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Supply Chain Integration and Supplier Management in Supply Chain

Effectiveness of Supply Chain Integration and Supplier Management in Supply Chain

Networks

by

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the

Requirements for the degree of

MASTER OF SCIENCE

In

ENGINEERING MANAGEMENT

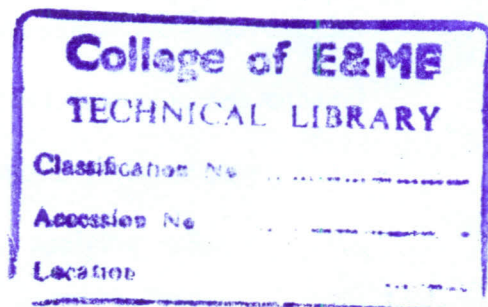
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2014



# Supply Chain Integration

EME,NUST

## **Effectiveness of Supply Chain Integration and Supplier Management in Supply Chain Networks**

By: Ibrahim Burki

A thesis submitted in partial fulfillment of the requirements for the degree of Engineering Management at the College of EME, Pakistan.

10<sup>th</sup> September 2014

## Supply Chain Integration

### **ABSTRACT**

In the last one (1) decade, there has been an increased focus on Supply Chain Management (SCM) as a competitive weapon due to the significant effects that supply chain activities have on all elements of an organization's financial performance, including operating performance and costs, revenue growth, as well as a growth in the asset management.

Integration in supply chain networks has turned out to be a subject of investigation as well as for the professional practices. Theoretical and practical understanding on the supply chain integration was considered as inadequate in Pakistan as so far the research had been descriptive mostly. Encouraged by the lack of research and variety of benefits, the goal of this study is to comprehend what is supply chain and integration between different players involved. Furthermore, highlight what are the crucial factors for implementation of the supply chain integration. Further to that this research focused on highlighting the factors that affect the Supply Chain performance which is directly proportional with overall growth of the organizations. A quantitative methodology had been used to furnish this research work where professional networks and online approach was undertaken. Information in this matter was collected from the different sectors of manufacturing, Humanitarian/Non government organizations and sourcing agencies of Pakistan. In these organizations information was gathered from the officer to senior level managers working in the procurement, logistics or supply chain management. However, collected information was analyzed by applying reliability tests, correlation analysis and simple linear regression to furnish the outcome. Based upon

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the findings of the analysis, it was determined that these five (5) under studied sections effectively improve the performance level of supply chain management.

### **ACKNOWLEDGEMENTS**

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## CHAPTER 1: INTRODUCTION

### 1.1 Background and rationale of research

“In the last one (1) decade, there has been an increased focus on Supply Chain Management (SCM) as a competitive weapon due to the significant effects that supply chain activities have on all elements of an organization’s financial performance, operational performance and costs, revenue growth, as well as a growth in the asset management”.

.The opportunities for competitive advantages are significant as many western firms have integrated with suppliers for example:

- Intel with China's Fuzhou Rockchip Electronics.
- Mazda and Ford.
- Sony andEricson
- HP-Compact etc.

This recognition of the importance of supply chain management has given rise to an abundance of recent research on SCM practices flowing from business schools, industry consortia, SCM software providers, and consultancies. One of the key issue which needs to be explored and developed especially in a Pakistan’s context how supply chain integration is associated with effective measures of performance, such as top management’s commitment , functional performance, channel performance, supplier operational performance and operational organizational performance with other factors

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like lean manufacturing, total quality management, and financial aspects and returns etc.

An unembellished and costly disruptions have been recorded in the past by different companies across the globe under various industries including Boeing and General Motors, Dell, Toyota, and Ericsson , Sony, Nike and Apple etc.

However while working with suppliers, local or international, organisations are now faced with extensive supplier disruption risks. Such threat only increase because organisations have a tendency to depend upon suppliers. In this era around 50% of the overall expenditure of the organisations are allocated for purchasing inputs from suppliers[1] whereas, a manufacturer these days prefer to assemble instead of production of items required to furnish the end product[2]. Similarly due to on going economical crisis across the globe, the percentage of failure of suppliers were reportedly swung up by thirty percent (30%). As this crisis lingers on, the supplier risks for the organisations may not reduce but it may increase only[3].

From the organizational point of view, a practical question should be how to reduce the risk of supply chain managements' failure? Many organizations do not had an adequate answer to this question. However, another point to ponder for the professionals or students of this field could be, how they can avoid any similar failures by what kind of actions and that too prior to such fiascos?

Even though such questions are open ended as the academic view on the supply chain management integration/collaboration in Pakistan's context is still very limited as the research on supply chain integration had been descriptive so far and one of the answers to such questions is the succesful implementation of supply chain integration in



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the organizations which is tough to be implemented straight away as it requires lots of factors to be catered and only possible after the implementation of cross functional breakh within the firm.

The rationale of this research work was to examine various aspects of integration in order to structure and define the clear concept of supply chain management integration for better implementatoin. As there is a lack of detailed frameworks and concrete recommendations for how supply chains can be effectively integrated in Pakistan.

There is slight confusion regarding the term supply chain management integration and thus, this research work deems to propose a definition of supply chain management integration and its effectiveness.

### **1.2 Research Questions**

Goal of this examination is to highlight the effectiveness of supply chain integration.

Following mentioned are the questions undertaken in this dissertation :

1. Important aspect is to understand the concept and significance of integration of supply chainmanagement/network
2. How effectivenesse of an overall supply chain system is affected by supply chain integration.

### **1.3 Objectives of the Study**

The rationale of this work is to examinethe essential factors affecting performance of firms depending upon "Supply Chain" in Pakistan. Objectives of the research work are as followed:

- To highlight the importance of supply chain integration.

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- To statistically evaluate the relationships between level of commitments effecting supply chain performance in Pakistan
- To provide fraud prevention and corruption reduction strategy in supply chain management systems through supplier management.
- Provision of generic supply chain performance measurement oriented strategies for the organizations

### 1.4 Contributions of the Study

As quoted by Alan Nicol, Executive Member

*“Common to all manufacturing companies is the need to control the flow of material from suppliers, through the value adding processes and distribution channels, to customers. The supply chain is the connected series of activities which is concerned with planning, coordinating and controlling material, parts and finished goods from supplier to customer. Traditionally, the flow of material has been considered only at an operational level. No longer, however, can the potential of integrating the supply chain be ignored. Companies that manage the supply chain as a single entity and ensure the appropriate use of tools and techniques in order to meet the needs of the market, will not get left behind in the fight for survival”.*

Therefore, being a supply chain professional it is observed in Pakistan that our major of supply chain companies or relevant firms are unaware of the cross functional breakthrough with in the firm and how often the supplies do not meet the deadline or quality benchmark. This everyday situation and loss we have to face in personal (every day purchases) or professional lives can be undone with the improvement of the system by integrating the different channels of the supply chain systems.

This research work may provide literature and guidelines to understand the supply chain integration in Pakistan's perspective. In addition to that this research may highlight

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strategies for measuring the supply chain performance within a firm. Likewise, this research work may contribute to the literature on fraud prevention corruption reduction in the supply chain systems by effective supplier management. Therefore, industrial organizations “ Supply chain oriented or buying firms” can utilize the tools/criteria introduced in this research to improve their overall efficiency.

### **1.5 Organization of the Study**

Second Chapter (II) presents the summary of the perceptions and developed ideas. Third Chapter (III) covers analysis and discussions based upon the hypothesis analyses and undertaken “methodology”. In addition to that sample design, process for collection of data were also covered. Chapter-IV covers the results and findings from the study. Chapter-V focuses on conclusions and recommendations.

## CHAPTER 2: LITERATURE REVIEW

### 2.1 Integration in “Supply Chain” Networks

In former collected works, assimilation of the networks involving supply chain has been accentuated. Supply networks assimilation is categorized as “the degree to which a manufacturer strategically collaborates with its supply chain partners and collaboratively manages intra and inter-organization processes” (Yusuf, 2004). Persistence of supply networks integration was to manage the whole lot of output/outflow in a manner which contenders should not stand by the end product “or to the equitable benefit generated” (Woodruff, Flint, 2006). Some of the benefits of “Integrated supply chain systems” can be improved delivery time (lead time), low level of stock in warehouse or stores, reduction of bullwhip effect and last but not the least a healthy addition of customer contentment (Wisner, 2003). Assimilation, data distribution and synchronization also improves the overall capability of the supply networks to respond deviations in vibrant situations (Woodruff, Flint, 2006).

Internal assimilation method is important and along with supplier assimilation. However, to expand the efficiency, core assimilation have to be streamlined first to reassure the supplier assimilation (Walters, 2004). Internal assimilation affects certainly the external assimilation with suppliers and customers. Both internal and external assimilations are substantial experiences of refining firm’s supply chain dexterity (Martinez-Olvera, Shunk, 2006).

Supply networks assimilation can be functional under diverse frameworks. Regards to strategy perception, external assimilation and internal assimilation in strategy impacts organizational output (Vargo, 2004). Ulaga presented in (2003) that

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supplier assimilation adds up suppliers proficiencies in practice and recital implementation. Tokman along with group of other researchers Richey, Marino and Weaver in the year (2007) studied the facts that return on investments in the projects only expands if the intra firm assimilation is conducted. Supply networks assimilation monitors effect of the association of outflows deviation and its effectiveness with international variation. Supply networks assimilation improves the efficiency of output by effectively influencing the output variations. It was studied by Storey, Emberson, Godsell, Harrison (2006)

that the constructive effects of international industrial deviations effectively gushes the optimality of outflows.

Ponomarov and Holcomb studied (2009) the effects and linkages of supply chain assimilation with non standard returns which adds an organization's value. Rainbird in 2004 studied that supply networks assimilation have these magnitudes: core assimilation and an exterior assimilation "that is customer integration and supplier integration". Supply networks assimilation was splitted into supply networks incorporation of data and dissemination. Tokman, Richey, Marino and Weaver (2007) explained that supply networks assimilation intensely describes the complex phenomenon of its (supply network's) efficiency. Similarly, Rainbird (2004) explained that the supply networks assimilation was based upon interior assimilation and exterior assimilation. Exterior assimilation can be in form of suppliers or clients. Piercy (2007) explained the factors which can affect the internal networks assimilations.

Ponomarov, Holcomb, (2009) study showed that the supply networks assimilation was found extremely constructive for exterior partners as chunks of data was provided upfront

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which aided in collaborative issue resolving practices. It was noticed by Petersen et al, that commercial efficiency of interior and exterior participants of supply networks was improved after successful implementation of supply networks assimilation.

### 2.2 Strategic Procurement

**Procurement** is the process of acquiring different kind of goods, equipment or services from any source external to the organization. Procurement is preferred to be carried out at the most competitive price as well as ensuring that the offered product is meeting the desired quality, quantity as well as it should be supplied or provided in an appropriate lead time.

Strategic procurement is regarded as the involvement of service provider or supplier's abilities to design, engineer, manufacturing and assembling to accomplish premeditated goals (Lambert, Garcia-Dastugue, 2006). Strategic procurement can be considered as a tool by which buyers or managers can be benefited at the time of finalizing the decisions by pre determining the economical lead and by being flexible

Strategic procurement is termed as a organized and broad process of procurement of goods or services and ensuring the relationship with supplier/s moves forward in attaining the organization's strategic (long term ) goals (Lusch, Vargo, O'Brien, 2007). "However Strategic procurement has another definition as a procurement framework based on the concept of total cost of ownership, which helps firms add value and improve their competitive positions (Lusch, Vargo, O'Brien, 2007)".

However to attain the strategic procurement following mentioned steps are carried out to ensure a well established supplier or service provider is involved:

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1. Checking out the store/inventories and assessing the future requirements.
2. Issuance of purchase or framework agreement request.
3. Request for quotation/proposal
4. Opening of bids
5. Evaluation (technical and financial) of bids
6. Negotiations and award of contract

Studies have assured that longterm involvement of suppliers in procurement strategies are confidently linked with an organization's monetary performance. Such studies also found that strategic procurement also can progressively influence the buyer and seller's business associations. (Wisner, 2003). However, strategic procurement can be considered a major factor effecting seller's responsiveness, proactive communication. Because of this long term relationship even supplier's performance evaluation can be easily calculated or formulated based upon the operation or project's requirements and expected performance.

Further to that strategic procurement was considered subsidiary connection with a firm's production cost reduction and it provided information on a matter that how supply networks assimilation expands supply network efficiency.

Piercy (2007) examined the relationship between obtaining fitness and assembling execution. They found that buying fitness has four measurements: supply base advancement (parts packaging), purchaser supplier relationship improvement, supplier capacity inspecting and acquiring integration. They affirmed that purchaser supplier relationship improvement, supplier ability examining and obtaining mix are absolutely

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related with assembling execution. Piercy in 2007 explain that theobtaining combination was additionally found to have assumed a critical part in enhancing assembling execution. Furthermore, Mentzer along with Stank and Esper (2008) discovered some measurements of buying ability: strengthening, worker capability, collaboration adequacy strategic, association viability new item advancement, and purchaser dealer relationship administration. Obtaining capability was identified with execution, which was made out of piece of the overall industry, TQM and client fulfillment (Kalaiganam, Varadarajan, 2006). It has not been warrented in past inquires about that buying capability has a critical association with TQM and client fulfillment. This study underlines that acquiring ability might be regarded to serve to attain better client fulfillment.

Notwithstanding that, researchers have done some critical tries to study the relationship between supplier incorporation and assembling execution. Kalaiganam, Varadarajan (2006) analyzed the effect of buying coordination and practices on assembling execution. Three examination models were tried: 1) effect of obtaining coordination and practices on assembling execution, 2) effect of buying practices on assembling execution, with an extra steer relationship between acquiring joining on acquiring practices, and 3) directing impact of acquiring mix between buying practices and assembling execution. These results give experiences into how buying ought to be inside coordinated into business process and making arrangements for focal point.

Lambert, Garcia-Dastugue (2006) examined the effect of acquiring/supplier inclusion on vital buying and its effect on company's monetary execution. Their study displayed that buying/supplier association is decidedly connected with vital sourcing and key sourcing has a positive impact on association's budgetary execution (Lambert, Garcia-Dastugue,



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2006). Kalaiganam, Varadarajan (2006) utilized an alternate methodology for inspecting the backhanded relationship between vital buying and money related execution. In their exploration, key buying influences three variables, which are correspondence with suppliers, constraining the quantity of suppliers and the improvement of long haul associations with suppliers. Their observational examination results demonstrated that these components were influenced decidedly. Be that as it may, just two elements, correspondence with suppliers and long haul supplier connections are decidedly identified with client responsiveness, which has a positive effect on budgetary execution. This examination infers that key sourcing pushes better supply administration ability which prompts enhanced client responsiveness and monetary execution (“Kahn, Maltz, Mentzer, 2006”).

“Tokman, Richey, Marino, Weaver” (2007) researched effects of acquiring viability as well as buying of vital joinings on commercial execution. This demonstrated that the obtaining adequacy along with buying vital reconciliation have a constructive association with few parts of professional execution: business and monetary. In addition to that healso inspected the directing impact on acquiring key incorporation, and the results demonstrate that the relationship between buying viability and business execution is improved by obtaining vital mix (Tokman, Richey, Marino, Weaver, 2007). More or less, all the said explores in this specific zone legitimize the way that key sourcing has been found to altogether influence the authoritative and store network execution.

### 2.3 Coordination and Responsibility

A significant group of examination has distinguished trust as a deciding component good to go in associations. Jacobides (2005) studied that similar discoveries recommend that association quality comprises of trust along with that association duty impacts conclusions of crucial choices. Furthermore, society, coordinated with qualities, trust, and responsibility, is indispensable to achievement good to go to-business dealings and gives organizations potential favorable circumstances that could be valuable in keeping up and creating connections (Zabkar and Brencic, 2004).

Reliance is an essential component of store network connections and major components which were considered impactful on reliance were fitness, respectability, along with compelling correspondence (Levina, Vaast, 2005). Such affiliations were credited to mien of people for appending a fundamentally enthusiastic worth to societal connections which influence reliance for building connections for possible increase/danger evasion (Levina, Vaast, 2005). Usher in 2004 suggested, additionally, that trust directs the association among undertaking clash and affiliation clash, presuming that reliance is an imperative component currently understanding the profits of assignment clash without persisting through the expenses of relationship clash. Levina, Vaast (2005) contends that trust and duty result from an effective relationship that gimmicks viable correspondence, prepared adjustment, commonly grasped participation, and abnormal amounts of fulfillment. Positive activities help keeping up and enhancing communitarian connections and propelling accomplices to work at protecting their relationship ventures through participation. Positive relationship empowers organization to comprehend the system of one another, correspondence holes among both the

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parties' reductions. It is simple for both gatherings to adjust the systems of one another that are obliged to perform the occupation etc. Enhanced incorporation among the accomplices will help in better work methods coming about higher client fulfillment.

Trust and duty are developed as a consequence of a few variables, not only in light of the fact that a merchant offers great items at an agreeable cost. In this way reliance is termed as a fundamental part for duty, yet responsibility counts for any of the forthcoming works. Reliance and responsibility are created after a long haul agreeable association which results in reduction of the possibility for any gathering to adventure the former. Reliance and duty connects directly with helpful/assistive practices whereas, reliance is an actual determining factor of association's responsibility and this was researched by Susskind along with Reynolds and Tsuchiya in 2004).

### **2.4 Commitment and Reliance among Supply Chain**

Responsibility and reliance influences association obligation and buyers agree on obtaining choices focused around the seller who is seen to be generally reliable (Jayachandran, Hewett, Kaufman, 2004). Specialists show a scope of viewpoints on duty. In the sociological writing, responsibility is used to assess conduct and sociologists frequently see duty as a distinct idea intended to perceive activities that are normal for particular people or gatherings. On the other hand, clinicians by and large characterize duty regarding choices or discernments that join a single person to a behavioral trademark (Jayachandran, Hewett, Kaufman, 2004). Seeing the idea of duty regarding a relationship, for instance in the connection of marriage, an association, or business try, gives a build inside a structure which recognizes one party's expectation to proceed such a association assumed some variables. This perspective, responsibility

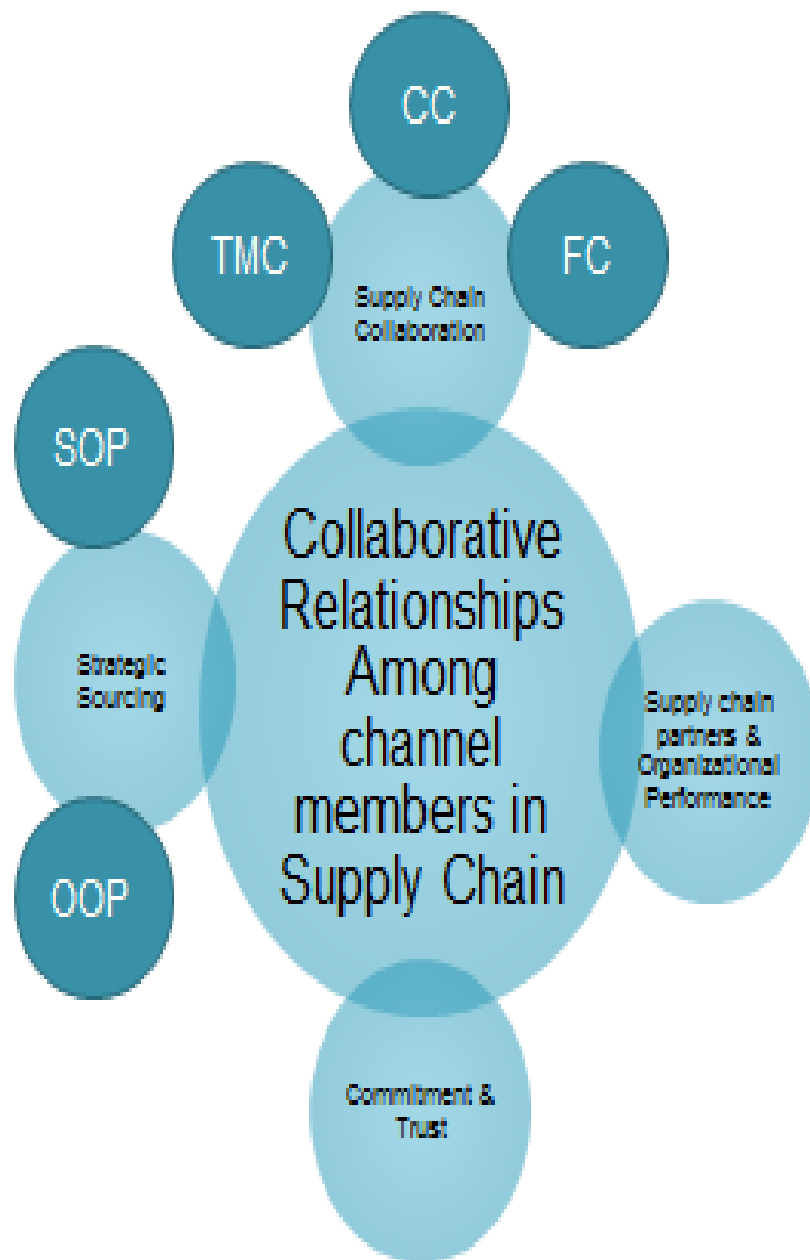
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could be observed as practically subordinate to singular's height of expectation to respond in a preciseway. These findings were shared by Susskind, Reynolds, Tsuchiya, (2004).

Wilmot along with Deis, Xu in 2004 characterized the association duty as the circumstance that gets during the trade accomplice standards a persisting synergistic association with an alternate enough to commit a greatest of exertion so as to be managed. Submittalsenses fundamentally, the importance of association in putting resources to ensure it persists uncertainly; duty to such a relationship can accordingly be characterized as the craving towards keeping up the inconclusively. Usher in the year 2004 concured, characterizing responsibility by way of persisting craving to keep up an esteemed relationship, accentuating the thought that dedication exists just when such affiliation is alleged noteworthy. This proposes a more prominent benchmark of commitment to the association and thus, more noteworthy readiness to ensure it is commonly useful. People who confirm getting a constructive quality through such association/sare eager to respond with an exertion which might be equivalent to association other stake holder's, for the purpose of previous profits got (Jacobides, 2005). In the event that these standards are connected to this work, it is not difficult to observe in an inventory network connection described by reliance, seller maintenance could be normal.

