confidence that describes that no party exploit the believes of other party. Trust present when one supply chain factor as confidence on other SC factor (Enderson & Narus 1990). For better flow of information trust is major factor. There will conflict of interest when individuals prefer their risk and rewards instead of risk and reward of supply chain. Trust and supply chain member's commitment is very vital for increasing the performance of supply chain in the countries that are developing (bianchi and saleh, 2010).

**Flow of information:**

To decrease the cost is the control purpose of supply chain inventory MGT. collaboration in inventory system can be difficult because the firms are separate from each others. Sharing information is important for making supply chain responsive (Stanley et al 2009), because inventory management is main area of focus in supply chain. Finding coordination in inventory management is very difficult because all companies are competing against each other or they are independent. These companies do not share their personal and secret data and other third party have to find their inventory policies. For a responsive supply chain point of sales data should be available.

**Relationship and decision making:**

Increasing the satisfaction, decreasing conflicts and maximizing relational behavior are three outputs of long term coordination. The result of better decision making are that demand can be better forecasted, development of trust among supply chain members and informational flow (Mehrjerdi, 2009)

**Supply chain Supply chain responsiveness:**

Supply chain responsiveness means how rapidly an organization treats with customer inputs. Agile and quick supply chain is important. (Li et al 2008). If the goal and vision of supply chain members are different then the profit of supply chain cannot be achieved (Arshinder et al, 2007). Agility in the supply chain is important factor. Agility means quickness, in which time you fulfill the order. Conflicts increase individual profits instead of profit of whole supply chain. There are three basic outcomes of long-term orientation one is relational behavior maximization second is minimization in conflicts and third is full satisfaction. When there is supply chain responsiveness in supply chain then delivery will be on time, cost will be reduce and forecasting of data will be accurate (Mehrjerdi, 2009).

**METHODOLOGY:**

**Data collection and sample:**

This study involves analysis of a questionnaire that consist of statements relating to top level management commitment, mutual understanding, flow of information, organizational factors, relationship and decision making and supply chain responsiveness. All items were measured at five point likert scale that have 5 options ranging from 'strongly disagree to' to 'strongly agree'. Data was collected from 72 respondents or participants from three randomly selected manufacturing organizations in Faisalabad Pakistan. Response rate was 80 %. Organizations were selected using random sampling. Questionnaires were distributed postally and by hand to employees of these organizations. A total 90 questionnaires were distributed to participants; thirty questionnaire per organization. The respondents were given assurity according to their privacy, confidentiality and independency of researcher from their organization. The ages of respondents were from 25 to 45. For finding the coordination in supply chain in manufacturing industry, it is necessary to find relation between variables that are selected. These variables are top level management commitment, mutual understanding, flow of information, organizational factors, relationship and decision making and supply chain responsiveness. For this purpose we select three manufacturing organizations in Faisalabad. These firms are selected randomly. The questionnaire which we used for the data collection has already developed by the Rajesh k Singh (2011). This questionnaire is selected because it is reliable, valid and internationally accepted. This questionnaire is very valid for our data collection and also very easy to understand. The questionnaire was comprises on total 32 questions which was grouped in 6 main headings of above discussed variables. The questionnaire was developed using the likert scale that have 5 options strongly disagree, disagree, neither agree nor disagree, agree and strongly agree. These questions are very best to find coordination in supply chain. We distributed total 80 questionnaires in three textile manufacturing firms of Faisalabad. Orient coating and finishing mill and sadaqat textile mill and one another. We give questionnaire to employees that have 4 to 5 year or above experience in that firm. Some of them were managers, assistant managers, supervisors and other experienced employees.

**Data Analysis:**

Quantitative data analysis was used. Raw data was set and inputted to generate descriptive statistics, which include mean, standard deviation and correlation coefficient. To test the relationship between top level management commitment, mutual understanding, flow of information, organizational factors, relationship and decision making and supply chain responsiveness, statistical analysis was done using SPSS statistics 15. Table 1 presents Mean, Standard deviation and Correlation and coefficient.

**Measurement:**

SPSS software was used for analysis purpose. Data was put in this software and results are collected in the form of table. These results are in the form of Mean, Standard deviation and Correlation coefficient. The score of different attributes for the manufacturing firms are given in table below,

**Correlations:**



	Mean	St. Dev	Top Level Commitment	Mutual Understanding	Flow Of Information	Relationship And Decision making	Organizational Factors
Top Level Commitment	2.0579	0.43169					
Mutual Understanding	2.4444	0.54904	.534(**)				
Flow Of Information	2.3495	0.43709	.248(*)	.283(*)			
Relationship And Decision-making	2.0602	0.53318	.695(**)	.667(**)	.323(**)		
Organizational Factors	2.2801	0.41568	.519(**)	.468(**)	.511(**)	.410(**)	
Supply chain responsiveness	2.0278	0.47389	.434(**)	.510(**)	.434(**)	.455(**)	.529(**)

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

\* Correlation is significant at the 0.05 level (2-tailed).