Reynolds and Leeman (2007) recommend through their work that devotion in purchaser seller association can be the presence of a verifiable/ unequivocal guarantee of

# RELATIONSHIPS AMONG CHANNEL MEMBERS IN SUPPLY CHAIN

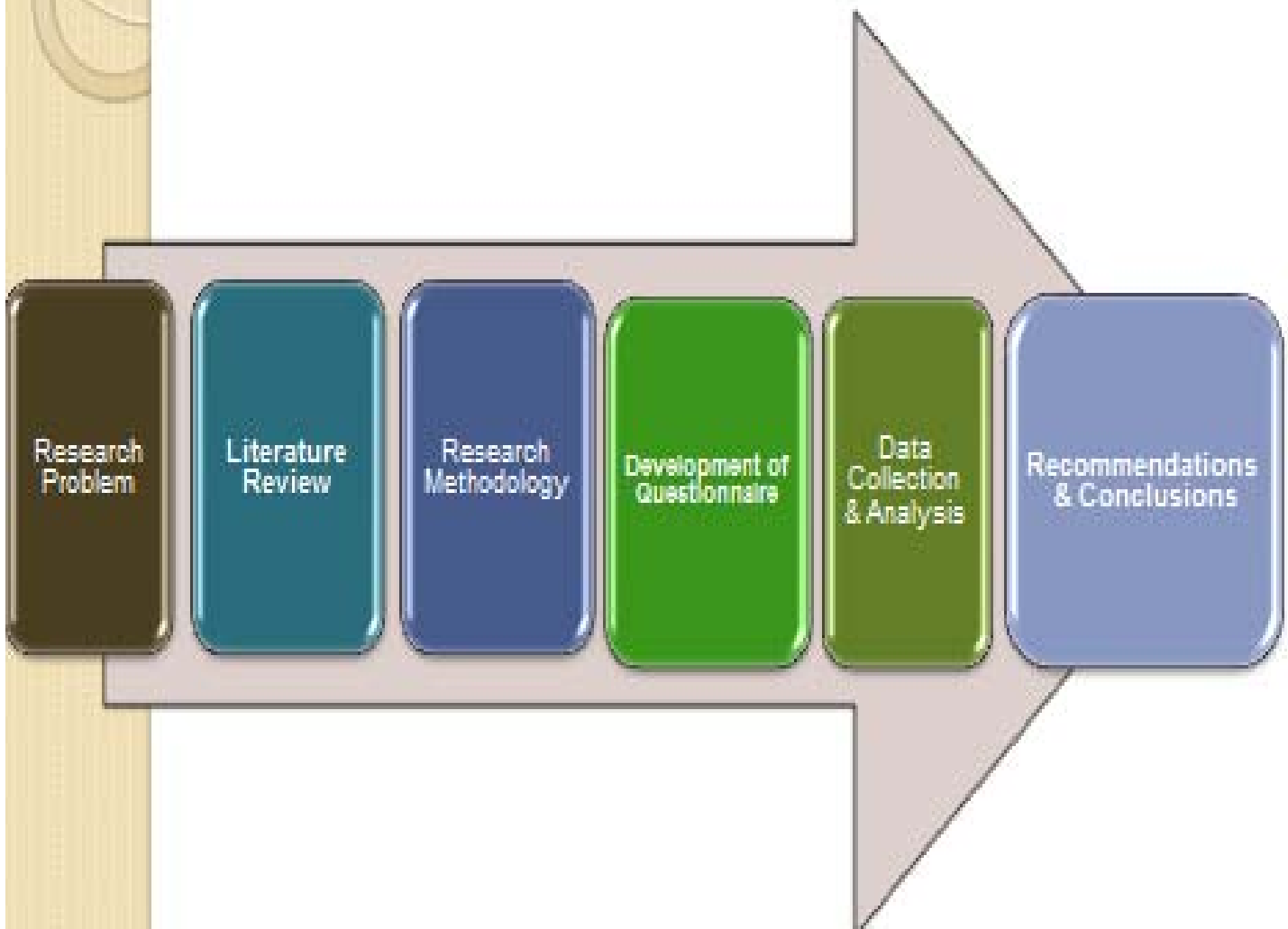


integrations as well as progression among trade accomplices. In subcontracting connections, responsibility

infers an eagerness to be faithful to the relationship, again bringing about seller maintenance. Reliance, could be considered as a crucial part in trader maintenance (Levina, Vaast, 2005).

**CHAPTER 3: METHODOLOGY OF RESEARCH**

# Methodology Plan



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In the following chapter methodology which was applied to undertake this study is discussed and it involves technique of figures assortment, manner of the study. However a combination of both qualitative and quantitative methods were applied along with the semi structured questionnaire for the collection of information.

### **3.1 The Pilot Study**

Pilot study is an exercise carried out for drafting and testing the survey questions by the help of various experienced persons working in different firms along with the highly qualified personnel of different universities. Through professional and social supply networks different professionals were approached.

Pilot study comprises of minimal mock-ups however, students have authority to fix the glitches under the initial or “development” stage prior to the complete survey. Students are also allowed to authenticate the concepts and its related readings.

A questionnaire was sent to the group of professionals in the field of Supply Networks or in Logistics/Procurement. The professionals went through the set of questions and responded on how the items were constructed. Their advice and endorsements were integrated and set of questions were modified upon their advice to ensure they are easy to understand and responded back with a proper feedback.

The thirty five professionals were approached for provision of the feedback and out of thirty five 25 responses were gathered back for the pilot study. Mostly professionals were Logistics managers, purchasing managers, vice presidents and other supply network officials of various Humanitarian/Non government organizations, supply chain companies, FMCG and Oil and gas related industries located in the Pakistan.

### 3.2 Sample Procedure and Data Collection approach

In this exercise 3 (three)-stage procedure was utilised for the collection of samples. So in 1<sup>st</sup> (first) phase was an assesment of the available audience due to very limited number of available Supply networks associated professionals. It was a tough task to find 200 plus such professionals in a place where they keep their profiles confidential. In second phase the number of assesed professionals were selected who were working under different local and multinational firms in Pakistan

The set of questions were dispersed via internet links of google documents further with the help of social networks and email communications. The problems faced during collection of data was due to busy routines of the professionals thus response rate of the participants was not very healthy. Following the collection of information different statistical tests were applied.

Now based upon the above mentioned exercises total 200 professionals were approached for the survey and 140 requested persons responded back with the questionnaires, however out of these 140 there were 20 filled questionnaires which were not properly filled that is some were incomplete and some had the neutral or same response for all the questions thus such responses were not considered for the analysis of the data set received. So response rate which should be considered is 120 out of 200 which in turn is 60% and acceptable for the evaluation purposes.



**CHAPTER 4: FINDINGS AND ANALYSIS**

The collected data was analyzed through SPSS 20 and following mentioned graphs illustrates the information through which supply networks integration and its consequences on the overall output can be understood.

**Table 1**

| <b>Gender</b> | <b>Frequency</b> | <b>Percent (%)</b> |
|---------------|------------------|--------------------|
| Male          | 91               | 76                 |
| Female        | 29               | 24                 |
| <b>Total</b>  | <b>120</b>       | <b>100.0</b>       |

**Table 1**

As summarized in the table-1 the figure-1 expresses the collected information in reference of different groups for the persons who took the survey. However, table 1 explains that the total number of respondents was 120 that is “N=120”. Furthermore, the above mentioned table explains that in total 91 males took the survey and on the other hand in total 29 females took this survey. The different percentages of these age groups were expressed that is 76% of the total population was represented by the male participants however remaining 24 % participants were females.

| <b>Position</b> | <b>Frequency</b> | <b>Percent</b> |
|-----------------|------------------|----------------|
| Officer         | 26               | 22.0           |
| Executive       | 40               | 33.0           |

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|                   |            |              |
|-------------------|------------|--------------|
| Manager           | 34         | 28.0         |
| Senior Management | 20         | 17.0         |
| <b>Total</b>      | <b>120</b> | <b>100.0</b> |

**Table 2**

As summarized in the table-2, the collected information is in reference of different groups for the different positions working in various organizations who took the survey. However, in table 2 these categories were prepared following the HR policies of the mainstream multinational firms which explains that the total number of respondents who were under Officer's category were 26, which was only 22 % of the total 120. Furthermore, the above mentioned table explains that 40 Executives took this survey which represents 33 % of the N, similarly 34 Managers and 20 members of Senior Management took this survey which represents 28 % and 17 % of the total participants.

### **Hypothesis-1**

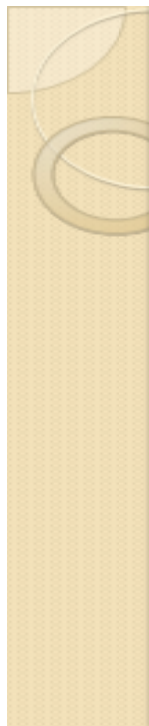
#### **Reliability Test:**

Reliability test is the one of the utmost unpretentious way for testing the reliability as well as stability of the collected information.

However, a hypothesis was given that Supply chain integration is significantly depended upon the 5 proposed sections that is Top management commitment, Channel commitment, Functional commitment, Supplier operational performance Organizational Operational Performance.

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Therefore, Cronbach Alpha (which is defined in statistics, as a constant of interiorsteadiness which is further used for an estimation of the reliability of a psychometric test, Wikipedia) was applied to test hypothesis.



### Reliability Test

#### Hypothesis-1

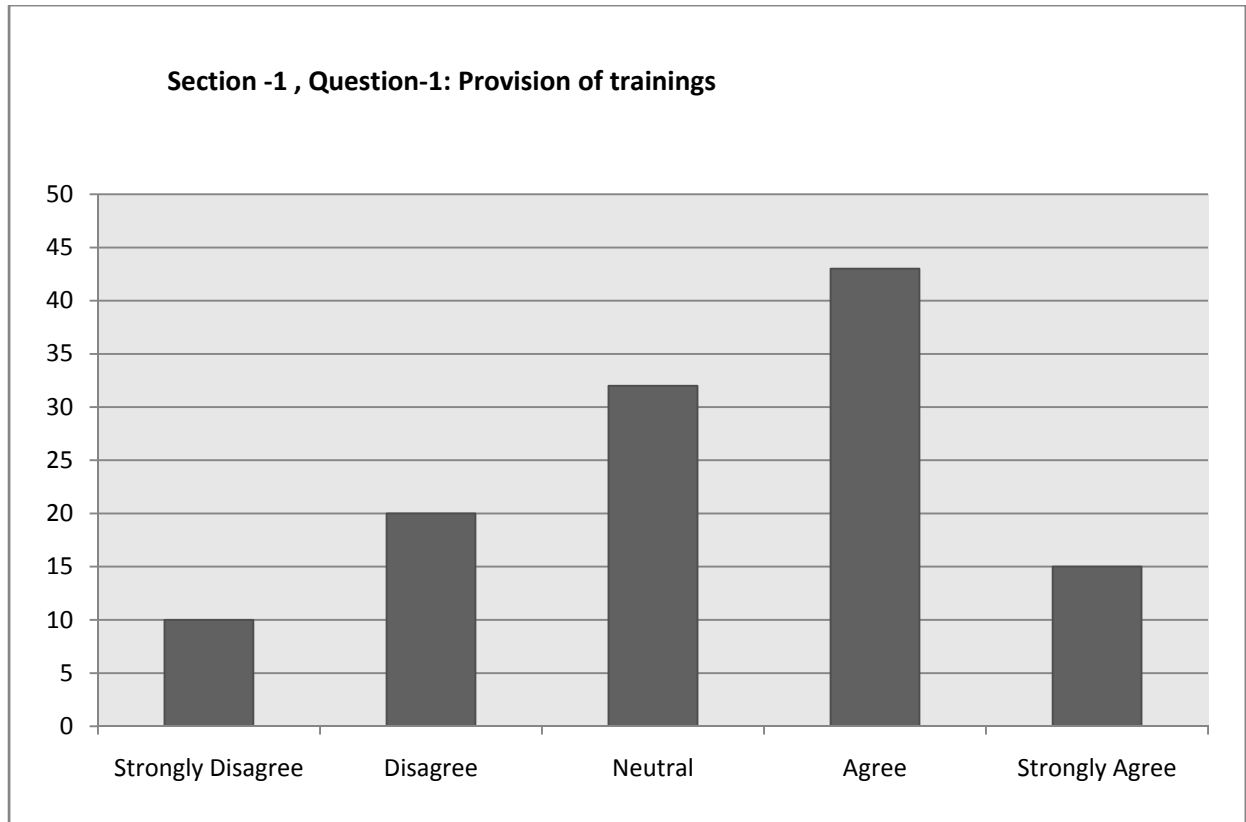
supply chain collaboration is significantly dependent upon all the five (5) proposed sections.

| Supply Chain Collaboration             | Cronbach's Alpha | N of Items |
|--|------------------|------------|
| Top Management                         | .818             | 10         |
| Channel Commitment                     | .814             | 7          |
| Functional Commitment                  | .916             | 6          |
| Supplier Operation Performance         | .808             | 6          |
| Organizational Operational Performance | .719             | 8          |
| Whole Questionnaire                    | .815             | 37         |

#### Findings:

Hence H-1 is proved, the questionnaire and overall factors in it were found internally consistent and Supply chain collaboration is significantly depended upon the said five (5) sections.

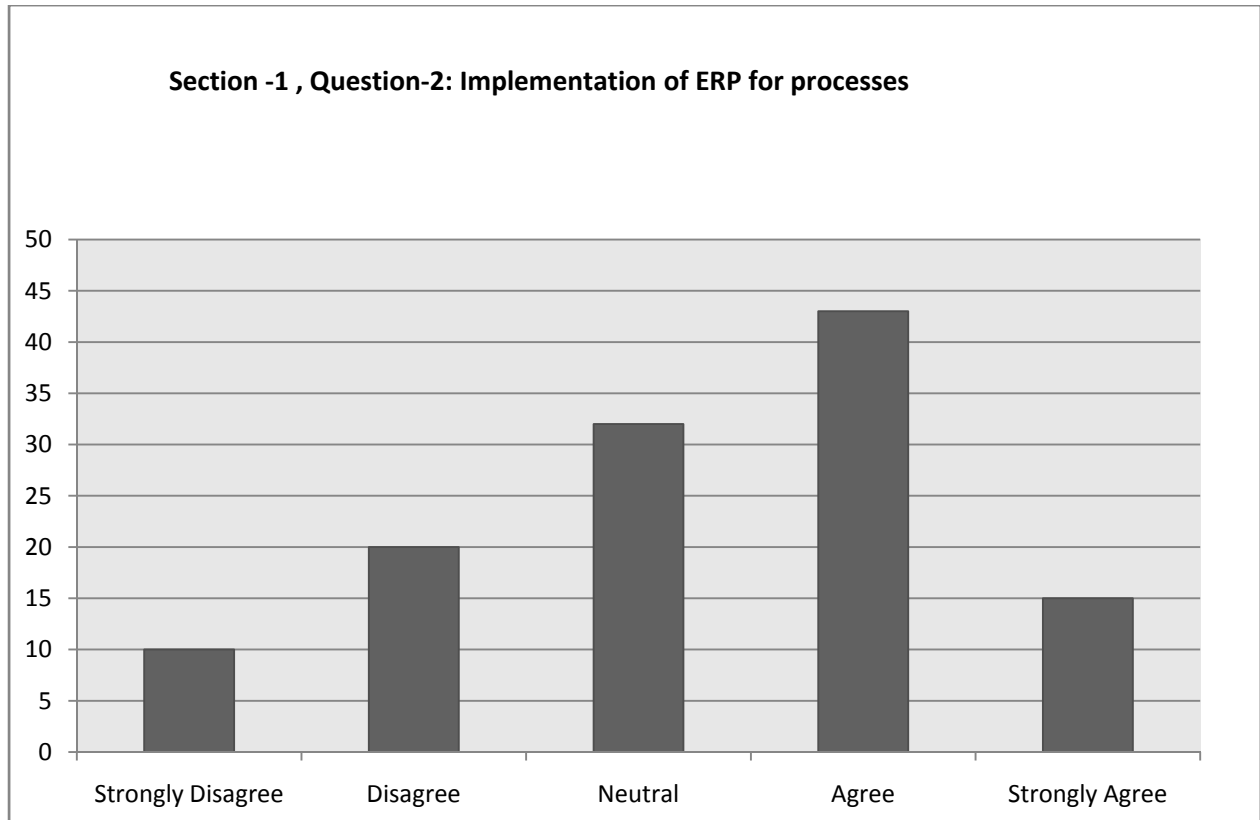
## Supply Chain Integration



**Figure-2**

As summarized above collected information is in regard of provision of trainings or the inhouse or externally offered trainings by the firm to the employees working at different positions in various organizations who took the survey. However, out of 120 respondents, 10 % “strongly “disagree””, 20 % disagree, 31% are neither agree nor disagree, 42% agree and 15% “strongly agree” that their firms support or offer their staff any kind of training.

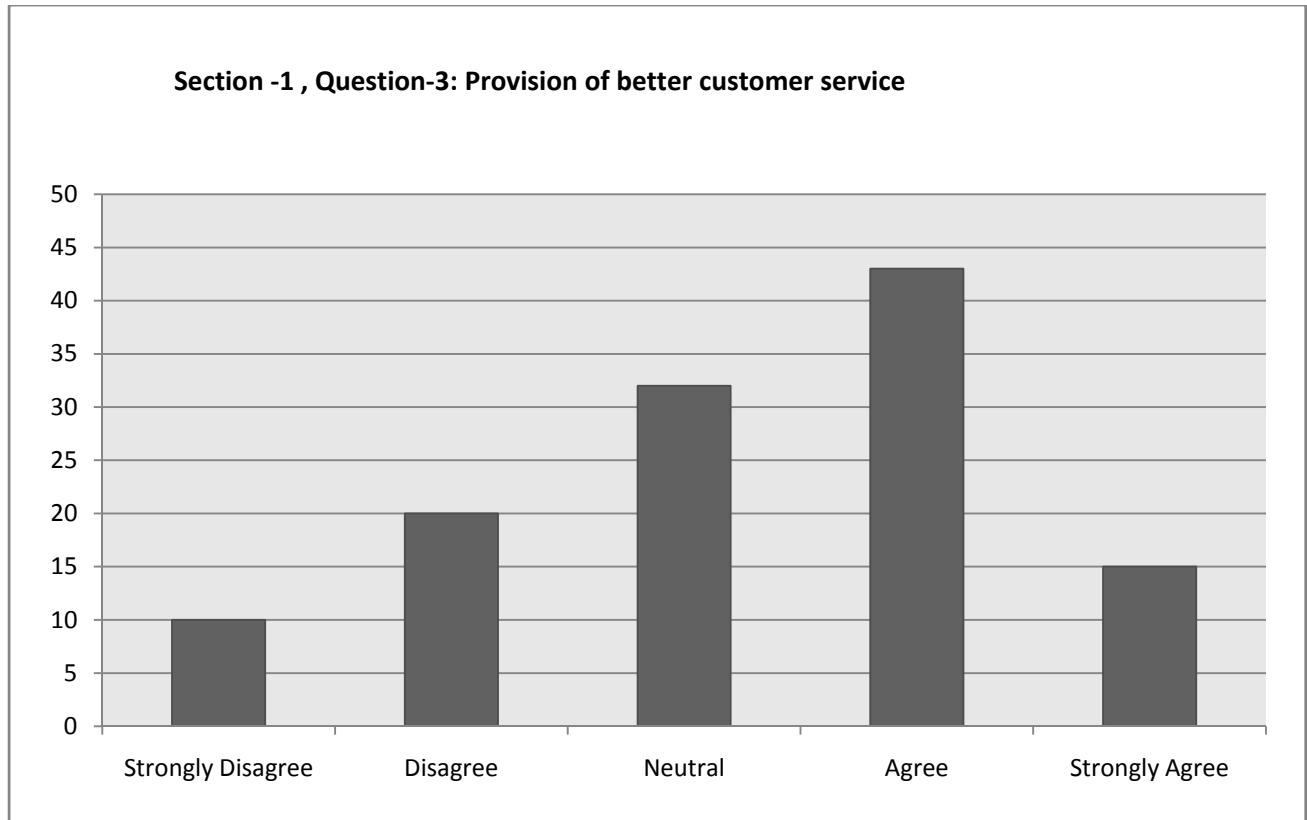
## Supply Chain Integration



**Figure-3**

As summarized above collected information is in regard of implementation of Enterprise resource planning software by different firms for their employee working at different positions who took the survey. However, out of 120 respondents, 22 % “strongly disagree”, 22 % disagree, 26% are neither agree nor disagree, 15% agree and 15% “strongly agree” that their firms have incorporated Enterprise resource planning software to streamline the work flow and for the improvement of overall efficiency.

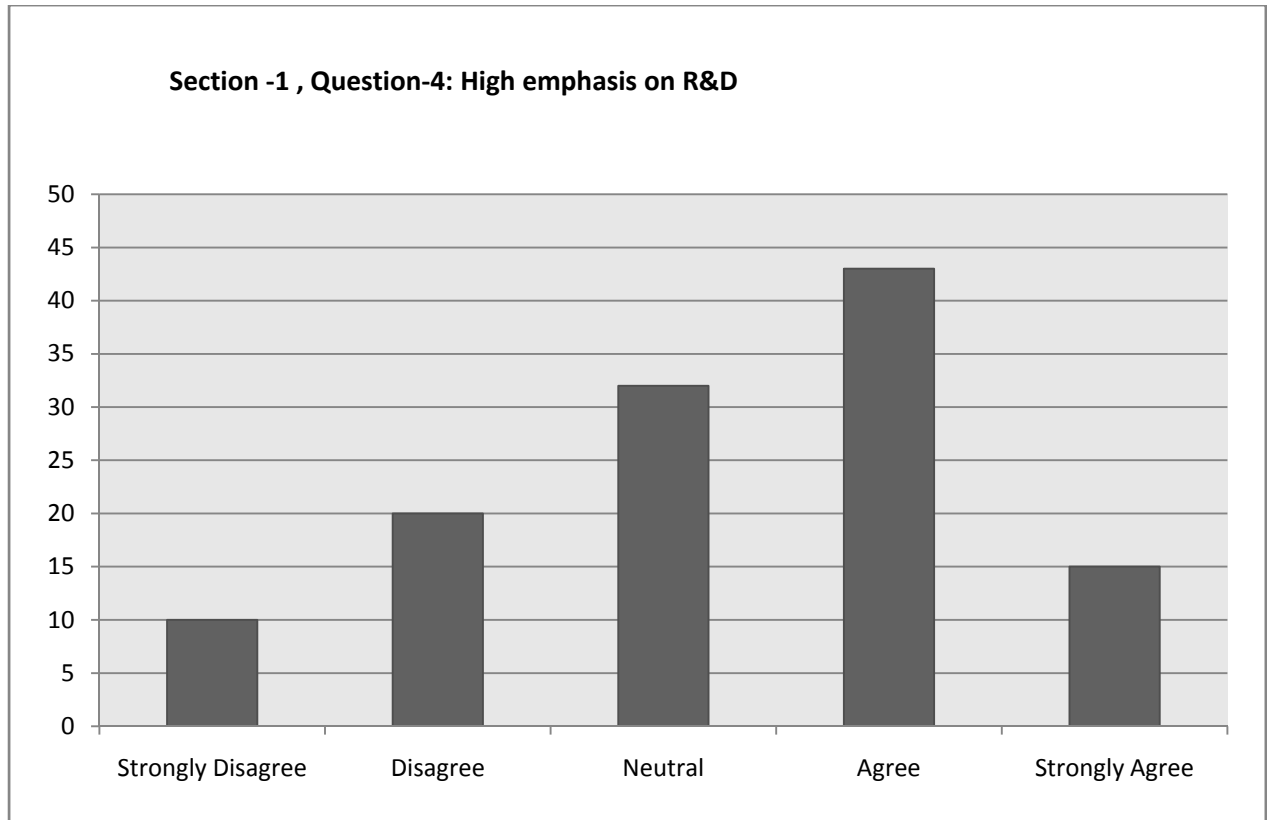
## Supply Chain Integration



**Figure-4**

As summarized above collected information is in regard of provision of better customer service by different firms for their employee working at different positions who took the survey. However, out of 120 respondents, 0 % “strongly disagree”, 21 % disagree, 22% are neither agree nor disagree, 45% agree and 12% “strongly agree” that their firms are focused on the provision of better customer service.

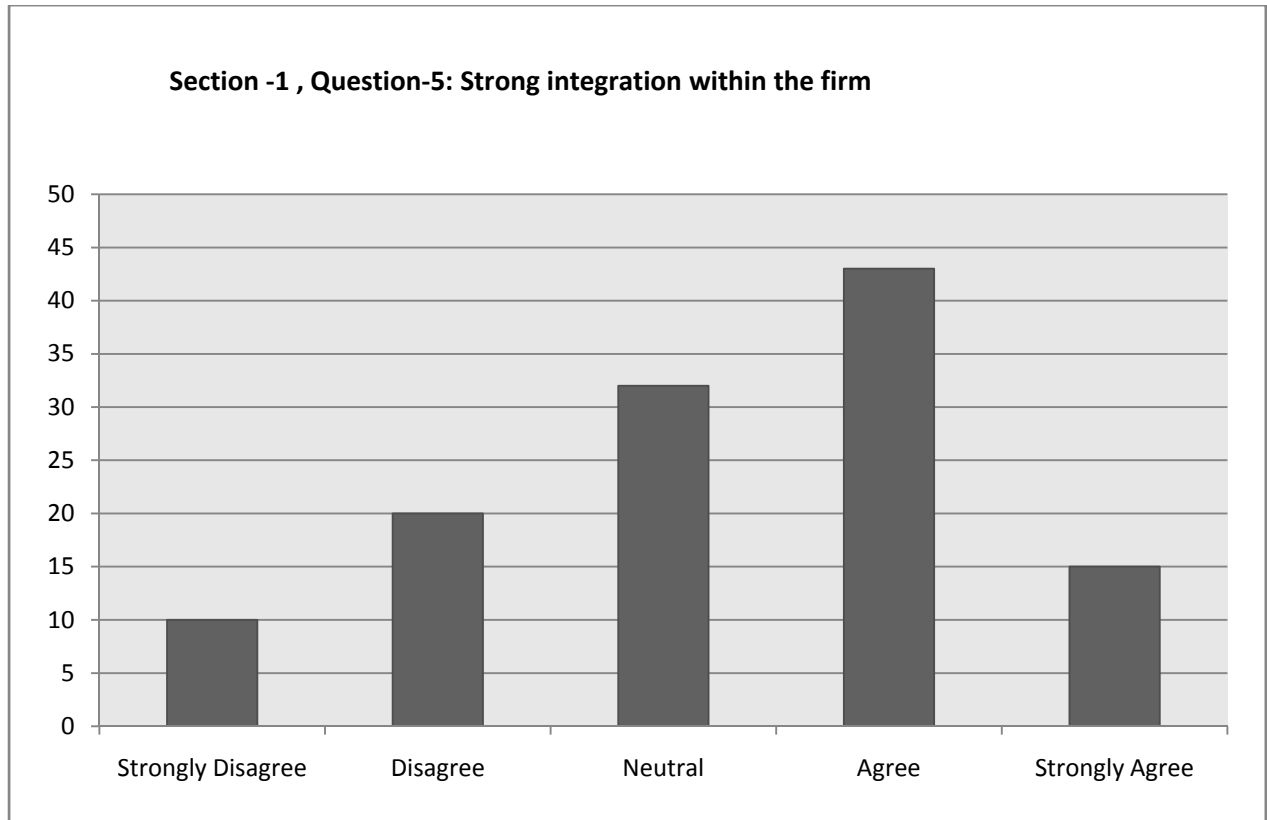
## Supply Chain Integration



**Figure-5**

As summarized above collected information is in regard of research and development by different firms for their employee working at different positions who took the survey. However, out of 120 respondents, 0 % “strongly disagree”, 21 % disagree, 22% are neither agree nor disagree, 45% agree and 12% “strongly agree” that their firms emphaize upon research and development of new technologies and techniques for a better output.

## Supply Chain Integration

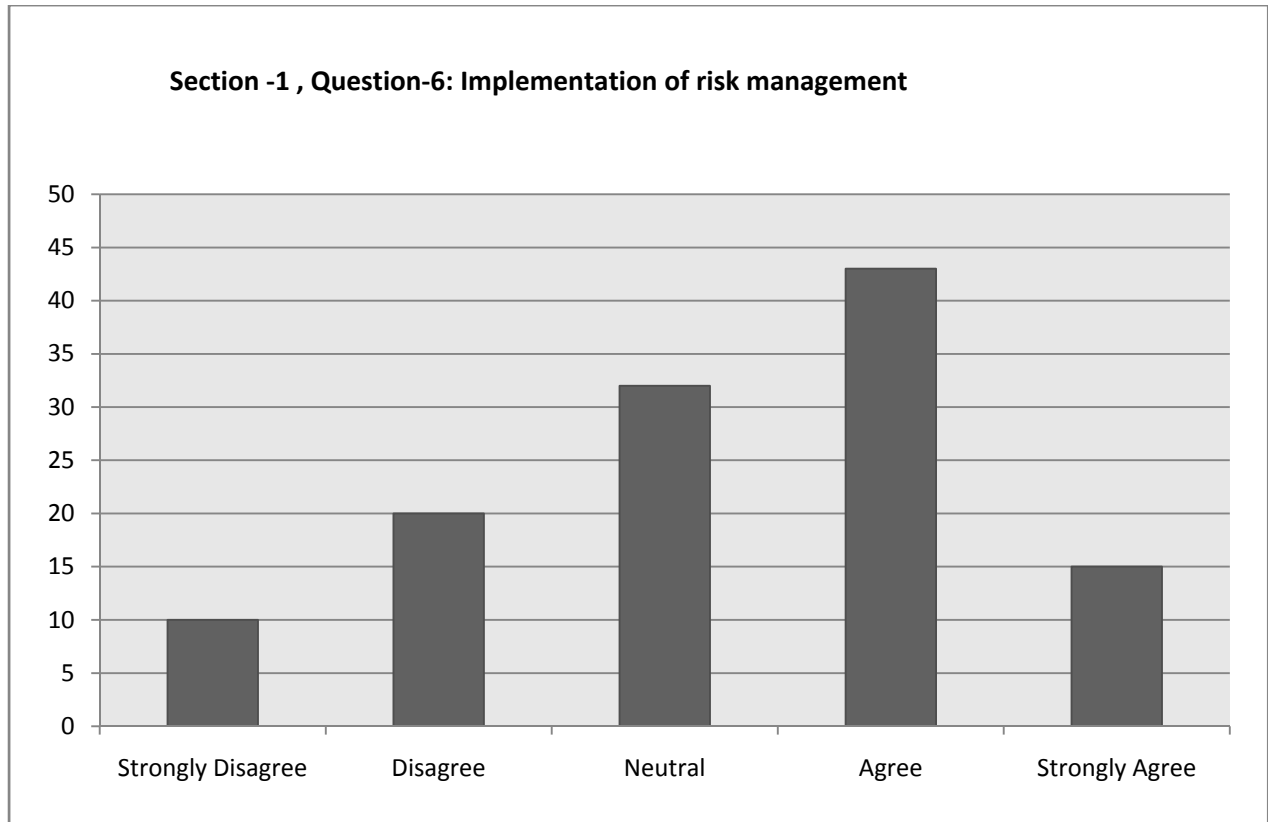


**Figure-6**

As summarized above collected information is in regard of how strongly a firm is integrated internally (relationships or collaboration of different departments of a firm) by different firms for their employee working at different positions who took the survey. However, out of 120 respondents, 0 % “strongly disagree”, 21 % disagree, 22% are neither agree nor disagree, 45% agree and 12% “strongly agree” that their firms understands the importance of strong internal integration and emphaize upon strong collaboration of different departments.



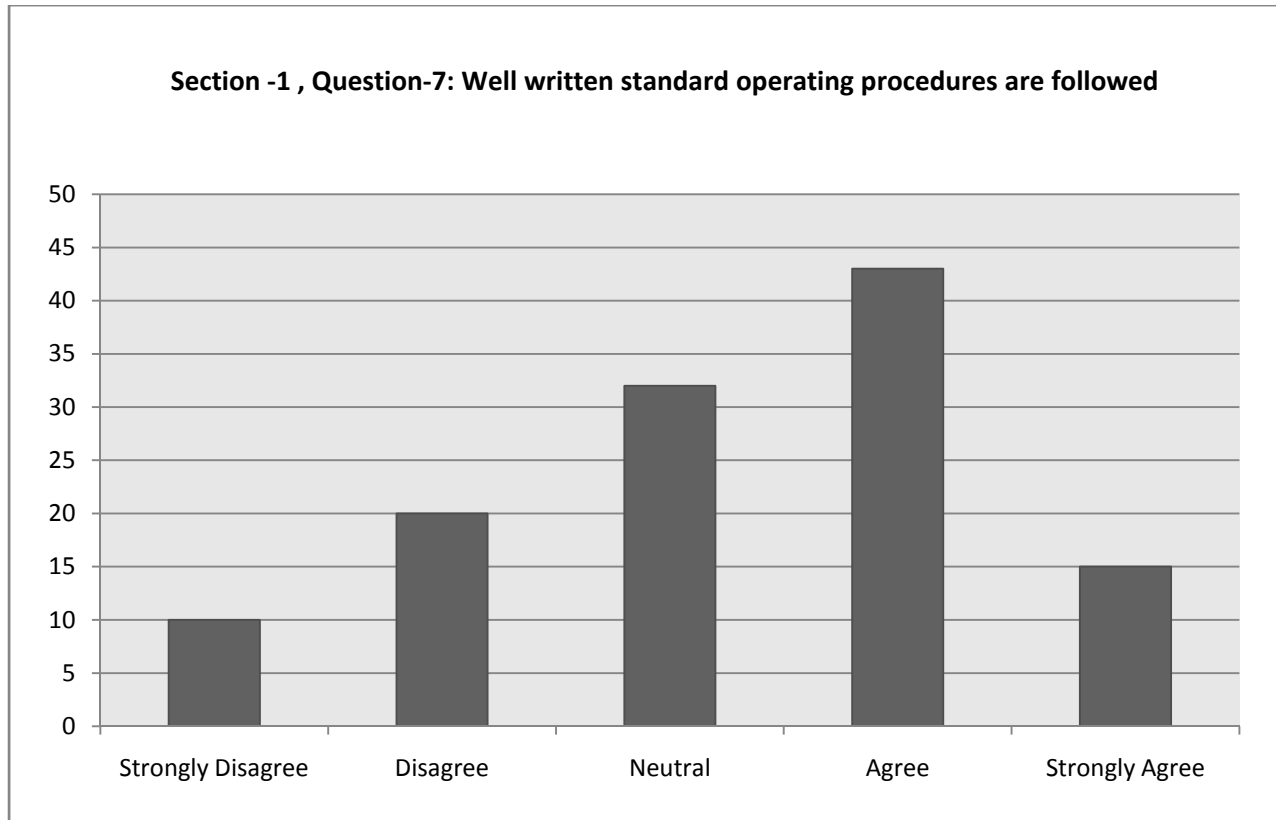
## Supply Chain Integration



**Figure-7**

As summarized above collected information is in regard of implementation of risk management or risk management software by different firms for their employee working at different positions who took the survey. However, out of 120 respondents, 8 % “strongly disagree”, 22 % disagree, 23% are neither agree nor disagree, 36% agree and 11% “strongly agree” that their firms understands the importance of risk reduction and implementation of risk management techniques and softwares with in a firm.

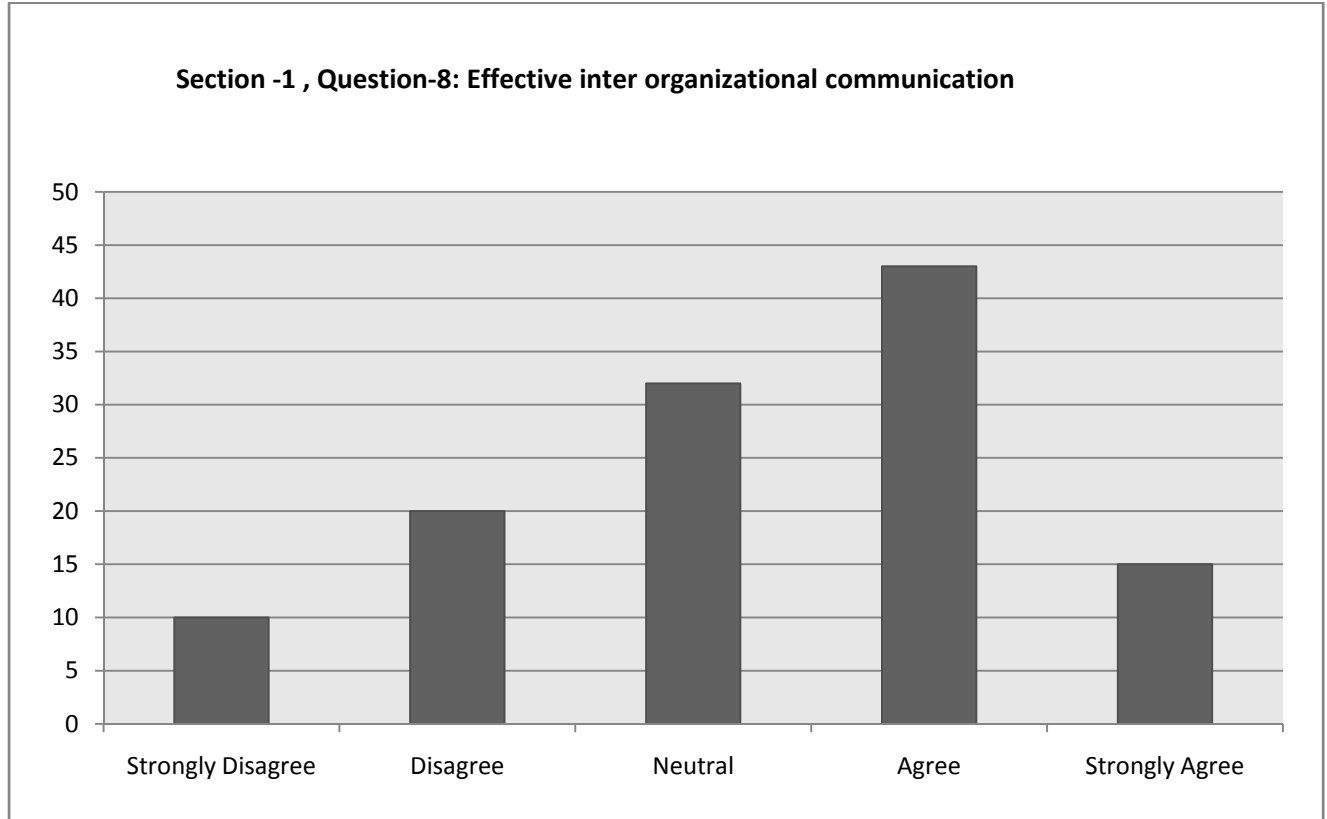
## Supply Chain Integration



**Figure-8**

As summarized above collected information is in regard of application of standard operating procedures with in a firm for the employee working at different positions in various organizations who took the survey. However, out of 120 respondents, 12 % “strongly disagree”, 22 % disagree, 21% are neither agree nor disagree, 37% agree and 8% “strongly agree” that their firms have well written standard operating procedures which are furthermore properly implemented for an effective and smooth completion of operation as well as for the improved effectiveness.

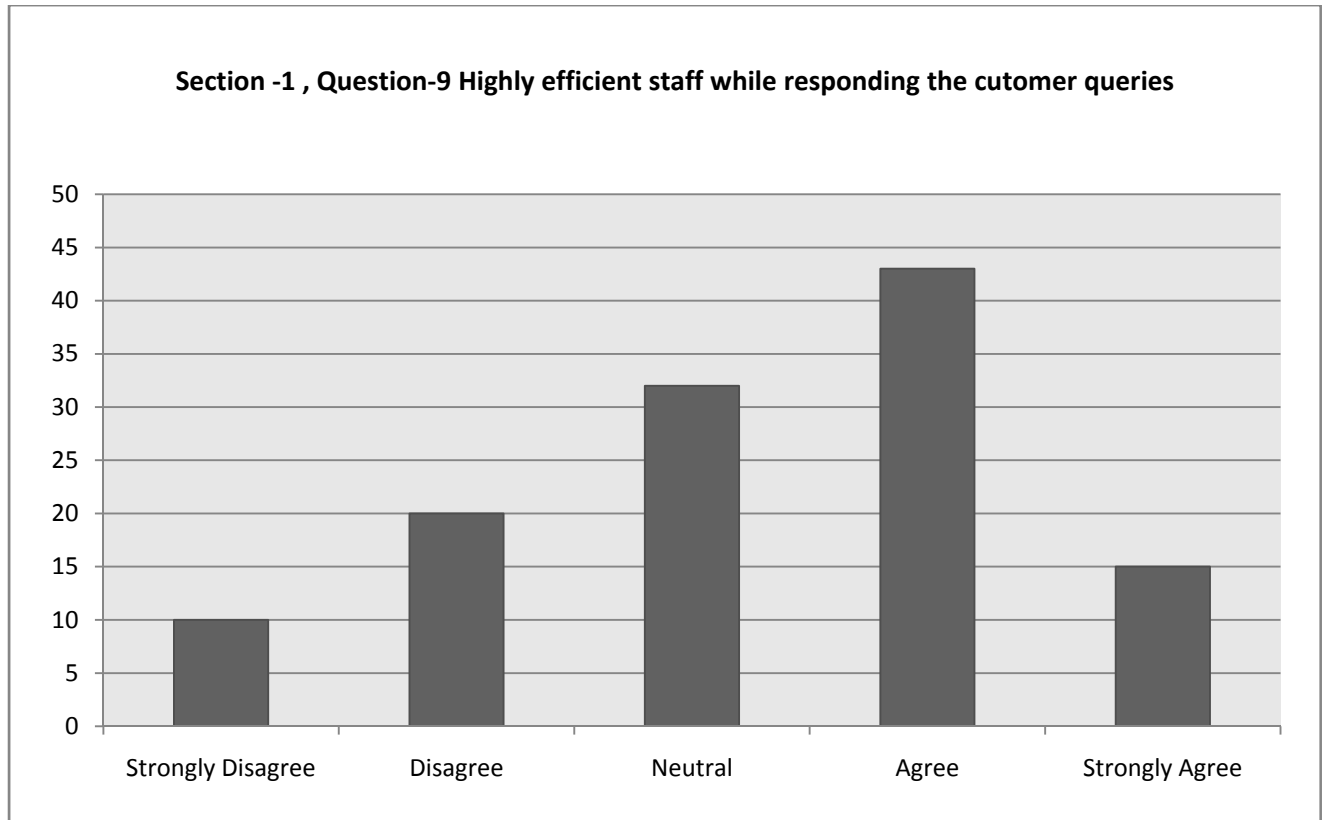
## Supply Chain Integration



**Figure-9**

As summarized above collected information is in regard of implementation of effective inter organizational communication within a firm for the employee working at different positions in various organizations who took the survey. However, out of 120 respondents, 12 % “strongly disagree”, 22 % disagree, 21% are neither agree nor disagree, 37% agree and 8% “strongly agree” that their firms have implemented effective internal communication across the departments.

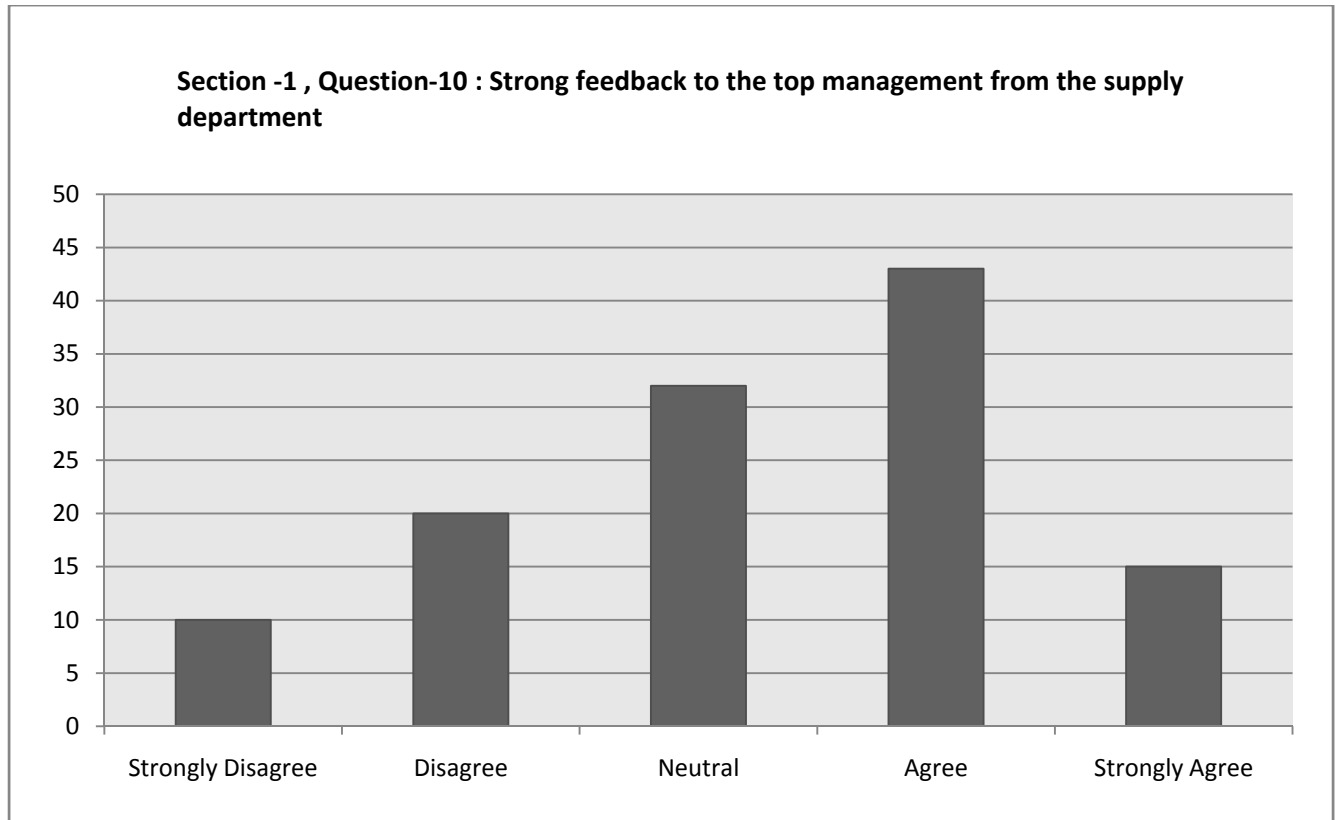
## Supply Chain Integration



**Figure-10**

As summarized above collected information is in regard of highly efficient staff who corresponds with customers effectively within a firm for the employee working at different positions in various organizations who took the survey. However, out of 120 respondents, 11 % “strongly disagree”, 23 % disagree, 24% are neither agree nor disagree, 33% agree and 9% “strongly agree” that their firms have this type of staff in their firms who resolve their customers queries to ensure customers are satisfied from the provided services.

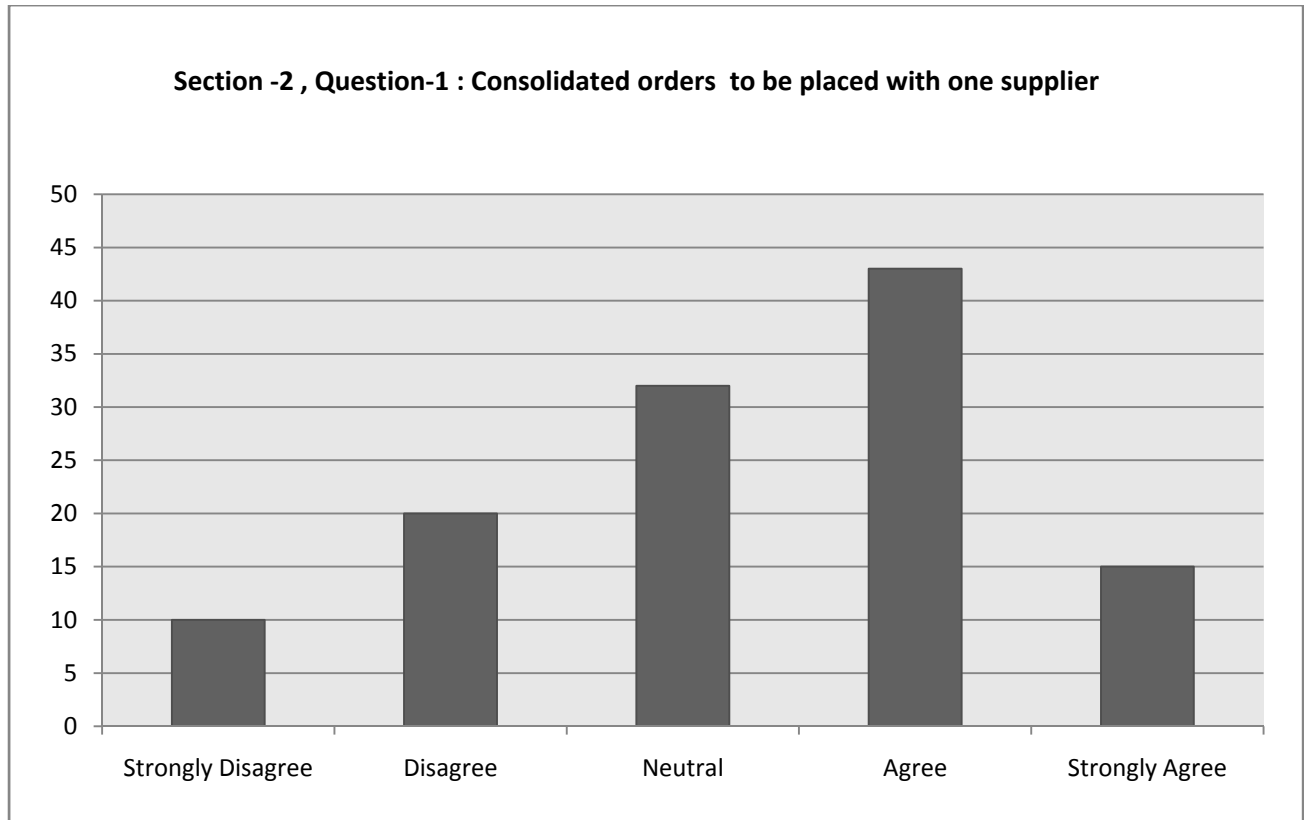
## Supply Chain Integration



**Figure-11**

As summarized above collected information is in regard of strong feedback system to the senior or top management of a firm for the employee working at different positions in various organizations who took the survey. However, out of 120 respondents, 10 % “strongly disagree”, 22 % disagree, 24% are neither agree nor disagree, 43% agree and 1% “strongly agree” that their firms have strong feedback systems to top management which further takes strong actions for the improvement of overall output as well as to ensure staff’s feedback is important.