The correlation for Top Level commitment ( $r=1$ ,  $p>0.01$ ). Mutual understanding and Top level commitment have correlation of ( $r=0.534$ ,  $p<0.01$ ). Top level commitment and flow of information have correlation ( $r=0.248$ ,  $p<0.05$ ). Top level commitment and relation and decision making have correlation ( $r=0.695$ ,  $p<0.01$ ). Top level management and organization factors have correlation ( $r=0.519$ ,  $p<0.01$ ). Top level commitment and supply chain responsiveness have correlation ( $r=0.434$ ,  $p<0.01$ ). Mutual understanding and flow of information ( $r=0.283$ ,  $p<0.05$ ). Mutual understanding and relationship and decision making have correlation ( $r=0.667$ ,  $p<0.01$ ). Mutual understanding and organizational factors have correlation ( $r=0.468$ ,  $p<0.01$ ). Mutual understanding and supply chain responsiveness have correlation ( $r=0.510$ ,  $p<0.01$ ).

Flow of information and relationship and decision-making have correlation ( $r=0.323$ ,  $p<0.01$ ). Flow of information and organization factors have correlation ( $r=0.511$ ,  $p<0.01$ ). Flow of information and supply chain responsiveness have correlation ( $r=0.434$ ,  $p<0.01$ ). Relationship and decision-making and organizational factors have correlation ( $r=0.410$ ,  $p<0.01$ ). Relationship and decision-making factors and supply chain responsiveness have correlation ( $r=0.455$ ,  $p<0.01$ ). Organizational factors and supply chain responsiveness have correlation ( $r=0.529$ ,  $p<0.01$ ).

### Regression Analysis:

Variables	Standardized beta	t
Top-level commitment	.434	4.028
Mutual understanding	.510	4.962
Flow of information	.431	4.032
Organizational factors	.529	5.215
Relationship and decision making	.455	4.281
R	0.529	
R <sup>2</sup>	0.28	
F	27.196**	

In top level commitment \*\*p<0.01, mutual understanding \*\*p<0.01, flow of information \*\*p<0.01, organizational factors \*\*p<0.01, relationship and decision making \*\*p<0.01

### Results and Discussions:

In the economies that are globally integrated SCM is very important technique for getting competitive edge and sustainable industry growth. To meet the competitive environment globally, a SC should be well responsive and coordinated in these days. There are some factors that are compulsory to analyze for the success of responsive and coordinated supply chain for the firm. This study evaluates these factors and their significant affect on coordination and supply chain responsiveness. The results that get are following:

Top level commitment has significant relationship with SC coordination which leads to responsive supply chain. Mutual understanding and supply chain responsiveness also have significant relationship which leads to coordinated supply chain. Flow of information and relationship and decision making also have significant relationship with supply chain responsiveness. Organizational factors like all other independent variables have significant relationship with supply chain responsiveness. So, the results are showing that to get competitive edge against their rivals, firms must have to adopt and implement these factors by creating responsive supply chain. The main role to build a responsive supply chain is the commitment of the top level management. All other factors followed by this commitment. Top level commitment has low significant level as compare to other factors under this research paper, supply chain responsiveness as well as top level management commitment has significant but competitively low than other independent variables under the consideration of this study. The SME, s in Pakistan are facing the resources problems to develop affective information sharing IT programmed.

### Conclusion:

Now days, the competition between the intenerated SC rather than individual firms. To gain a sustainable competitive edge, the coordination within the supply chain is an essential variable. In this study, coordination within SC is identified by six categories that are: top level management commitment, mutual understanding, flow of information, relationship and decision making and supply chain responsiveness in Pakistani manufacturing firms. For the responsive supply chain, the firms must have to work for enhancement of top level management commitment to build responsive supply chain. Other factors that also needed to be improve, is flow of information.

In the environment of Pakistan, the share of information and top level management commitment can play a significant role to develop a coordinated supply chain as well as other factors. For the purpose of efficient information sharing process, the firms must have to develop their IT means.

This argument supported by the Singh et al(2010) that SME,s are facing hurdles due to their scarce resources and are very impressive IT applications. These companies must overcome on these hurdles to get sustainable competitive advantage against their rivals in Pakistan's competitive environment.

### **LIMITATIONS AND FUTURE RESEARCH**

The limitation of this study is that it analyzes the three manufacturing industries in Faisalabad, Pakistan only. This study will provide a way for future investigation of these factors in different environments and other factors that will be proved a source of enhancement in supply chain coordination.

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