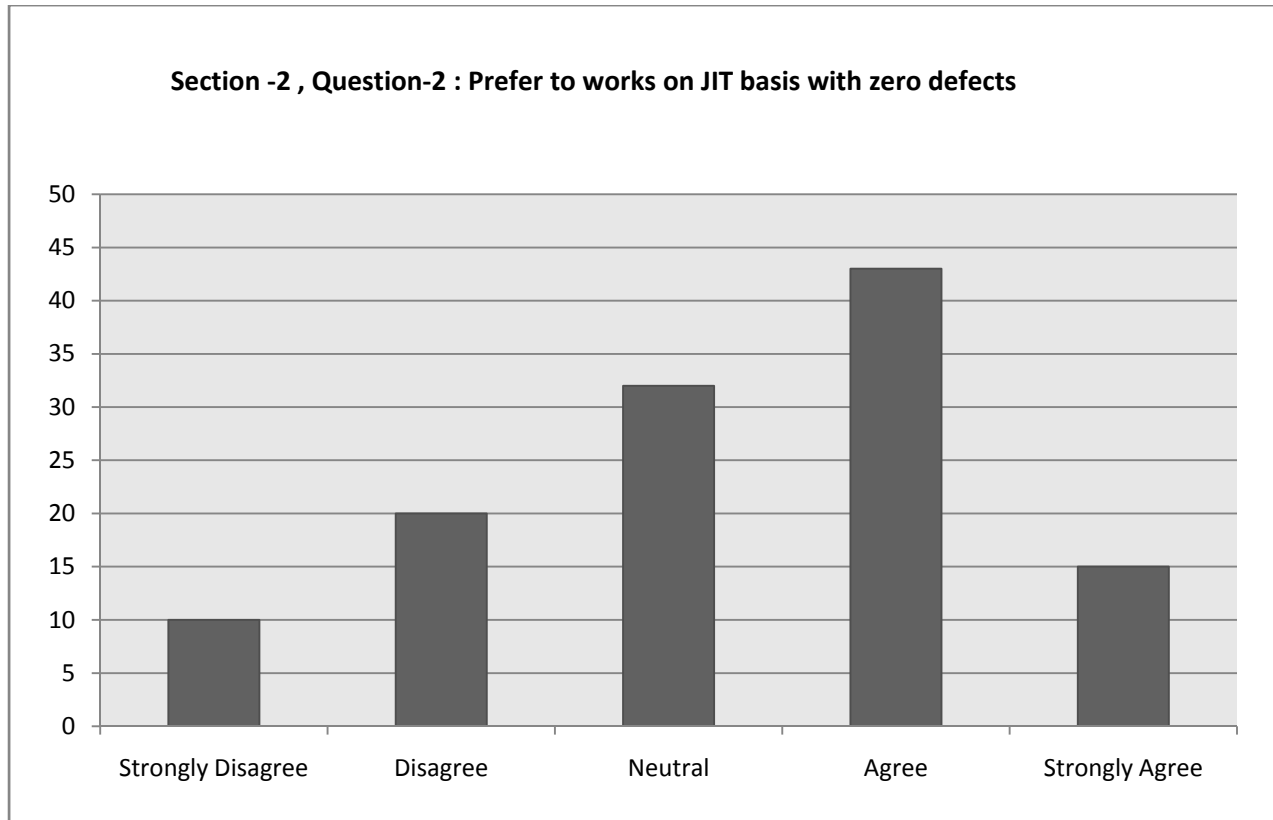
## Supply Chain Integration



**Figure-12**

As summarized above collected information is in regard of placement of consolidated orders with one supplier for better productivity by the firms and their supply chain employees working at different positions in various organizations who took the survey. However, out of 120 respondents, 0 % “strongly disagree”, 23 % disagree, 24% are neither agree nor disagree, 43% agree and 10% “strongly agree” that their firms prefer to place consolidated orders with one supplier to improve the overall quality of the final product.

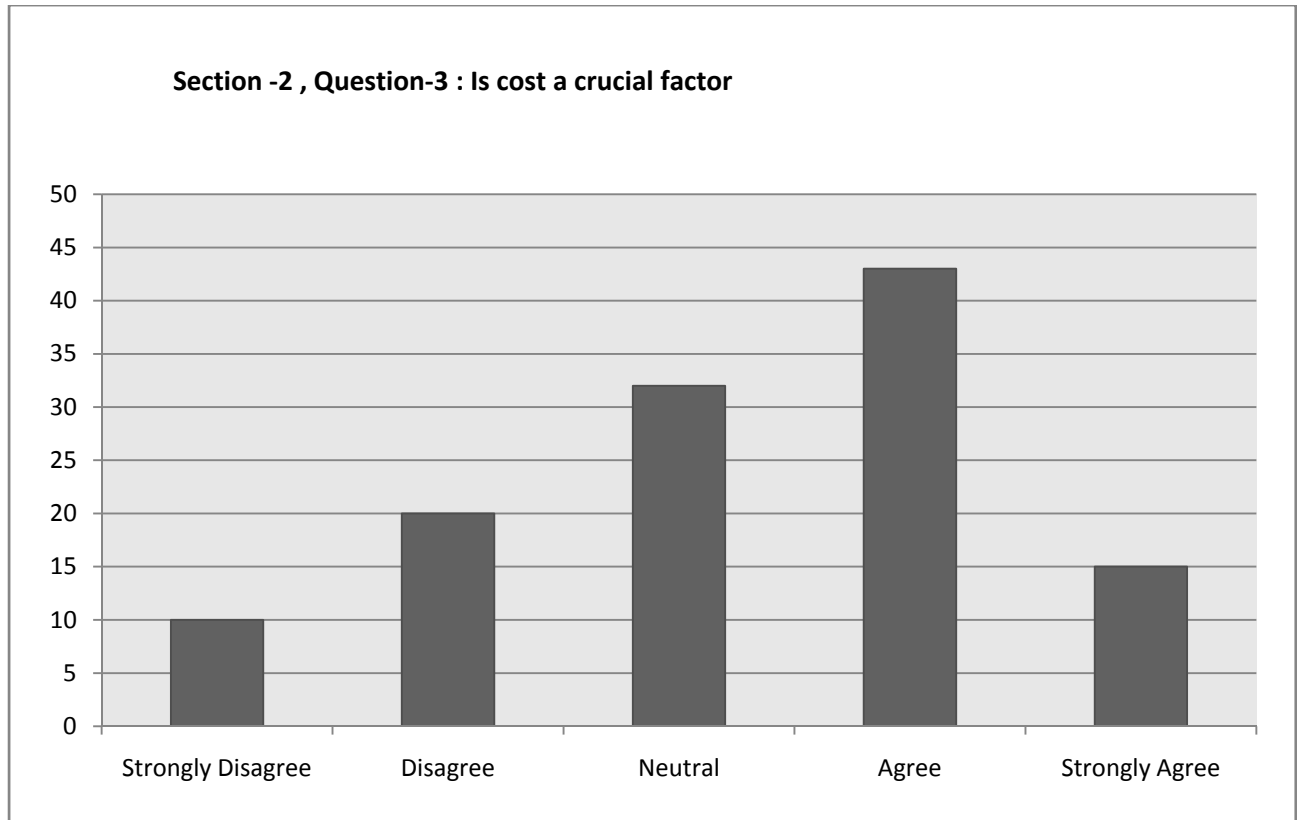
## Supply Chain Integration



**Figure-13**

As summarized above collected information is in regard of placement of orders with suppliers to work on just in time basis with zero defects and lesser inventory by the firms and their supply chain employees working at different positions in various organizations who took the survey. However, out of 120 respondents, 14 % “strongly disagree”, 23 % disagree, 25% are neither agree nor disagree, 28% agree and 10% “strongly agree” that their firms prefers to place orders on just in time basis to reduce the zero defects and optimum use of inventories.

## Supply Chain Integration

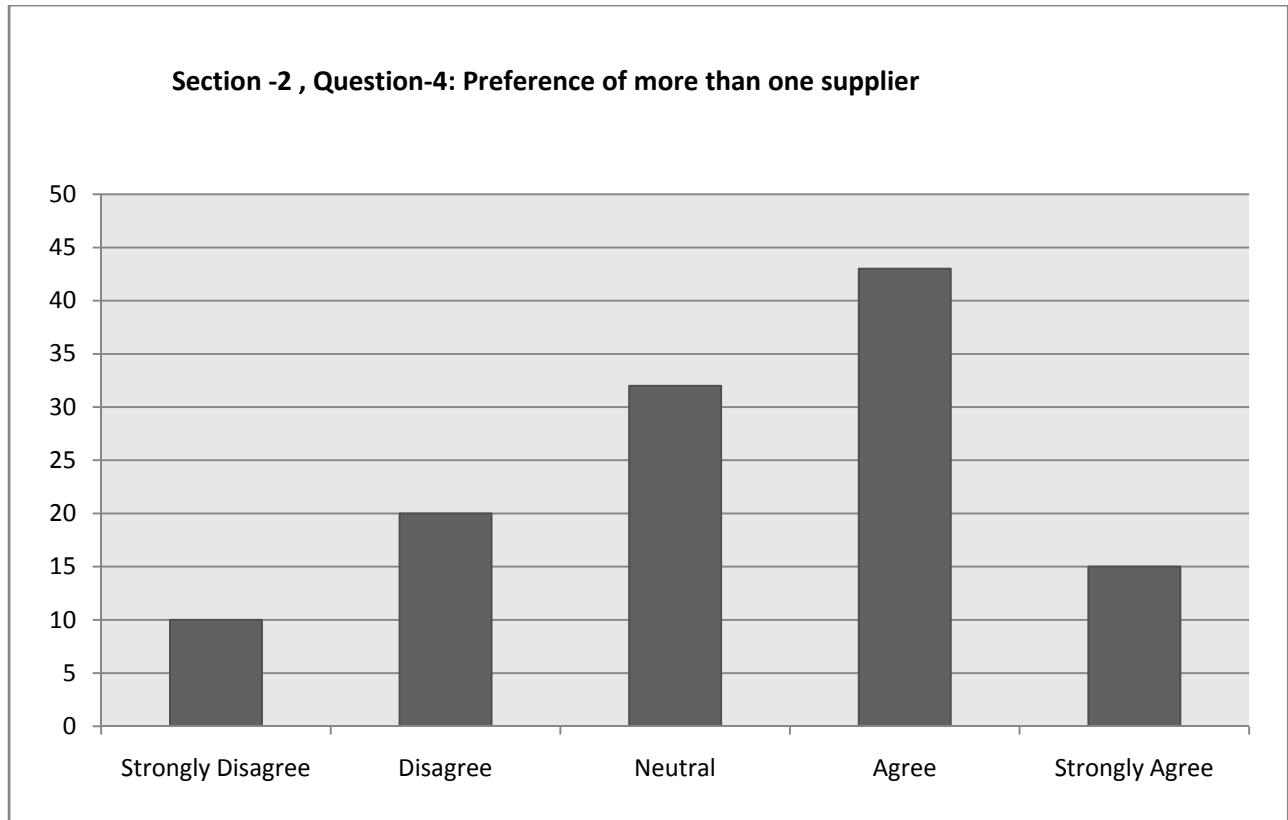


**Figure-14**

As summarized above collected information is in regard of consideration of cost as a crucial factor at the time of placement of orders by the firms through their supply chain employees working at different positions in various organizations who took the survey. However, out of 120 respondents, 14 % “strongly disagree”, 23 % disagree, 25% are neither agree nor disagree, 28% agree and 10% “strongly agree” that their firms considers cost prefers to place orders on just in time basis to reduce the zero defects and optimum use of inventories.



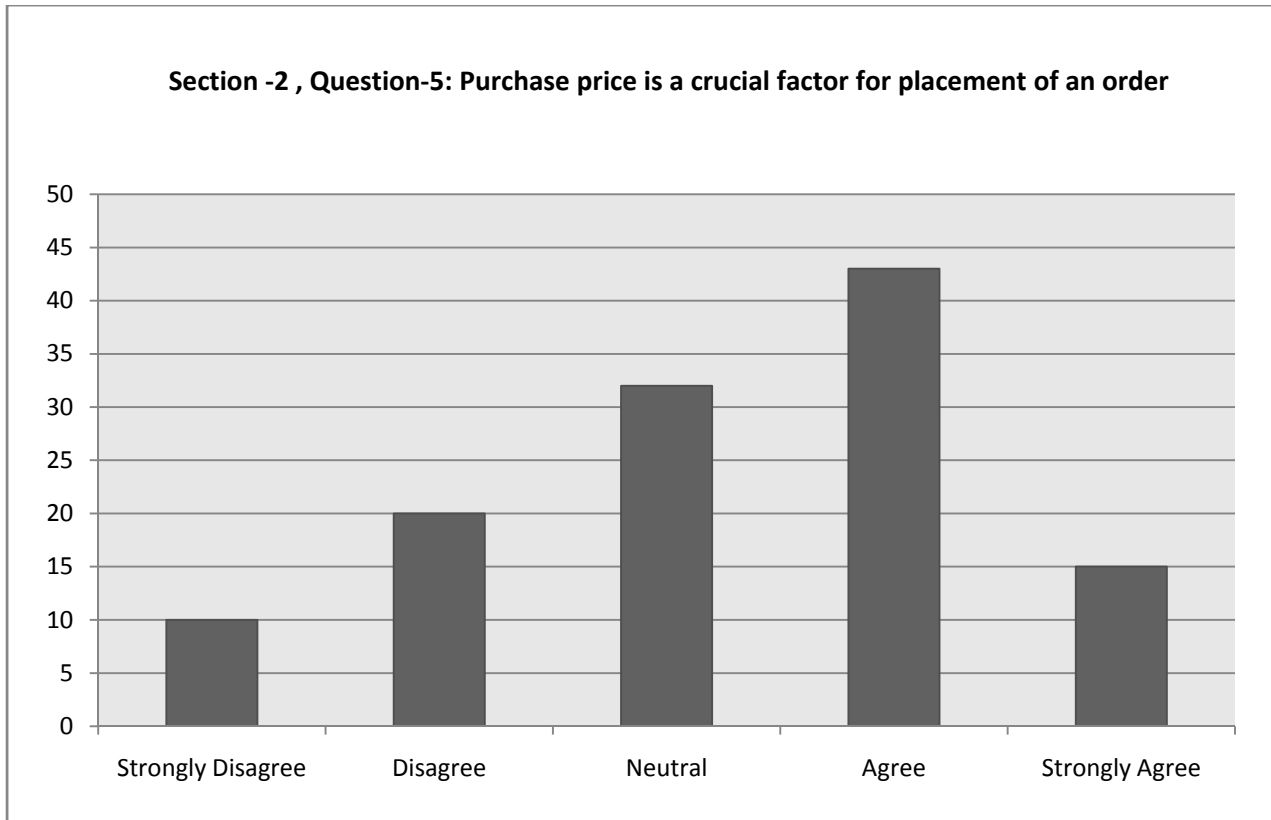
## Supply Chain Integration



**Figure-15**

As summarized above collected information is in regard of preferring more than one suppliers at the time of placement of orders by the firms through their supply chain employees working at different positions in various organizations who took the survey. However, out of 120 respondents, 8 % “strongly disagree”, 23 % disagree, 27% are neither agree nor disagree, 25% agree and 17% “strongly agree” that their firms prefers to place orders with more than one suppliers at the time of placement of orders as this option reduces the amount of risk involved for a firm’s failure which on contrary to single supplier would be very high.

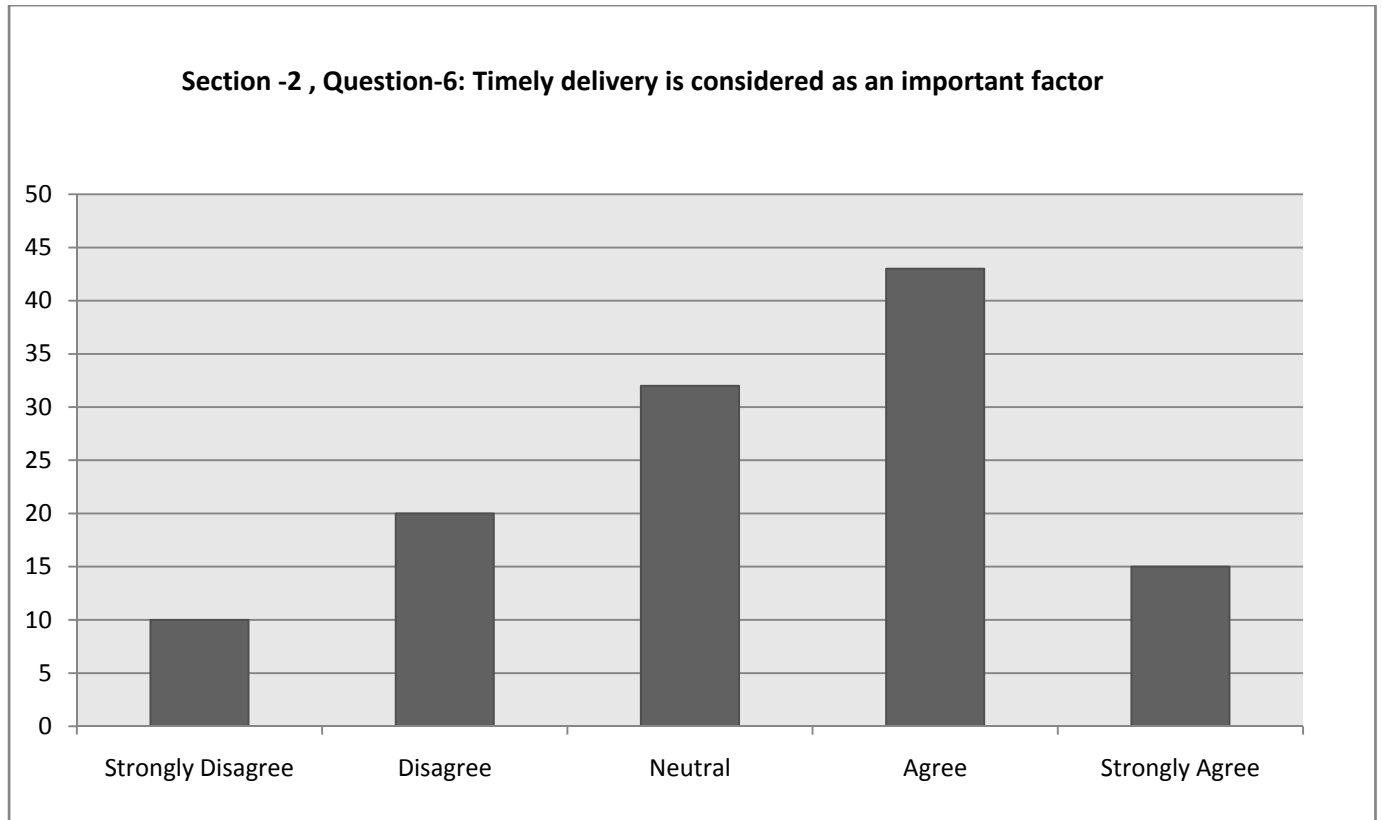
## Supply Chain Integration



**Figure-16**

As summarized above collected information is in regard of consideration of purchasing price as a crucial factor at the time of placement of the purchase orders by the firms through their supply chain employees working at different positions in various organizations who took the survey. However, out of 120 respondents, 8 % “strongly disagree”, 23 % disagree, 27% are neither agree nor disagree, 25% agree and 17% “strongly agree” that their firms considers purchase price as a critical factor at the time of selection of suppliers.

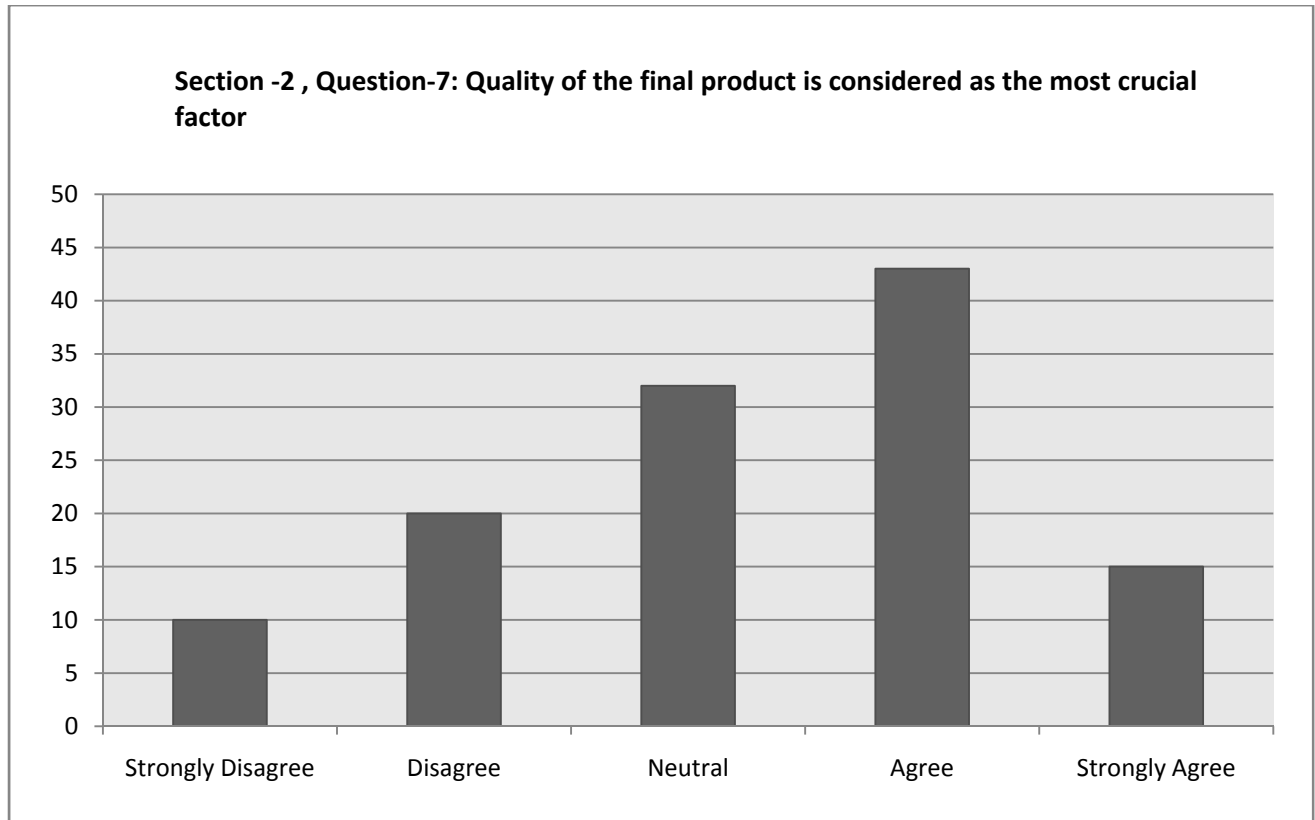
## Supply Chain Integration



**Figure-17**

As summarized above collected information is in regard of consideration of timely delivery as a decisive factor at the time of placement of the purchase orders by the firms through their supply chain employees working at different positions in various organizations who took the survey. However, out of 120 respondents, 0 % “strongly disagree”, 21 % disagree, 33% are neither agree nor disagree, 29% agree and 17% “strongly agree” that their firms considers timely delivery as a precarious factor at the time of selection of suppliers as this can affect the over all production time and out flows.

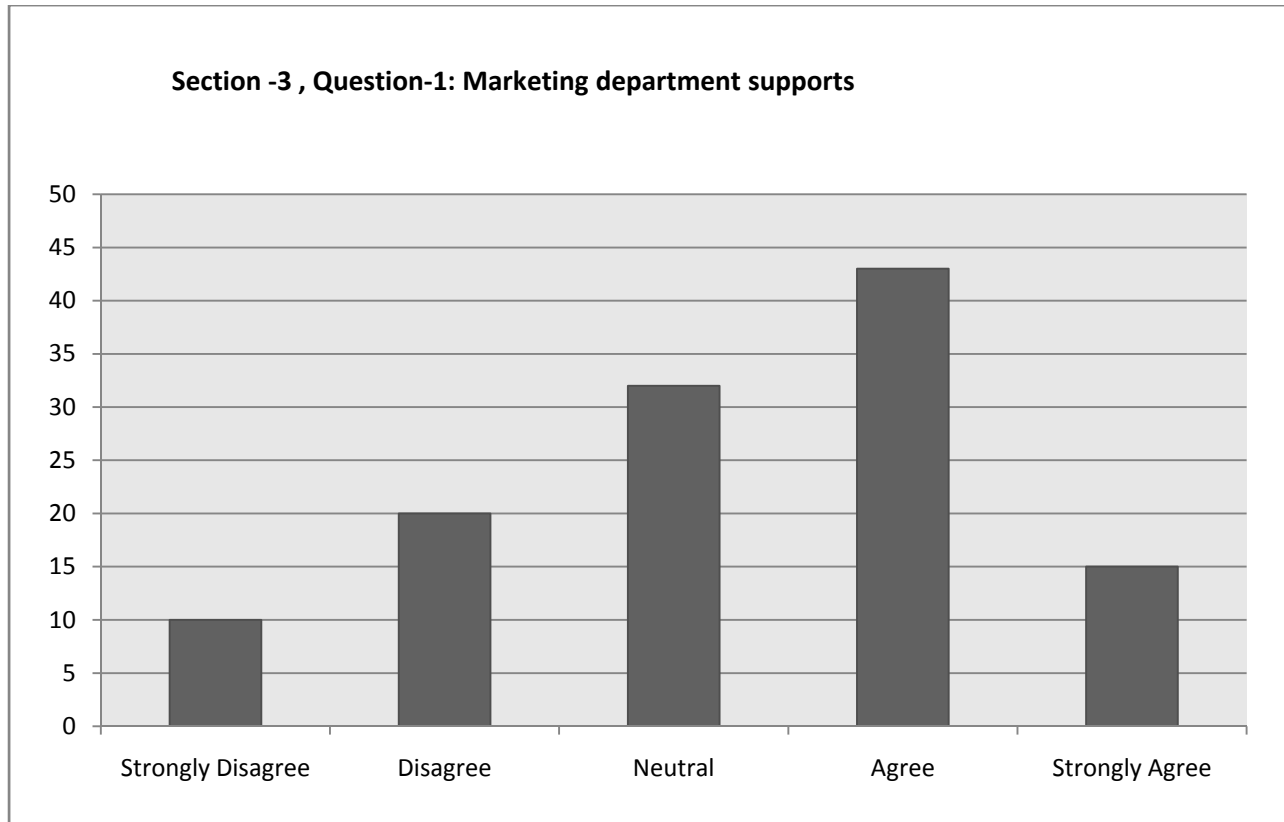
## Supply Chain Integration



**Figure 2**

As summarized above collected information is in regard of consideration of quality of the final product as a decisive factor at the time of placement of the purchase orders by the firms through their supply chain employees working at different positions in various organizations who took the survey. However, out of 120 respondents, 8 % “strongly disagree”, 13 % disagree, 33% are neither agree nor disagree, 33% agree and 13% “strongly agree” that their firms consider good quality of the final product as a precarious factor at the time of selection of suppliers as all the stakes of a firm especially buyer-customer relationships are based upon this critical factor.

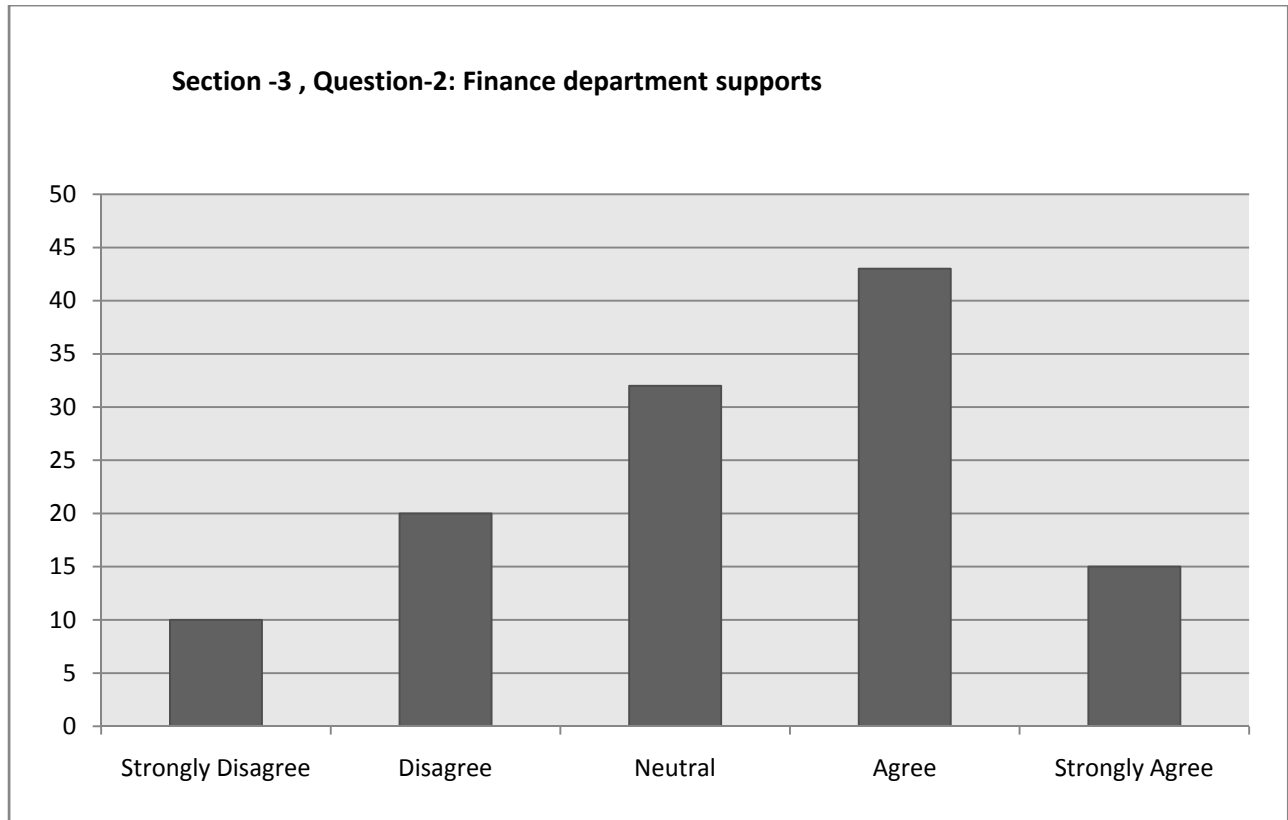
## Supply Chain Integration



**Figure-19**

As summarized above collected information is regarding the marketing department's support for the supply chain department for various organizations whose employees participated in this survey. However, out of 120 respondents, 8 % "strongly disagree", 13 % disagree, 33% are neither agree nor disagree, 33% agree and 13% "strongly agree" that their supply chain department receives a support from marketing department to successfully carry out the everyday operations of the firm.

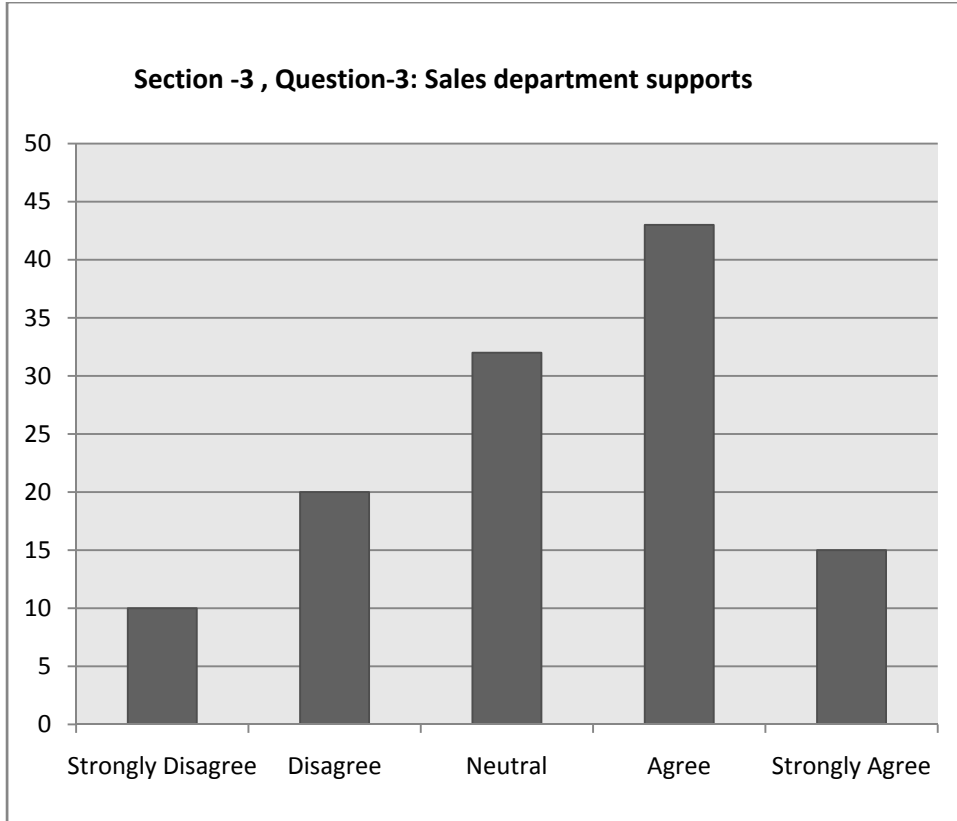
## Supply Chain Integration



**Figure-20**

As summarized in the figure-20 the collected information is regarding the Finance department's support for the supply chain department for various organizations whose employees participated in this survey. However, out of 120 respondents, 4 % "strongly disagree", 13 % disagree, 24% are neither agree nor disagree, 38% agree and 21% "strongly agree" that their supply chain department receives a support from Finance department to successfully carry out the everyday operations of the firm.

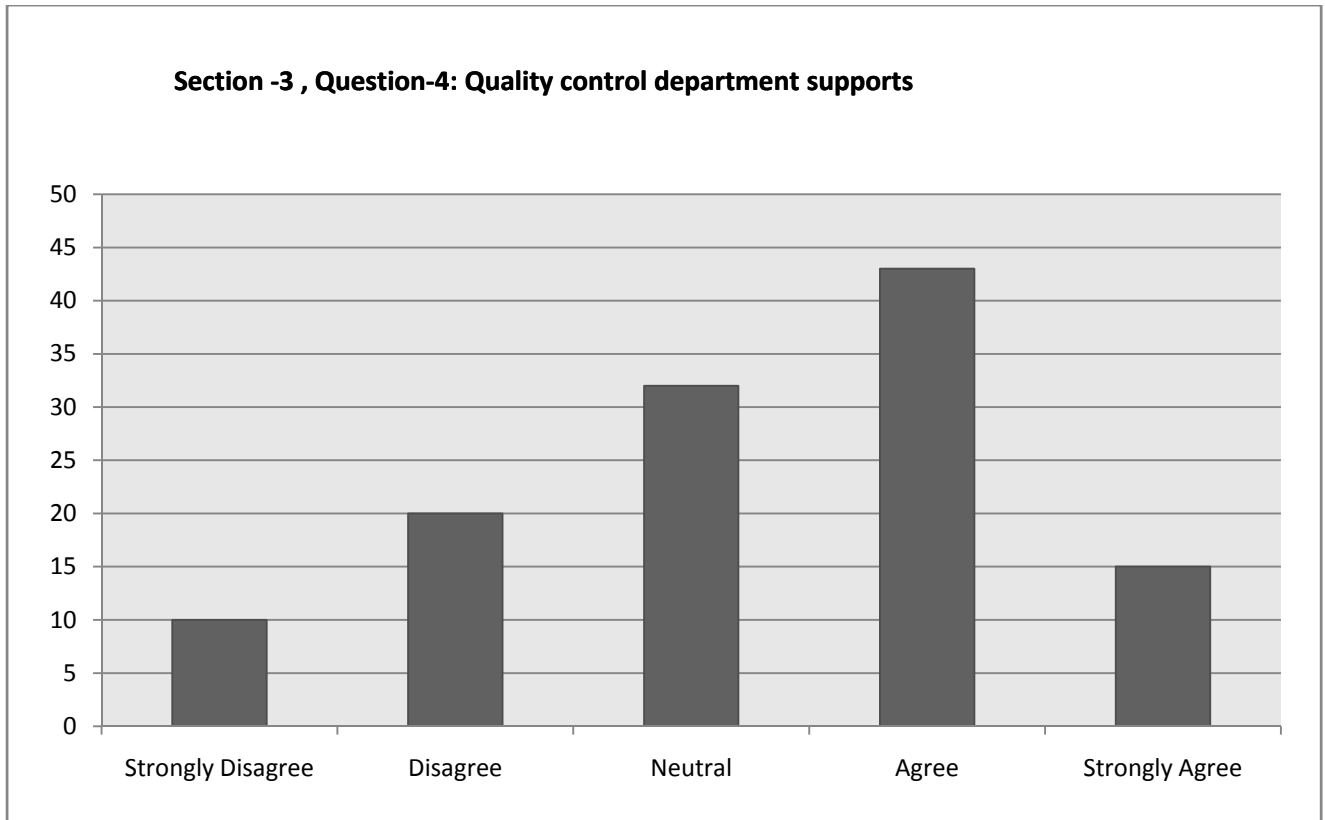
## Supply Chain Integration



**Figure-21**

As summarized above collected information is regarding the Sales department's support for the supply chain department for various organizations whose employees participated in this survey. However, out of 120 respondents, 13 % "strongly disagree", 13 % disagree, 29% are neither agree nor disagree, 37% agree and 8% "strongly agree" that their supply chain department receives a support as well as it is in coordination with Sales department to successfully offer thebest rates

## Supply Chain Integration

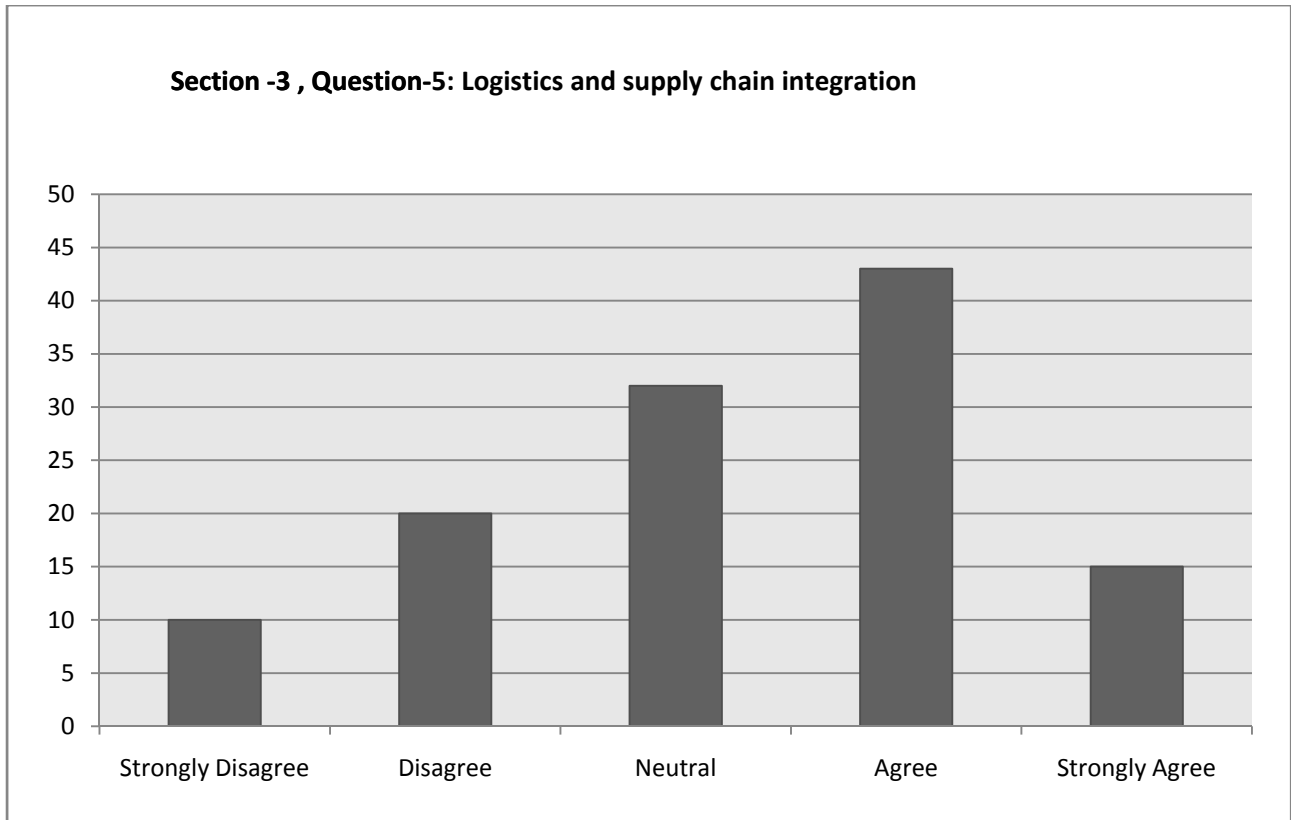


**Figure-22**

As summarized above collected information is regarding the Quality control department's support for the supply chain department for various organizations whose employees participated in this survey. However, out of 120 respondents, 4 % "strongly disagree", 13 % disagree, 29% are neither agree nor disagree, 37% agree and 1% "strongly agree" that their supply chain department receives a support as well as it is in coordination with quality control to ensure the optimal quality of the product is produced or supplied to the customers.



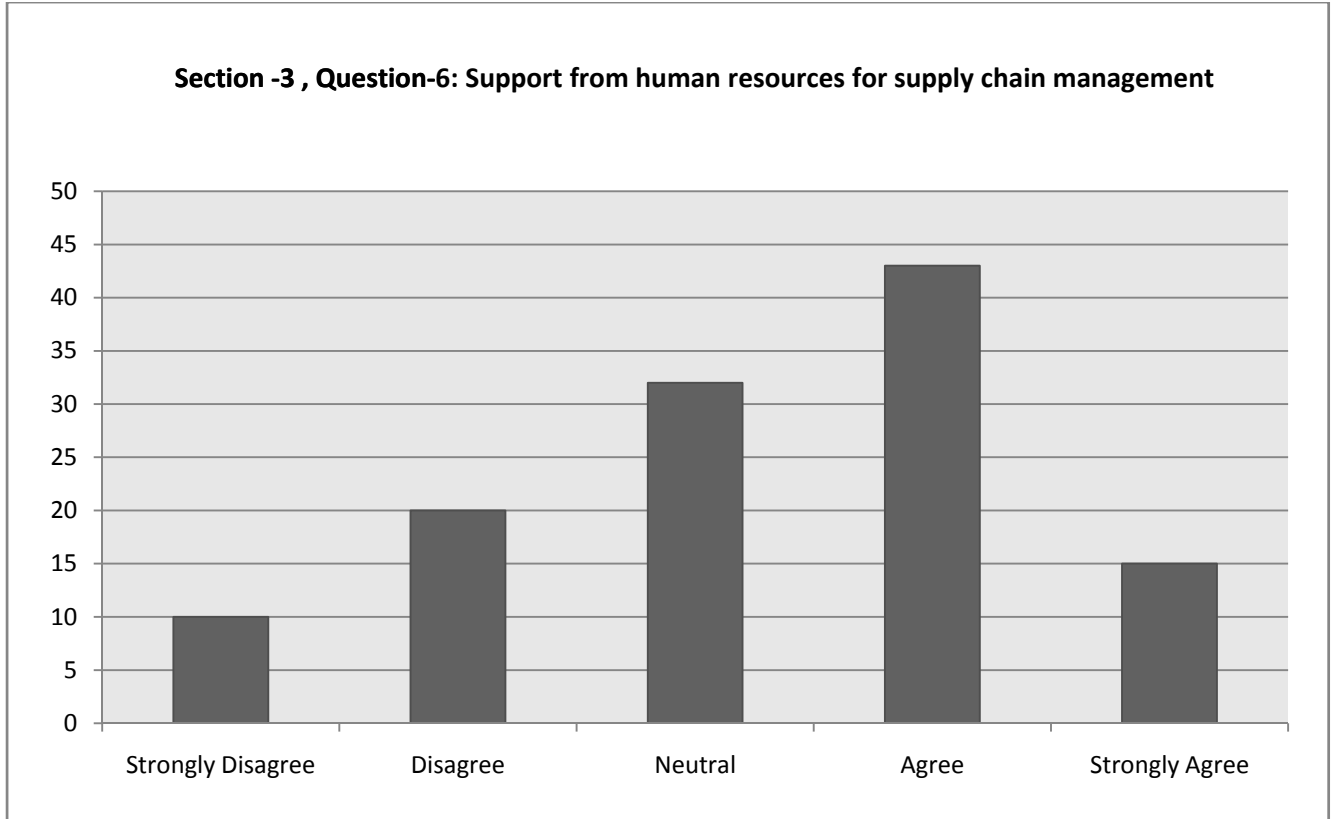
## Supply Chain Integration



**Figure-23**

As summarized above the collected information is regarding the integration of Logistics as well as supply chain department for various organizations whose employees participated in this survey. However, out of 120 respondents, 0 % “strongly disagree”, 17 % disagree, 29% are neither agree nor disagree, 41% agree and 13% “strongly agree” that their supply chain department receives a support as well as it is in coordination with Logistics department to ensure the optimal storage and timely transportation of the product to the customers.

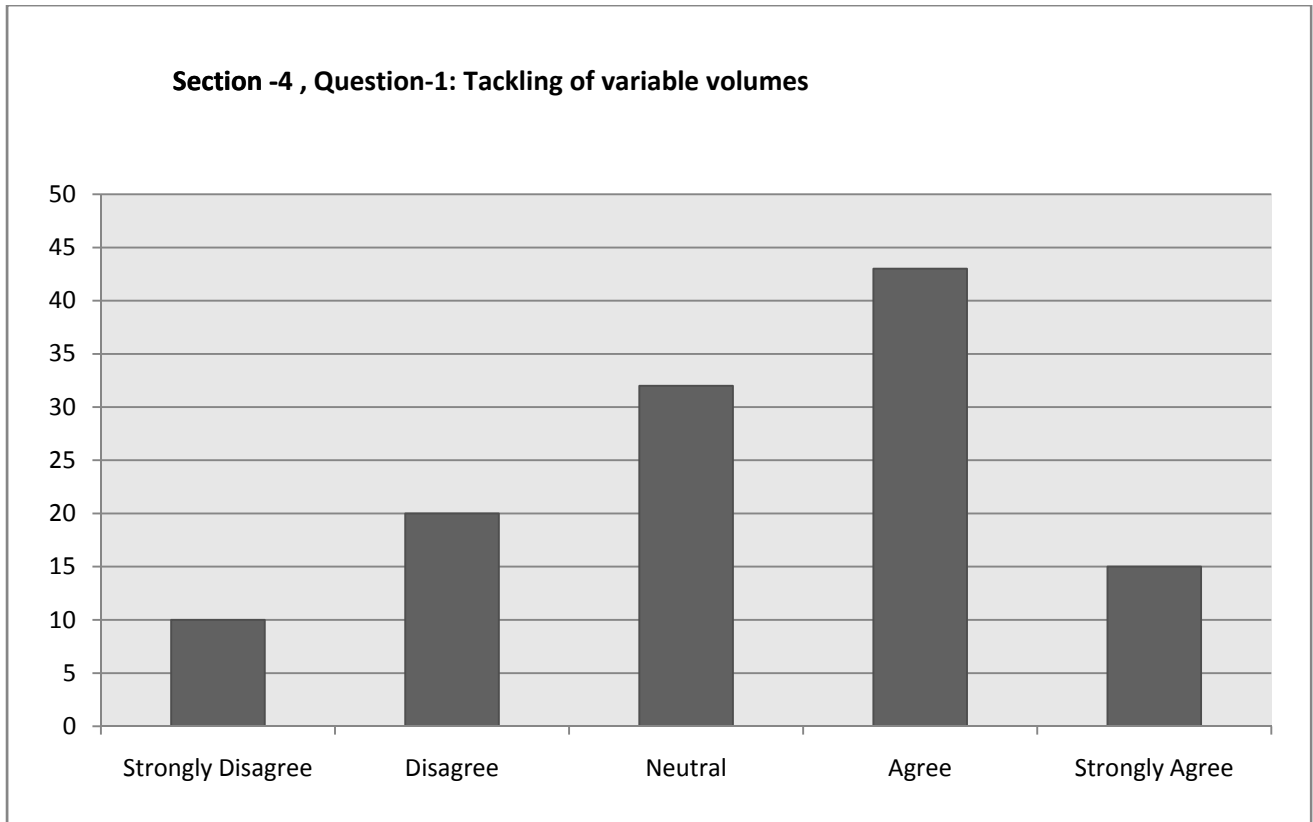
## Supply Chain Integration



**Figure-24**

As summarized above collected information is regarding the support from Human Resources department to supply chain department for various organizations whose employees participated in this survey. However, out of 120 respondents, 8 % “strongly disagree”, 25 % disagree, 29% are neither agree nor disagree, 25% agree and 13% “strongly agree” that their supply chain department receives a support from Human resources department to ensure the high quality personnel are available to carry out the operations and they are receiving the benefits accordingly.

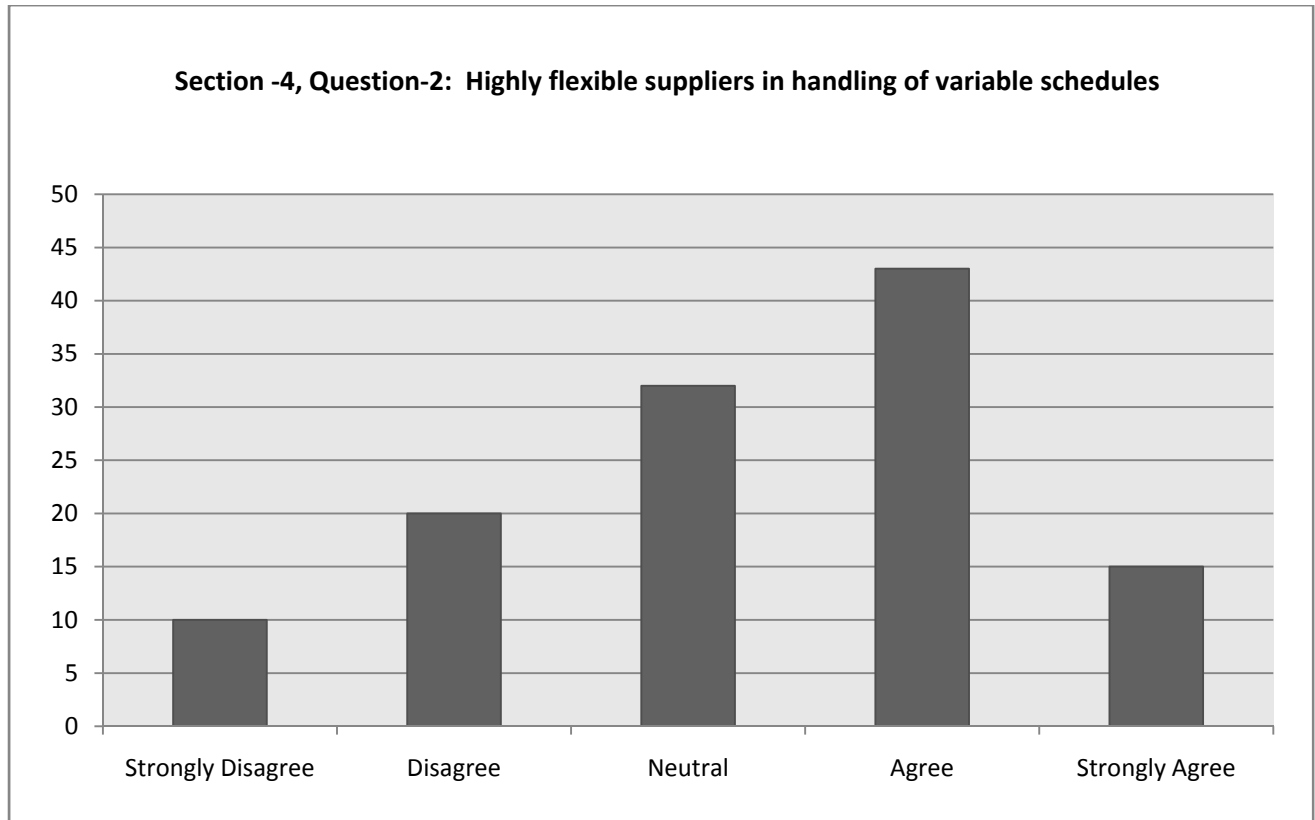
## Supply Chain Integration



**Figure-25**

As summarized above the collected information is regarding the capability of suppliers' operational capacity to handle the variable volumes of the orders for the supply chain departments for various organizations whose employees participated in this survey. However, out of 120 respondents, 0 % "strongly disagree", 4 % disagree, 44% are neither agree nor disagree, 52% agree and 13% "strongly agree" that their suppliers are capable of handling the variable volumes of supplies.

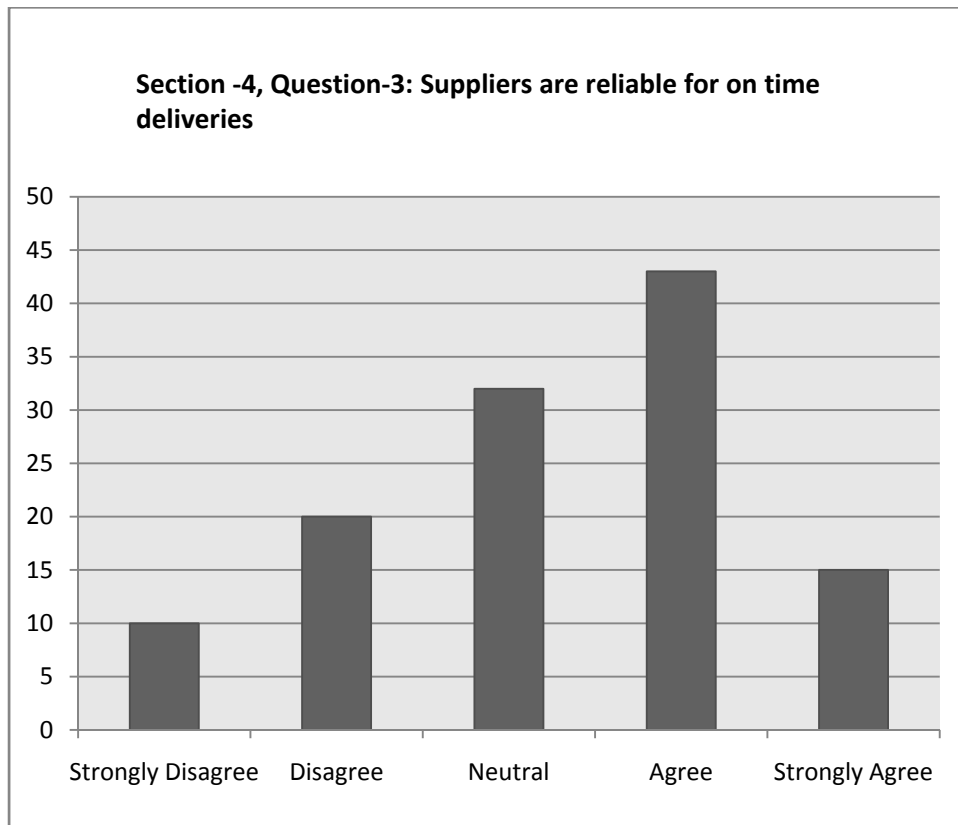
## Supply Chain Integration



**Figure-26**

As summarized above the collected information is regarding the handling of variable schedules of variable capability of suppliers' operational capacity to handle the variable volumes of the orders for the supply chain departments for various organizations whose employees participated in this survey. However, out of 120 respondents, 10 % "strongly disagree", 15 % disagree, 32% are neither agree nor disagree, 37% agree and 6% "strongly agree" that their suppliers are capable of handling the variable volumes of supplies under short notices.

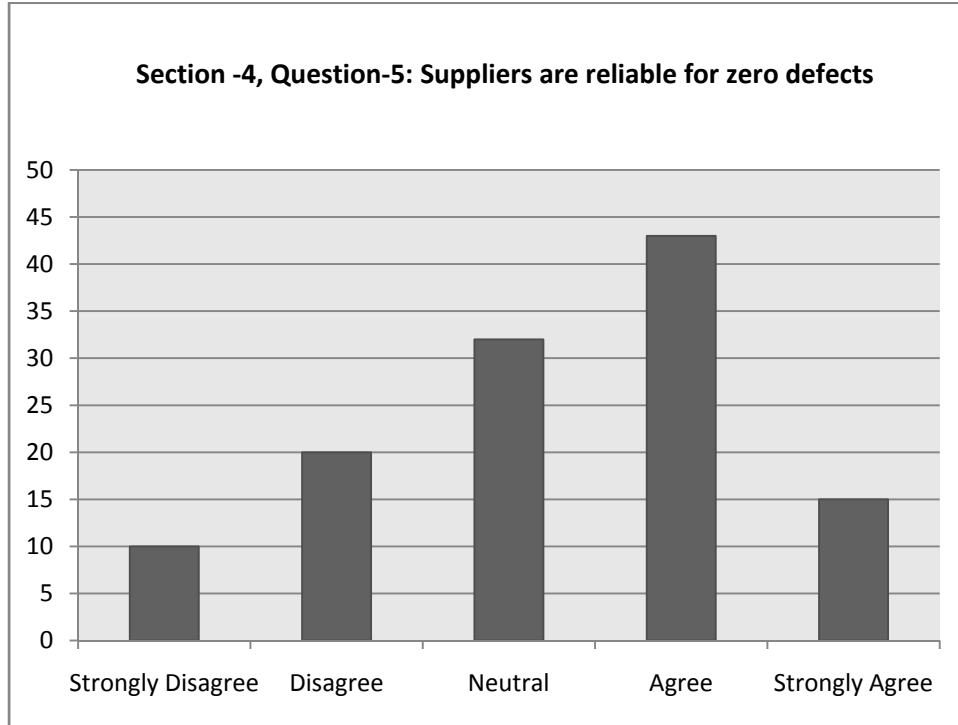
## Supply Chain Integration



**Figure-27**

As summarized above the collected information is regarding the following of planned delivery schedules by the suppliers for the supply chain departments for various organizations whose employees participated in this survey. However, out of 120 respondents, 15 % “strongly disagree”, 15 % disagree, 34% are neither agree nor disagree, 2% agree and 6% “strongly agree” that their suppliers are capable of managing the on time delivery schedules.

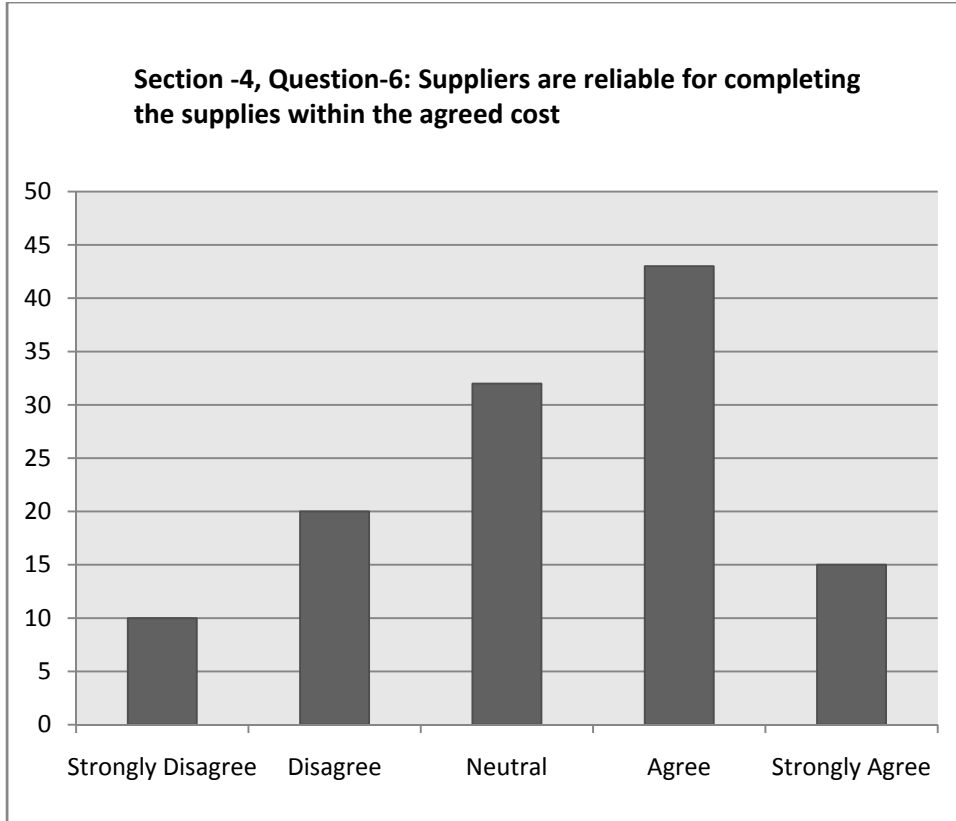
## Supply Chain Integration



**Figure-29**

As summarized above the collected information is regarding the suppliers' operational capacity to provide the final supplies with zero defects for the supply chain employees working at different positions in various organizations who took the survey. However, out of 120 respondents, 10 % "strongly disagree", 20 % disagree, 34% are neither agree nor disagree, 27% agree and 9% "strongly agree" that their suppliers are capable of managing the final supplies with zero defects.

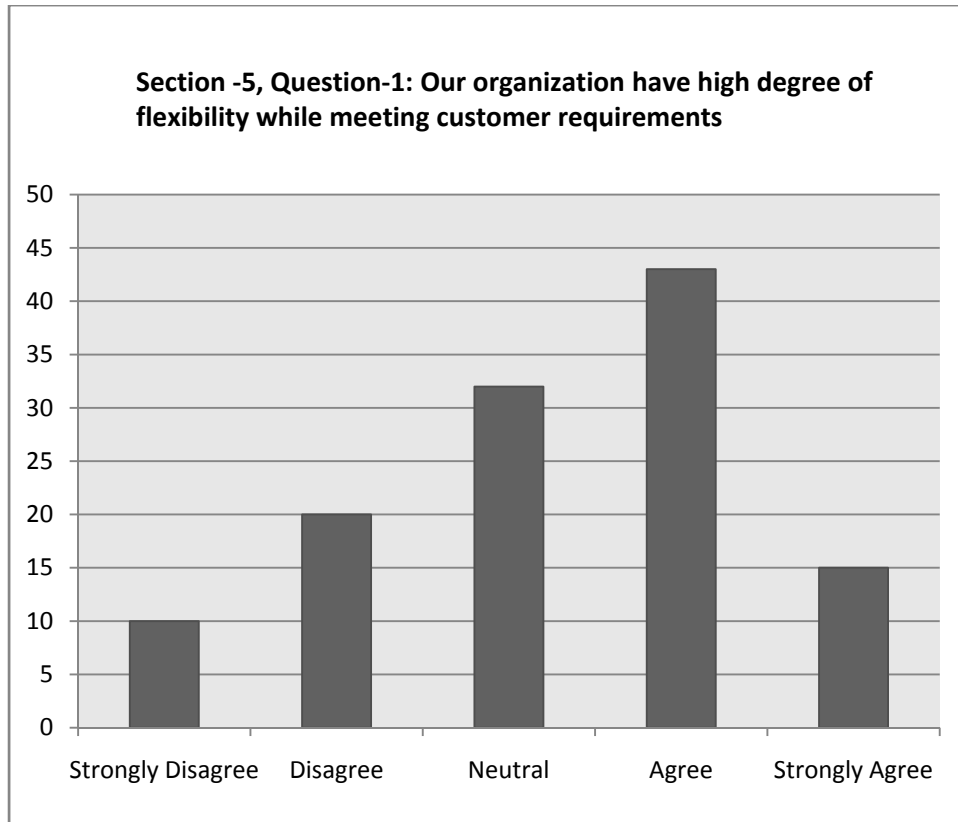
## Supply Chain Integration



**Figure-30**

As summarized above the collected information is regarding the capability of suppliers' to tackle the overall supplies within the agreed costs for the supply chain departments for various organizations whose employees participated in this survey. However, out of 120 respondents, 4 % "strongly disagree", 15 % disagree, 34% are neither agree nor disagree, 35% agree and 12%"strongly agree" that their suppliers are capable of completing the final deliveries within the agreed costs at the time of issuance of the purchase order.

## Supply Chain Integration

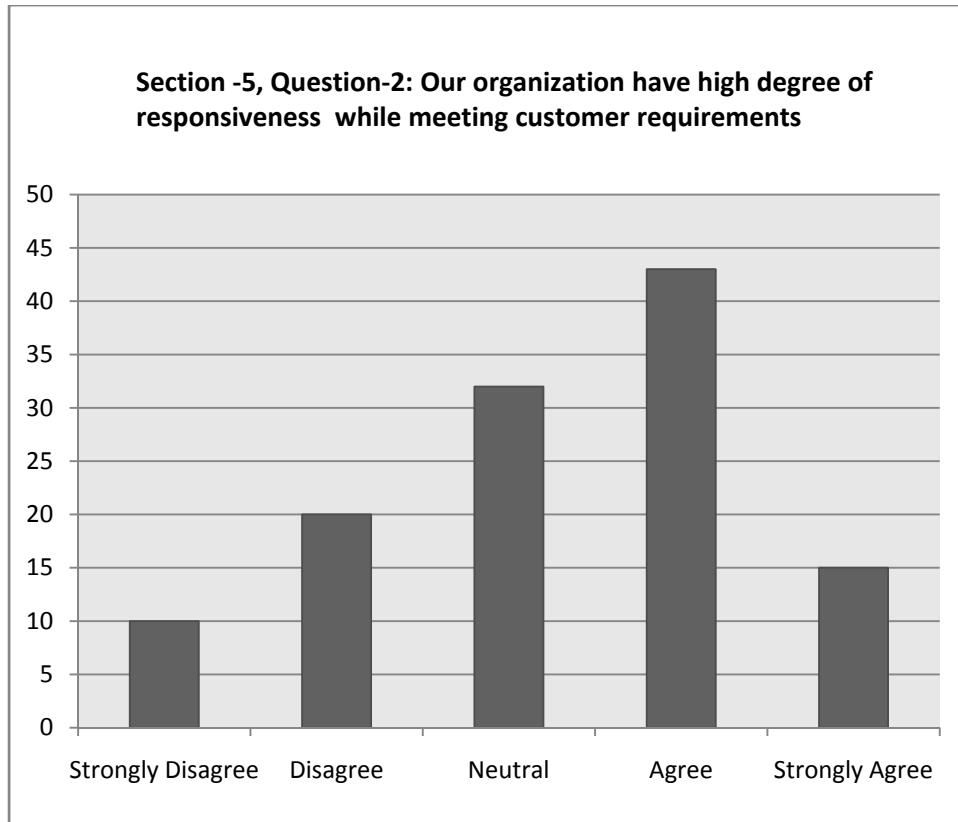


**Figure-31**

As summarized in figure-31 collected information is regarding our organization's capability in terms of handling the high degree of flexibility to meet the customer requirements for numerous firms whose employees participated in this survey. However, out of 120 respondents, 5 % "strongly disagree", 14 % disagree, 44% are neither agree nor disagree, 29% agree and 8% "strongly agree" that their firms are flexible for tackling the changing requirements of the customers.



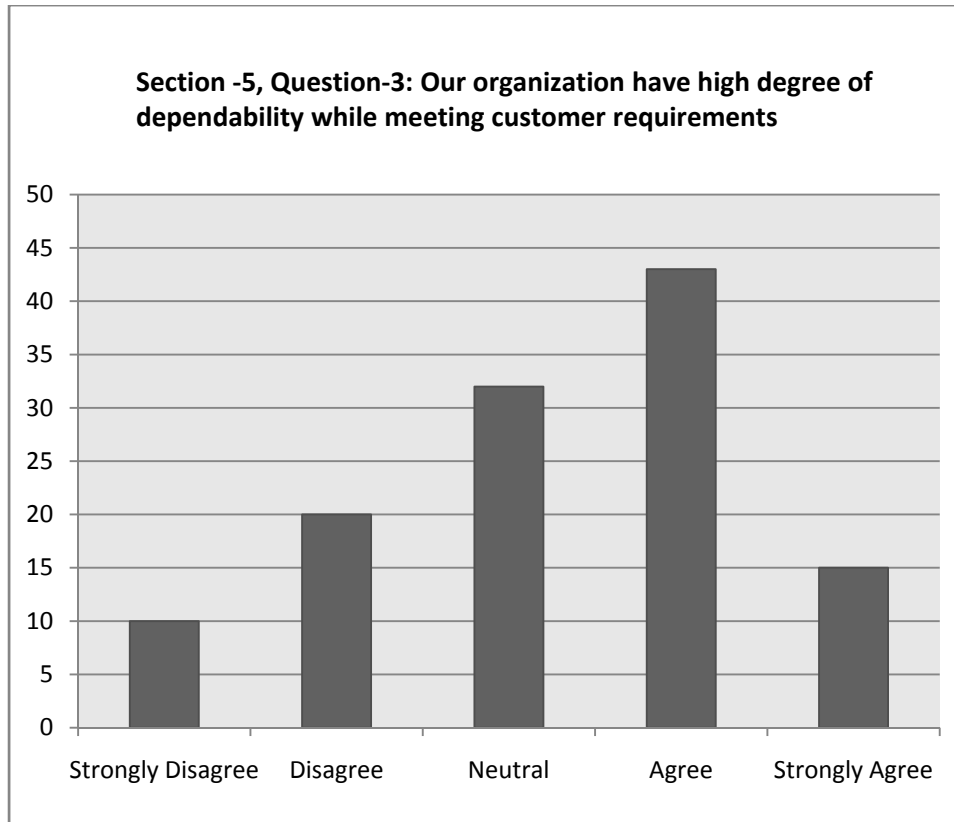
## Supply Chain Integration



**Figure-32**

As summarized in the figure-32 the collected information is regarding our organization's capability in terms of responsiveness while dealing with the customer requirements for numerous firms whose employees participated in this survey. However, out of 120 respondents, 9 % "strongly disagree", 15 % disagree, 37% are neither agree nor disagree, 28% agree and 11% "strongly agree" respectively that their firms are responsive enough for tackling the changing requirements of the customers.

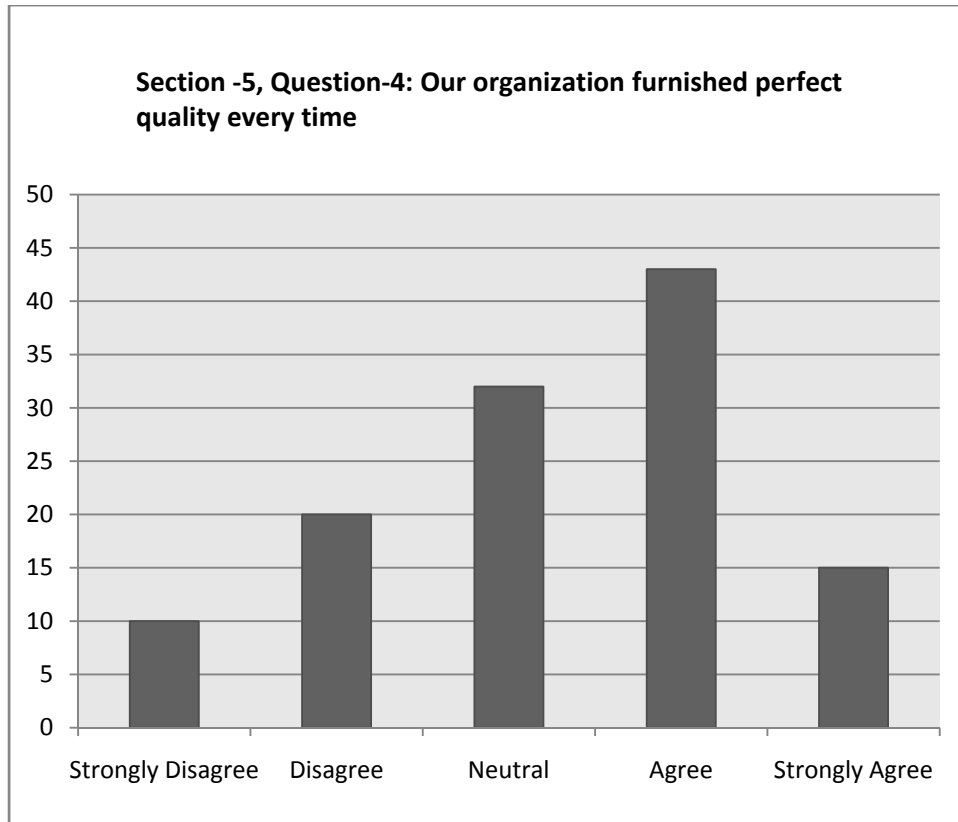
## Supply Chain Integration



**Figure-33**

As summarized in the figure-33 the collected information is regarding our organization's capability in terms of dependability while dealing with the customer requirements for numerous firms whose employees participated in this survey. However, out of 120 respondents, 8 % "strongly disagree", 15 % disagree, 37% are neither agree nor disagree, 29% agree and 11% "strongly agree" respectively that their firms are dependable enough for tackling the changing requirements of the customers.

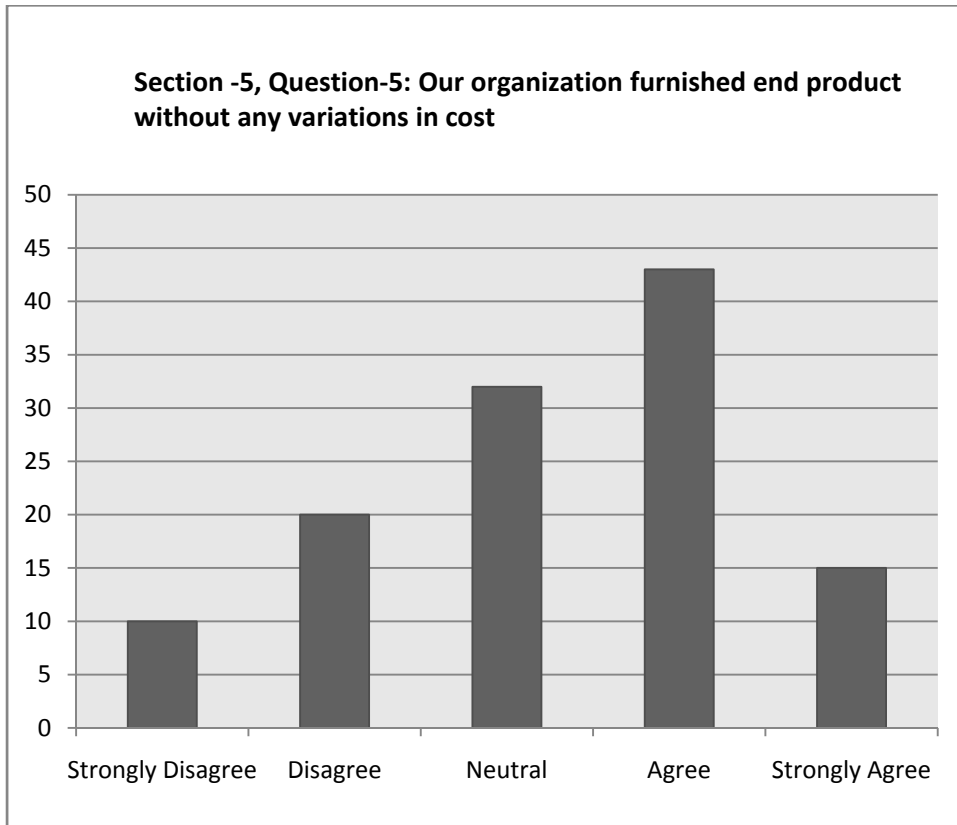
## Supply Chain Integration



**Figure-34**

As summarized in the figure-34 the collected information is regarding our organization's capability in terms of furnishing the perfect quality output for the customer requirements for numerous firms whose employees participated in this survey. However, out of 120 respondents, 15 % "strongly disagree", 23 % disagree, 38% are neither agree nor disagree, 13% agree and 11% "strongly agree" respectively that their firms are capable of producing the wel furnished products as per the customer's requirements.

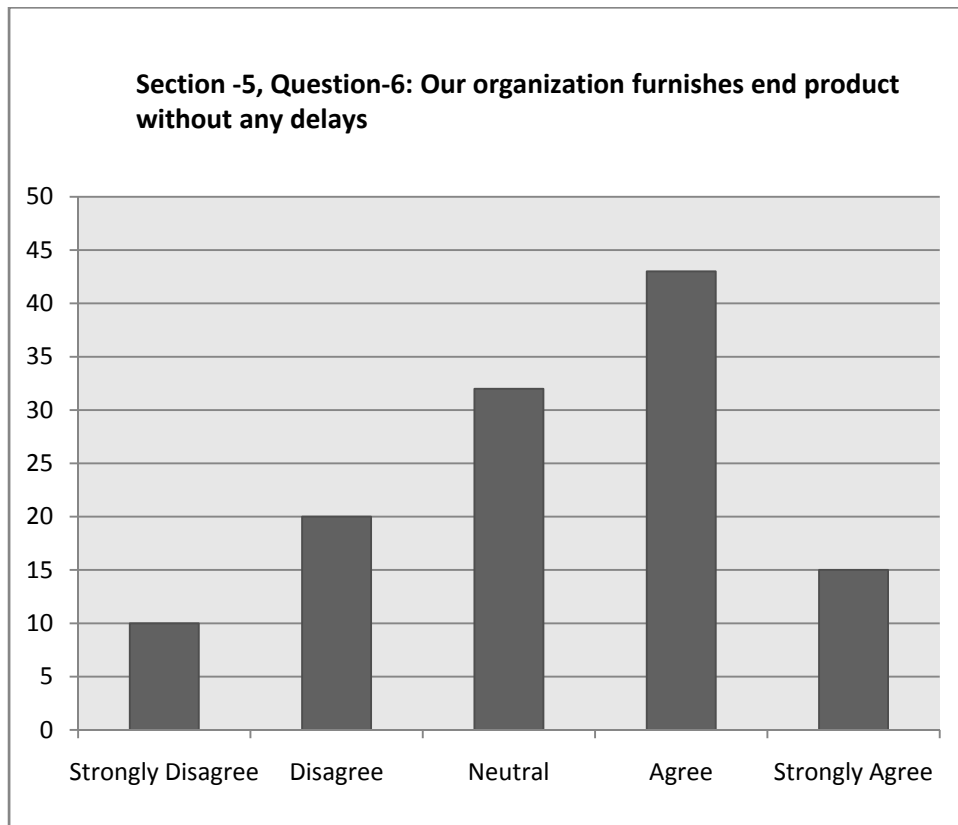
## Supply Chain Integration



**Figure-35**

As summarized in the figure-35 the collected information is regarding our organization's capability in terms of furnishing the perfect quality output without undergoing any variations in the cost for the customer requirements for numerous firms whose employees participated in this survey. However, out of 120 respondents, 6 % "strongly disagree", 20 % disagree, 38% are neither agree nor disagree, 30% agree and 6% "strongly agree" respectively that their firms are capable of producing the well furnished products as per the customer's requirements and that too within the agreed costs.

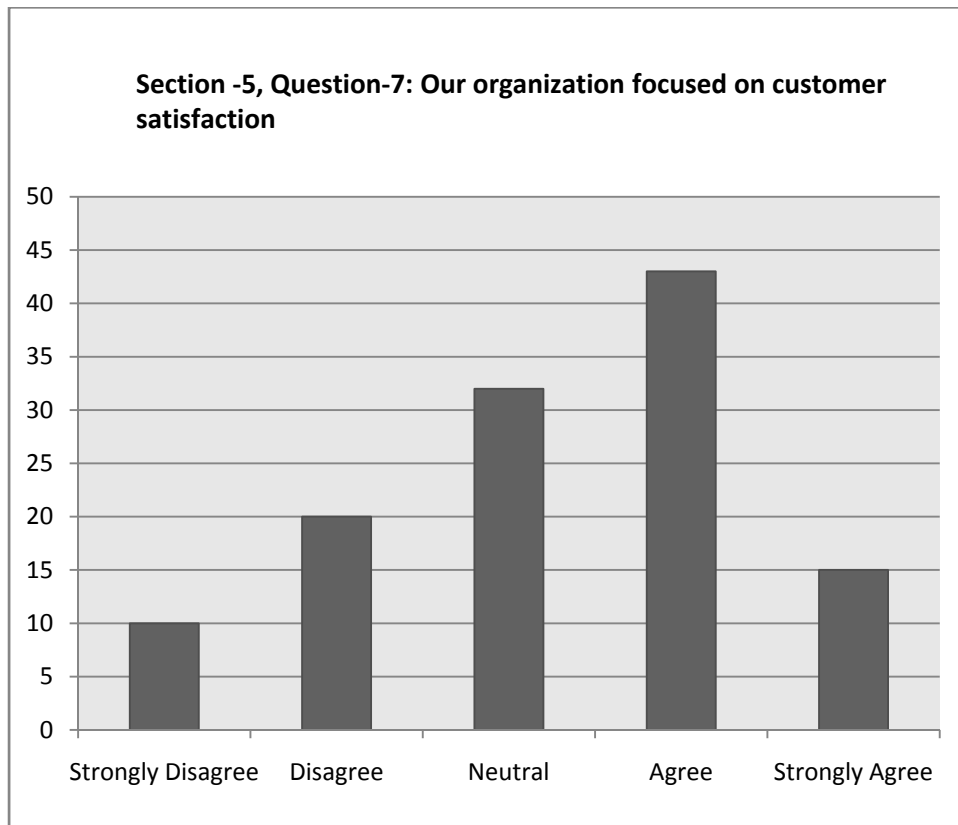
## Supply Chain Integration



**Figure-36**

As summarized in the figure-36 the collected information is regarding our organization's capability in terms of furnishing the output without undergoing any delays for the customer requirements for numerous firms whose employees participated in this survey. However, out of 120 respondents, 8 % "strongly disagree", 23 % disagree, 32% are neither agree nor disagree, 30% agree and 7% "strongly agree" respectively that their firms are capable of producing the perfect quality products as per the customer's requirements and that too within the agreed delivery plans or undergoing any delays.

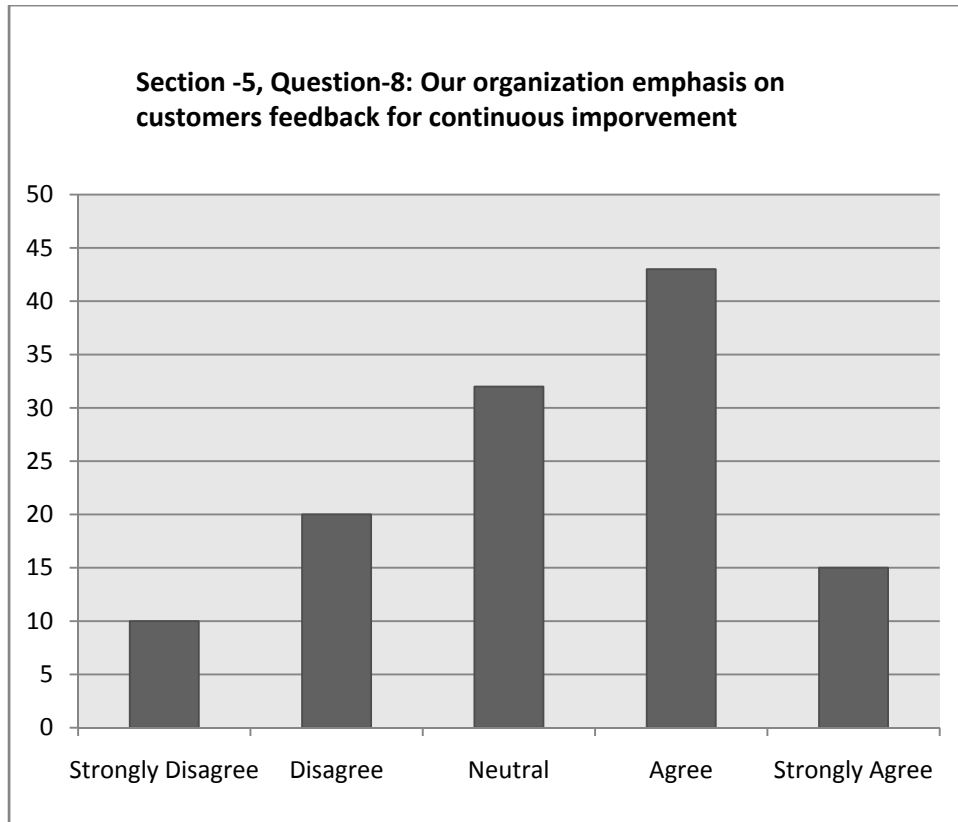
## Supply Chain Integration



**Figure-37**

As summarized in the figure-37 the collected information is regarding our organization's objective is to focus on customer satisfaction for numerous firms whose employees participated in this survey. However, out of 120 respondents, 8 % "strongly disagree", 13 % disagree, 27% are neither agree nor disagree, 36% agree and 16% "strongly agree" respectively that their firms are capable of provision of satisfactory services to the customers.

## Supply Chain Integration



**Figure-38**

As summarized in figure-38 the collected information is regarding our organization's objective to improve with the help of customers' feedback for continuous improvement in their productivity for numerous firms whose employees participated in this survey. However, out of 120 respondents, 8 % "strongly disagree", 17 % "disagree", 27% are neither agree nor disagree, 36% "agree" and 12% "strongly agree" respectively that their organizations' focus on customers' feedback for continuous improvement in their productivity.

### **Hypothesis-2:**

An overall Supply networks performance is confidently related with all five (5) proposed sections.

## Supply Chain Integration

### Hypothesis-3

Supply chain performance is highly governed and dependent upon the Organizational Operational Performance of the firm.

### Correlations

| Pearson Correlations     |                           |                       |                    |                                  |  |
|--------------------------|---------------------------|-----------------------|--------------------|----------------------------------|--|
| Supply Chain Performance | Top Management Commitment | Functional Commitment | Channel Commitment | Supplier Operational Performance | Organizational Operational Performance |
| 1                        | .701                      | .408                  | .469               | .689                             | .751                                   |
| Sig. (2-tailed)          | .000                      | .000                  | .000               | .000                             | .000                                   |
| N                        | 120                       | 120                   | 120                | 120                              | 120                                    |

**Figure-39**



## Supply Chain Integration

### **Findings:**

The above mentioned correlation table explain that the 'Organizational Operational Performance have the highest correlation value i.e. 0.751 which shows that the Supply Chain Performance have a direct relationship with high degree of responsiveness, perfect quality, no variation in costs, confirming customer order(s) without any delays and customer satisfaction etc. Thus, higher the Organizational Operation Performance will be, more will be the Supply Chain performance or vice versa and this validates H-3.

### **Regression Analysis**

Regression examination was applied to calculate the influence of independent variables on the dependent variable. The following mentioned are the independent and dependent variables in this case:

#### **Independent Variables:**

- Top management commitment
- Functional commitment
- Channel commitment
- Supplier operational performance
- Organizational operational performance

#### **Dependent Variable:**

- Supply chain performance

Supply Chain Integration

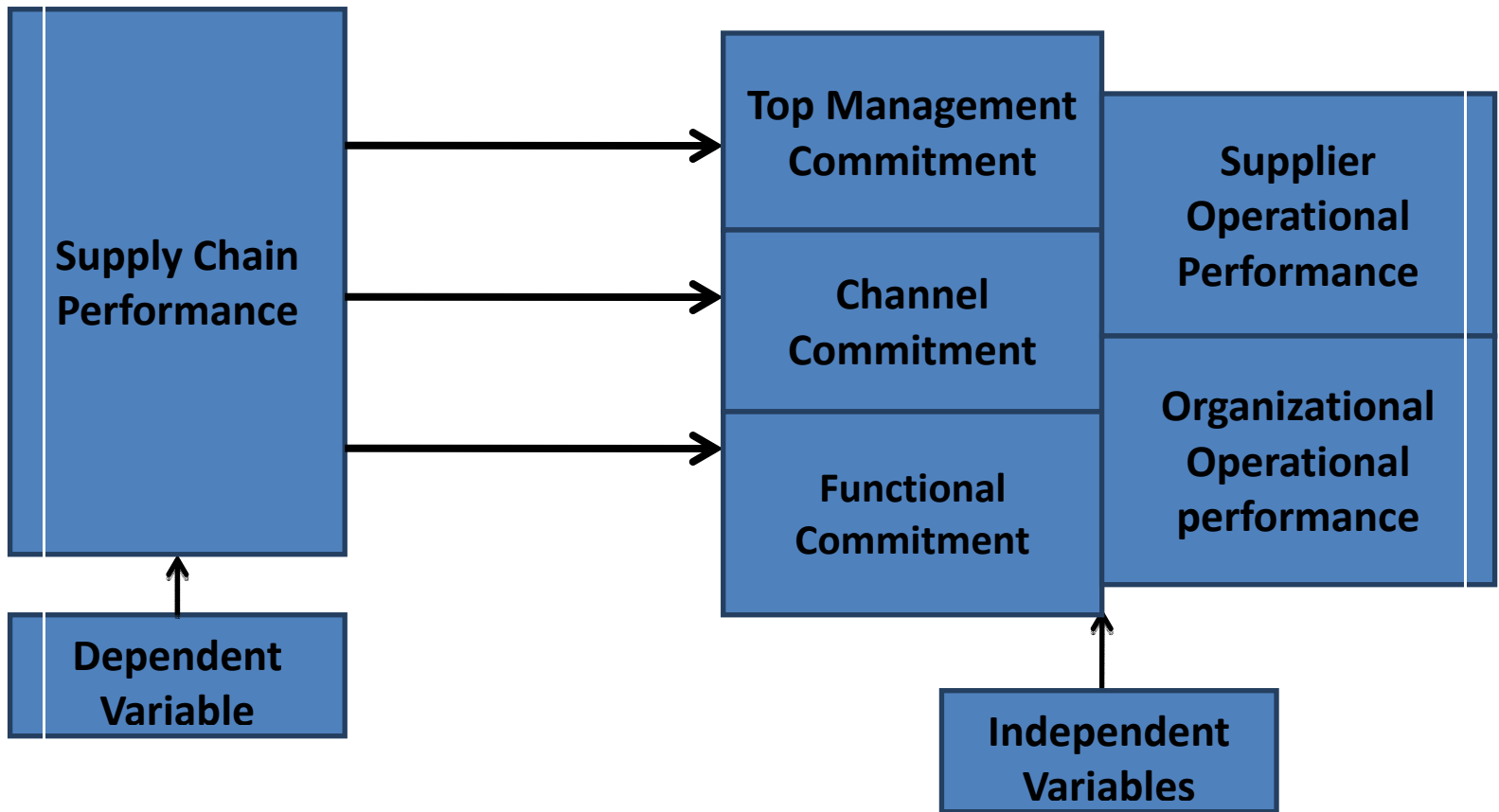


Figure-40

# Supply Chain Integration

## Model Summary <sup>b</sup>

| <b>“Model”</b> | <b>R</b>                | <b>“R Square”</b> | <b>“Adjusted R Square”</b> |
|----------------|-------------------------|-------------------|----------------------------|
| <b>TMC</b>     | <b>.781<sup>a</sup></b> | <b>.609</b>       | <b>.499</b>                |
| <b>CC</b>      | <b>.445<sup>a</sup></b> | <b>.198</b>       | <b>.177</b>                |
| <b>FC</b>      | <b>.483<sup>a</sup></b> | <b>.233</b>       | <b>.213</b>                |
| <b>SOP</b>     | <b>.693<sup>a</sup></b> | <b>.481</b>       | <b>.467</b>                |
| <b>OOP</b>     | <b>.753<sup>a</sup></b> | <b>.567</b>       | <b>.556</b>                |
| <b>Overall</b> | <b>.631<sup>a</sup></b> | <b>.418</b>       | <b>.403</b>                |

## Supply Chain Integration

| <b>Model</b> |            | <b>Sum</b>     | <b>of</b> |                   |
|--------------|------------|----------------|-----------|-------------------|
|              |            | <b>Squares</b> | <b>F</b>  | <b>Sig.</b>       |
| TMC          | Regression | 7.521          | 60.350    | .000 <sup>b</sup> |
|              | Residual   | 4.819          |           |                   |
|              | Total      | 12.340         |           |                   |
| CC           | Regression | 2.441          | 9.537     | .000 <sup>b</sup> |
|              | Residual   | 9.898          |           |                   |
|              | Total      | 12.340         |           |                   |
| FC           | Regression | 2.878          | 11.764    | .000 <sup>b</sup> |
|              | Residual   | 9.462          |           |                   |
|              | Total      | 12.340         |           |                   |
| SOP          | Regression | 5.931          | 35.788    | .000 <sup>b</sup> |
|              | Residual   | 6.409          |           |                   |
|              | Total      | 12.340         |           |                   |
| OOP          | Regression | 7.000          | 50.684    | .000 <sup>b</sup> |

## Supply Chain Integration

|  |          |        |  |  |
|--|----------|--------|--|--|
|  | Residual | 5.340  |  |  |
|  | Total    | 12.340 |  |  |

### Results

- The Sig. Value tells whether the model as a whole is significant or not. **"Do the independent variables reliably predict the dependent variable?"**. The Sig. Value is 0.000 (Sig < .05)
- The regression (sum of squares) informs us about incorporation of inconsistency for the model.
- The residual (sum of squares) informs us about exclusion of inconsistency for the model.

| ANOVA <sup>a</sup> |            |                  |            |                   |
|--------------------|------------|------------------|------------|-------------------|
| Model              |            | (Sum of Squares) | F          | Sig.              |
| 1                  | Regression | 11.907           | 27.5306874 | .000 <sup>b</sup> |
|                    | Residual   | .433             |            |                   |
|                    | Total      | 12.340           |            |                   |

### Results

- The "F-test" is related to null proposition in which combined means on the dependent variables will not be at variance and for our data it is equal to 27.943
- The calculated F value is meaningfully larger than 1, which indicates the variance between groups (Top management commitment, Channel Commitment, Functional

## Supply Chain Integration

Commitment, Supplier Organizational Performance and Organizational Operational Performance).

- Hence, we can reject the null hypothesis.

### **CHAPTER 5: CONCLUSIONS**

As we are aware of the fact from the above mentioned findings that Supplier management and Supply chain integration saves any firm from unembellished and expensive commotions as well as they reduce the risks factors like fraud as well as corruption. However, in a combination of both qualitative and quantitative studies we understood the significance of record keeping that how it can improve the overall quality of the finished products, timely deliveries as well as with the help of different statistics received we are in position to notice that integration in supply networks results in increased intra organizational performance which directly reflects in the improved output and that too at shorter periods. Furthermore, with support from different departments like quality control, marketing and sales the furnished products are out in the market or retail stores in quite lesser periods which results in the superior demands. Subsequently, along with that “senior managements” of the firm/s has to think over it and develop the procedures in a way that increases the organizational operational performance and all other commitment levels so that the organization as a whole would

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be benefited. However this study also concludes that by the help of effective strategic procurement and supplier management risks of frauds and corruptions reduce significantly. Details of the case study carried out in that regard is attached at appendix for better understanding of the procedures and processes to be followed.

### **CHAPTER 6: RECOMMENDATIONS**

“Organizational performance measurement and metrics have received much attention from researchers and practitioners. The role of these measures and metrics in the success of an organization cannot be overstated because they affect strategic, tactical and operational planning and control. Performance measurement and metrics have an important role to play in setting objectives, evaluating performance, and determining future courses of actions. Performance measurement and metrics pertaining to SCM have not received adequate attention from researchers or practitioners. We developed a framework to promote a better understanding of the importance of SCM performance measurement and metrics”

- Pledge or involvement by the Senior managements' may affect positive change in a firm's proficiency as well as in output.
- There is a strong need of strategic changes in the Supply Chain Systems
- A clear Supplier Registration and Management Criteria shall be benchmarked and after completion of each case supplier performance shall be recorded separately based upon the client's feedback and data management of the same shall be recorded, as this can be used as a critical factor to evaluate trust and commitment of the supplier

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- Proper implementation of strategic procurement needs to be incorporated in the firms to lessen the cost and increase the overall efficiency
- Besides focusing on the channel commitment Supply chain firms need to focus on cross functional break through which should be further followed by Supply Chain Collaboration
- Provision of time to time trainings on SCM and I.T. (ERP & MRP etc.) to the staff, ensuring that staff is well aware of the most recent and efficient supply chain practices
- On quarterly basis Organizational Operational Performance shall be calculated.
- Overall Supply Chain Performance of the firm shall be calculated based upon the five (5) proposed factors as well as other financial factors at the end of each project



## CHAPTER 7: CASE STUDY

### **Basics for Corruption Reduction and Fraud Prevention in Industrial/Humanitarian Organizations through Supplier Management in Supply Chain Systems**

#### **Abstract**

Unfortunately, all organizations (Industrial and Humanitarian/ Non-governmental organizations) are prone to fraud and corruption in their supply chain management routines. The reputational and financial fallout can be disastrous. With the growing number of companies using suppliers based in the local market has certainly increased the threat of fraud as well as corruption. There are various potential threats like, poor or non-existent record keeping, purchasing of lower quality goods at higher price, excessive entertainment of staff by suppliers, deviations in communications between procurement staff and suppliers, such as calls or text messaging to mobile phones, staff demanding extended periods of notice before they allow an audit to take place, inexperienced buyers and more.

But despite of all the above mentioned threats, this research paper emphasize upon the effectiveness of well maintained vendor/s records and sorting/filtration of vendor/s to cut down the possible threats of corruption and fraud.

This exercise is applied in a humanitarian organization of Pakistan but it is applicable to whole South Asia region due to similarity of culture and contexts. In that firm there were more than 550 (five hundred and fifty) registered vendors. As during the disasters or emergency phases requirements are met on urgent basis thus, providing golden opportunities for the fake companies or for the brother/sister companies of the already

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registered companies to be involved in the tendering process without declaration or even under some different (new) company's name.

Therefore, a list of required documents (along with check list) was developed and sent to all of the vendor(s) in the current database and based upon the receipt of the requested documents vendors were sorted out. Furthermore, these vendors were divided into active (meeting the entire set criterion) and non-active groups. This initial filtration stage allowed the firm to continue its work without a complete shutdown that is only vendors falling in the active group shall be allowed to participate in the tenders by the time whole process is completed. Likewise only those companies or firms meeting the set criterion (active category) shall be allowed to get registered in the future along with a dedicated filing system (soft and hard shall be maintained), and all of the companies/firms in the active group shall be physically verified (visited) by the Committee comprising of senior members of at least Finance department, Supply Chain (other than procurement) and Security department.

### **I. INTRODUCTION**

This exercise of re-designing of Supplier database or Supplier management was carried out in a humanitarian organization where in Pakistan, where there were more than 550 registered vendor(s). During the disasters or emergencies, requirements are met in state of urgency which provides opportunities for the fake or fraudulent companies.

A list of required documents (along with check list) should be shared with all vendor(s) in the database and based upon the receipt of the required documents vendors should be sorted out. Based upon the received documents these vendors should be divided

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into active (meeting the entire set criterion) and non-active groups. Only active group should be allowed to participate in the tenders. Likewise only those companies or firms meeting the set criterion (active category) shall be allowed to get registered in the future along with a dedicated filing system (soft and hard shall be maintained), and all of the companies/firms falling in the active group shall be physically verified (visited) before placement of the purchase contract if not at the time of registration.

A serious risk involved of fraud and corruption in supply chain management systems is based upon the selection of right vendor for the specific tenders, as the filtered and qualified vendors along with transparency in procedures of the registration and maintenance of suppliers record keeping (details/documentation) plays a vital role in reducing the corruption and fraud related risks. Suppliers' Database is a foremost utility tool for any procurement team to contact the suppliers regarding tenders. It is almost mandatory to keep it updated and maintained with all the related information of any particular vendor for supply chain purposes. Considering the local aspects and markets of South Asia majority of the firms face the above mentioned problems, thus an experimental exercise was carried out in a humanitarian organization where few cases of fraud and corruption were faced by the management in the last few years. The supplier database (an excel sheet) of the organization had 550+ vendors, but the critical problem with that database was, it was outdated and had incomplete information of the vendors. The above mentioned supplier database was lacking complete details of registered vendors as well as had outdated records without any regular up gradations, which lead to the various problems of duplicate registrations of same company under different names, fake companies (without getting registered with government), no

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properly earmarked categories of vendors or ear marked black listed vendors and last but not the least due to backdated information majority of the firms were not responding to the tender requests, resulting in the limited available options.

### **II. Methodology**

The supply chain presents many opportunities for corruption, these ranges from false invoicing, bribery and kickback schemes to inventory theft and substandard goods. But the major Red flag includes

- Poor or non-existent record keeping.
- Higher price/lower quality goods.
- Excessive entertainment of procurement staff by suppliers.
- Preference given to selected suppliers regardless of pricing/quality.

As mentioned above majority of the red flags are associated with the vendor related issues thus avoiding any conflict of interests of staff and whilst the risk of fraud cannot be eliminated entirely, it can be greatly reduced with the right approach and that is based upon the selection of right vendor for the specific tenders and for the registration with the firm followed by maintenance of supplier's record keeping (details/documentation).

Suppliers' Database is a foremost utility tool for any procurement team to contact the suppliers regarding tenders. It is a necessity to keep the records and information of any particular vendor for the goods/services provided and ratings assigned for the supply chain purposes. Considering the local aspects and markets of South Asia majority of

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the firms face the above mentioned problems, thus an exercise was carried out in a humanitarian organization where few cases of fraud and corruption were faced by the management in the last few years. The supplier database (an excel sheet) of the organization had 550+ vendors, but the critical problem with that database was, it was outdated and had incomplete information of the vendors. The above mentioned supplier database was lacking complete details of registered vendors as well as had outdated records without any up gradations, which lead to the various problems

### Step1: Contacting already registered vendors

As mentioned above few companies had replaced their contact persons, as well as their email addresses and contact numbers were changed and not recorded or updated in the records. There were numerous suppliers without any registration forms in the record.

| Company | Product Category |              |  |         | NTN No | Supplier Registration Form (Y/N) | Comments            |
|---------|------------------|--------------|--|---------|--------|----------------------------------|---------------------|
| 1       |                  |              |  |         |        |                                  |                     |
| 2 A     |                  | Construction |  |         | XX     | Y                                |                     |
| 3 B     |                  |              |  | Service | 1234   | Y                                |                     |
| 4 C     |                  |              |  | Trade   | 22     | Y                                |                     |
| 5 D     | Relief           |              |  |         | 33     | Y                                |                     |
| 6 E     |                  |              |  | Service | 44     | Y                                |                     |
| 7 F     | Relief           |              |  | Trade   | F      | Y                                |                     |
| 8 G     |                  |              |  | Service | G      | Y                                |                     |
| 9 H     |                  |              |  | Service | Trade  | H                                | Y                   |
| 10 I    |                  |              |  | Service | Trade  | I                                | Y                   |
| 11 J    |                  |              |  | Service | Trade  | J                                | Y                   |
| 12 K    | Relief           |              |  |         | 55     | Y                                |                     |
| 13 L    |                  |              |  |         | 66     | N                                |                     |
| 14 M    |                  |              |  | Service | M      | Y                                | NTN not in the form |
| 15 N    |                  |              |  | Service | Trade  | N                                | Y                   |
| 16 O    | Relief           |              |  | Service | O      | Y                                |                     |
| 17 P    |                  |              |  | Service | P      | Y                                | no ntn n d form     |
| 18 Q    |                  | Medical      |  |         | Q      | N                                |                     |
| 19 R    | Relief           |              |  | Trade   | R      | Y                                |                     |
| 20 S    | Relief           |              |  | Trade   | S      | Y                                |                     |
| 21 T    | Relief           |              |  |         | T      | Y                                |                     |
| 22 U    |                  |              |  | Trade   | U      | Y                                |                     |

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### Fig. II-I- A view of incomplete database

In the Fig.II. I , product categories are not defined accurately. There were suppliers without any National Tax Numbers (NTNs) in that record, few suppliers were without any registration forms and some were assigned wrong product categories Thus the most crucial and difficult task was to contact all the 550 (five hundred & fifty) vendors and request them to provide with all the required documents. This was done by sending emails (also by finding updated contact details from the internet) as well as physically visiting the suppliers. A separate sheet was maintained which recorded how many suppliers were contacted and requested to submit the required documents, mode of contact used to contact the vendors and how many of them has responded with the required documents. Following documents were requested;

- Supplier registration form.
- Company Profile.
- National Tax Number (NTN).
- Tax returns of last three years or more along with financial (bank) statements of last three years.
- Experience certificate of provision of services/goods to other national/multinational organizations.  
along with some other checklists.
- Supplier registration form checklist.

### **Step2: Filtering the vendors**

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In this step based upon the received documents specially the NTN certificate vendors were sorted out. One hundred and ninety nine (199) NTN certificates were received and based upon these NTN certificates different categories of the suppliers were made.

- Pink - No NTN Certificate provided or Supplier without Registration form
- Yellow - Suppliers with incorrect NTN
- White - NTN verified Suppliers
- Blue - NTN Not Verified from FBR Website or NTN registered under a different company name.

|    | A       | B       | C       | D        | E              | F   | G   | H      | I     | J       | K                | L       | M            | N    | O      | P          | Q        | R           | S | T                           |
|----|---------|---------|---------|----------|----------------|-----|-----|--------|-------|---------|------------------|---------|--------------|------|--------|------------|----------|-------------|---|-----------------------------|
| 1  | Company | Address | Country | Citytown | Contact Person | Tel | Fax | Mobile | Email | Website | Product Category |         |              |      |        |            |          | NTN No      |   |                             |
| 2  |         |         | A       | B        | AB             | AB  | AB  | AB     | AB    | AB      | Relief           | Medical | Construction | Food | Watsan | IT-Telecom | Services | Other       |   |                             |
| 3  | A       | xxxx    | A       | B        | AB             | AB  | AB  | AB     | AB    | AB      |                  |         |              |      |        |            | Service  |             |   | XXXX                        |
| 4  | B       | xxxx    | A       | B        | AB             | AB  | AB  | AB     | AB    | AB      |                  |         |              |      |        |            | Service  |             |   |                             |
| 5  | C       | xxxx    | A       | B        | AB             | AB  | AB  | AB     | AB    | AB      |                  |         |              |      |        |            |          |             |   | no NTN Certificate provided |
| 6  | D       | xxxx    | A       | B        | AB             | AB  | AB  | AB     | AB    | AB      |                  |         |              |      |        |            |          |             |   | No reg Form                 |
| 7  | E       | xxxx    | A       | B        | AB             | AB  | AB  | AB     | AB    | AB      |                  |         |              |      |        |            |          |             |   | no NTN Certificate provided |
| 8  | F       | xxxx    | A       | B        | AB             | AB  | AB  | AB     | AB    | AB      |                  |         |              |      |        |            | Service  |             |   | no NTN Certificate provided |
| 9  | G       | xxxx    | A       | B        | AB             | AB  | AB  | AB     | AB    | AB      |                  |         |              |      |        |            | service  | consultancy |   | No reg form found           |
| 10 | H       | xxxx    | A       | B        | CD             | CD  | CD  | CD     | CD    | CD      |                  |         |              |      |        |            | Service  | Trade       |   | ABCD                        |
| 11 | I       | xxxx    | A       | B        | CD             | CD  | CD  | CD     | CD    | CD      |                  |         |              |      |        |            |          | Trade       |   | 1235372-8                   |
| 12 | J       | xxxx    | A       | B        | AB             | AB  | AB  | AB     | AB    | AB      |                  |         |              |      |        |            | Service  |             |   | no NTN Certificate provided |
| 13 | K       | xxxx    | A       | B        | CD             | CD  | CD  | CD     | CD    | CD      |                  |         |              |      |        |            | Service  |             |   | 1234                        |
| 14 | L       | xxxx    | A       | B        | AB             | AB  | AB  | AB     | AB    | AB      |                  |         |              |      |        |            |          | Trade       |   | no NTN Certificate provided |
| 15 | M       | xxxx    | A       | B        | AB             | AB  | AB  | AB     | AB    | AB      |                  |         |              |      |        |            | Service  |             |   | XXXX                        |

Fig.II-II-Color coded sheet for the NTN

As it is evident by the Fig.II-II, the pink highlighted suppliers show that either the registration forms are missing or they have not provided the NTN certificates. Likewise, the blue highlighted suppliers have provided the NTN but it is currently not valid. The

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yellow highlighted suppliers depicts the incomplete NTN in the list. White highlighted suppliers have NTN available in the list.

Upon filtering the suppliers' list according to the color coding, a separate sheet of suppliers was created which only had vendors qualified for the next step of soft verification of suppliers. The total of 199 suppliers had qualified out of 550 list of this separate sheet.

| 1  | Company | Address                             | Country    | City/Town | Province | Contact Person | Tel      | Fax      | Mobile   | Email             | Website        | Product Category   | NTN No   |
|----|---------|-------------------------------------|------------|-----------|----------|----------------|----------|----------|----------|-------------------|----------------|--------------------|----------|
| 2  | ABCDEFG | Plot 12, main road, Industrial Area | Pakistan   | ABCDEFG   | Capital  | Mr. XXX        | 12345678 | 12345678 | 12345678 | abcdefg@gmail.com | www.abodef.com | GOS                | 12345678 |
| 3  | HJKKLM  | Plot 12, main road, Industrial Area | China      | HJKKLM    | Capital  | Mr. XXX        | 12345678 | 12345678 | 12345678 | abcdefg@gmail.com | www.abodef.com | GOS                | 12345678 |
| 4  | ABCDEFG | Plot 12, main road, Industrial Area | Pakistan   | ABCDEFG   | Capital  | Mr. XXX        | 12345678 | 12345678 | 12345678 | abcdefg@gmail.com | www.abodef.com | GOS                | 12345678 |
| 5  | HJKKLM  | Plot 12, main road, Industrial Area | Pakistan   | HJKKLM    | Capital  | Mr. XXX        | 12345678 | 12345678 | 12345678 | abcdefg@gmail.com | www.abodef.com | Printers           | 12345678 |
| 6  | ABCDEFG | Plot 12, main road, Industrial Area | Pakistan   | ABCDEFG   | Capital  | Mr. XXX        | 12345678 | 12345678 | 12345678 | abcdefg@gmail.com | www.abodef.com | IT                 | 12345678 |
| 7  | HJKKLM  | Plot 12, main road, Industrial Area | Pakistan   | HJKKLM    | Capital  | Mr. XXX        | 12345678 | 12345678 | 12345678 | abcdefg@gmail.com | www.abodef.com | Logistics Services | 12345678 |
| 8  | ABCDEFG | Plot 12, main road, Industrial Area | Geneva     | ABCDEFG   | Capital  | Mr. XXX        | 12345678 | 12345678 | 12345678 | abcdefg@gmail.com | www.abodef.com | Generators         | 12345678 |
| 9  | HJKKLM  | Plot 12, main road, Industrial Area | Pakistan   | HJKKLM    | Capital  | Mr. XXX        | 12345678 | 12345678 | 12345678 | abcdefg@gmail.com | www.abodef.com | Relief Items       | 12345678 |
| 10 | ABCDEFG | Plot 12, main road, Industrial Area | Malaysia   | ABCDEFG   | Capital  | Mr. XXX        | 12345678 | 12345678 | 12345678 | abcdefg@gmail.com | www.abodef.com | Relief Items       | 12345678 |
| 11 | HJKKLM  | Plot 12, main road, Industrial Area | Pakistan   | HJKKLM    | Capital  | Mr. XXX        | 12345678 | 12345678 | 12345678 | abcdefg@gmail.com | www.abodef.com | Printers           | 12345678 |
| 12 | ABCDEFG | Plot 12, main road, Industrial Area | Pakistan   | ABCDEFG   | Capital  | Mr. XXX        | 12345678 | 12345678 | 12345678 | abcdefg@gmail.com | www.abodef.com | IT                 | 12345678 |
| 13 | HJKKLM  | Plot 12, main road, Industrial Area | Austria    | HJKKLM    | Capital  | Mr. XXX        | 12345678 | 12345678 | 12345678 | abcdefg@gmail.com | www.abodef.com | Fire & Security    | 12345678 |
| 14 | ABCDEFG | Plot 12, main road, Industrial Area | Pakistan   | ABCDEFG   | Capital  | Mr. XXX        | 12345678 | 12345678 | 12345678 | abcdefg@gmail.com | www.abodef.com | Printers           | 12345678 |
| 15 | HJKKLM  | Plot 12, main road, Industrial Area | USA        | HJKKLM    | Capital  | Mr. XXX        | 12345678 | 12345678 | 12345678 | abcdefg@gmail.com | www.abodef.com | Food               | 12345678 |
| 16 | ABCDEFG | Plot 12, main road, Industrial Area | Bangladesh | ABCDEFG   | Capital  | Mr. XXX        | 12345678 | 12345678 | 12345678 | abcdefg@gmail.com | www.abodef.com | Logistics Services | 12345678 |
| 17 | HJKKLM  | Plot 12, main road, Industrial Area | Pakistan   | HJKKLM    | Capital  | Mr. XXX        | 12345678 | 12345678 | 12345678 | abcdefg@gmail.com | www.abodef.com | GOS                | 12345678 |
| 18 | ABCDEFG | Plot 12, main road, Industrial Area | Japan      | ABCDEFG   | Capital  | Mr. XXX        | 12345678 | 12345678 | 12345678 | abcdefg@gmail.com | www.abodef.com | HDPE Pipes         | 12345678 |
| 19 | HJKKLM  | Plot 12, main road, Industrial Area | Japan      | HJKKLM    | Capital  | Mr. XXX        | 12345678 | 12345678 | 12345678 | abcdefg@gmail.com | www.abodef.com | Tents              | 12345678 |
| 20 |         |                                     |            |           |          |                |          |          |          |                   |                |                    |          |

Fig.II-III- Sheet Comprising of the qualified vendors

### StepIII: Compliance level of NTN holders

As this exercise was underway and the research work was in process on NTN, it was learnt that in the near future, only active taxpayers should be allowed to participate in the procurement tenders. So, verification process of the 199 suppliers proceeded, whether they were in active taxpayers list or not. FBR provides a utility tool on their website 1(<https://e.fbr.gov.pk/ATLSearchUtility.aspx>) for users to check the compliance



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level of the NTN holder. As per FBR parameters, if the compliance level is above 50%, the NTN holder is considered to be active. If it is under 50%, the NTN holder is deemed inactive. There is a possibility that the NTN holder might have outstanding taxes.

For illustration purposes, another columns were added to the database to show a compliance level and supplier visit along with date of visit of each supplier as per the FBR active taxpayers' search utility.

Furthermore, vendors were classified according to their territories by including "Province" column in the sheet. But the core point in any supply chain management system is defining the product categories and ear marking of vendors accordingly.

### **IIICONCLUSIONS**

While carrying out this exercise the main focus was on soft verification and re-designing of the Suppliers' database. Selection of the supplier/s is the most critical step towards corruption reduction and fraud prevention for any organization, there are many other key factors involved in corruption and fraud activities but choosing a right supplier to work with reduces that risk. This step also leads to improve the strategic planning of a firm and can lead to further strengthening the position of a firm by ensuring that the key factor of trust and commitment is there and thus, reliable supplier database can help in meeting its long term targets with the help of strategic sourcing. Whereas, strategic sourcing is viewed as the use of supplier capabilities in the process of design, engineering and manufacturing to achieve strategic objectives. Thus strong supplier database or reliable suppliers can facilitate a firm in finalizing the frameworks that can assist managers in the process of making buying decisions with consideration of the

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competitive advantage and demand flexibility as primary factors, and process capability, process maturity and systematic risk as secondary factors

### **IV. Recommendation**

To further strengthen the supply chain management following steps are suggested to be incorporated;

- Pre-qualification—minimum required documents to register a supplier
- Blacklisting – the criteria defined for blacklisting of suppliers
- Physical verification – authentication of suppliers' information by visiting the location of suppliers
- Rating of Suppliers – criteria to be outlined to rate the performance of suppliers
- Product categorization – classification of suppliers' expertise to be defined within their generalized category
- Improvement of Supplier Registration Form (SRF) – revise SRF to include information such as mobile number and essential documents checklist
- Dedicated person identified for maintenance of database and a standard defined for data entry

In addition to the above mentioned list, another critical suggestion to any firm would be a company issued email. There are many organizations in the world who only entertain contacts with official email addresses. For example, Thomson Reuters does not let anyone subscribe anyone for their news information via email unless it is an official email address listed to a company. Also, Google Inc. does not let anyone register for its

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apps unless it is a company issued email. Thus it should also be mandatory for vendors to get registered with an official email address. Consequently, this will avoid cases where fake firms or non-declared sister/parent firms get registered, similarly if the contact person has left the company, the email address will not be employed by anyone for any other company. This definitely will limit the people who receive invitation for tender participation on their personal email addresses and further releasing the confidential information.

Aside from the above mentioned basic improvements in suppliers' database, an automated software portal will be an advantage. Such an automated portal can manage the information centrally and can provide a better user interface to all the suppliers.

## APPENDIX

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