IT AS A KEY SUCCESS FACTOR IN SUPPLY CHAIN MANAGEMENT

By

MUHAMMAD ABUBAKAR
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I, hereby, declare that no portion of the work referred to in this thesis has been submitted in support of any application for another degree or qualification of this university or any other institution of learning.

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List of Tables

List of Abbreviations

EDI	Electronic Data Interchange
PSO	Pakistan State Oil
SCM	Supply Chain Management

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ACKNOWLEDGMENT

The primary and leading praises to **ALLAH ALMIGHTY** that cannot be expressed in particular words, but it's my heartily thanks to ALLAH who helped me in every step of life and also helped me to accomplish a project in the assigned time.

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Last but not least, I am very thankful to my **Parents** who make hard efforts for me and they continually supports me in the every step of life and they also gave me very conducive atmosphere where I can achieve my goals and targets.

Abstract

Purpose of the Research- This thesis is based on studying the impact of Information technology in supply chain management. The basic motive behind this research was that to get to know the actual advantages of IT in supply chain of PSO Karachi, Pakistan and how they carry their operations.

Research Design and Sampling- Data was collected through Descriptive quantitative method by using specifically designed questionnaire for the research study. The population selected for this research study are the permanent and contractual supply chain employees. The sample size selected for this research study is 100 respondents. The statistical tools selected for this research study includes ANOVA and Regression analysis.

Findings of the Result- The findings were revealed that the how electronic data interchange application practices impacts on supply chain because companies have to maintain its value in competitive market.

Limitations of the Study- Due to lack of resources such as privacy in information, lack of time and city circumstances, research was limited and did not cover all the areas of supply chain.

Practical Implication- This study would be useful for the managers, suppliers and buyers because it includes the clear and deep knowledge about the supply chain concepts and real practices of EDI applications.

Future Implications- The researcher highlighted certain future implications for other researcher such as they must cover all the areas of the O&G companies to get the exact and accurate results. Secondly, the researcher must try to increase the sample population because with the help of large sample size, it would be easy to distinguish the practices of the Oil and gas companies.

Key Words- Electronic data interchange (EDI), Supply Chain, PSO Company.

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Chapter 1: Introduction

1.1 Purpose and History of study

Supply chain Management is a combination of three words supply, chain and management. Supply is all about meeting the needs, wants and demands of customers where as the chain actually represents connectivity. Supply chain have exclusive part to play in this way. Supply chain management just like three other functions; having a unique role to play in making trades effectively. Supply chain management is mainly the dealing of the practice which initiates from the purchasing of raw material to the processing of that materials in the plant and then bringing the ultimate product to the customer. Supply chain management is to deliver the finest possible facilities to the customer with extreme cost effectiveness.

According to Fostar (2008) supply chain management is system based method used for the increase performance level, Influence the opportunities to develop gradually, Smooth the downstream and upstream relations between customers and suppliers.

Henfield and Nicholass (1999) stated that SCM contains integration of a set of tasks, activities through continuously improved supply chain relationship for the sake of reaching justifiable profit.

Number of researchers had recognized Information Technology in SCM as a effective to using the terms like materials resource planning (MRP), electronic data interchange (EDI) and enterprise resource planning (ERP). Apart from above-mentioned Information technologies, A huge number of IT programs has been planned, lntroduced and fulfilled accordingly for achieving different requirements of the supply chain events.

Combination of Supply chain and information technology is vital aspect for the business for handling information flow among its vendors, drivers of supply chain and end customers too. Nowadays, IT is measured as a prerequisite for permitting the effectiveness of supply chain difficulty and transformation in terms of cost effectiveness, responsiveness and pace.

Globalization has further boosted the worth of usage of IT in Supply chain as business spans beyond borders and boundaries with requirements to manage it accordingly.

1.2 Problem Statement

Worldwide, Integrated SCM is a developing area for transforming the supply chain performance. IT is measured as a key for this type of integration. Since, the race is getting harder so businesses have entered into aggressive competition and concentrating on moving their supply chain into well-organized and active supply chain management by integration. This will become more hard to compete at the given platform if we disregard the significance of information flow in a timely manner across the supply chain which our competitors are already practicing. Therefore the problem statement is, "to determine the level of reliability, speed and accuracy by usage of EDI in supply chain management by virtue of information technology with special reference to Pakistan state oil as PSO is the leading oil and gas sector of the Pakistan."

1.3 Aim of the Research

Aim of the research is that Information technology and its tools have given a strong support in the implementation of the supply chain management in PSO. The work of hard papers is now being replaced by the electronic word documents and emails which increases reliability in business, saving time and accuracy in work. Information technology is being supportive of all supply chain processes which includes; procurement, manufacturing, warehousing and distribution.

1.4 Objective of the study

This research study comprises of following objective:

- To measure improvement in performance of supply chain management with the help of EDI (Electronic Data Interchange).

1.5 Hypothesis

As above-mentioned researches, findings and theories. Below given hypothesis is designed for scrutinizing and exploring the effect of IT on supply chain. A case study of PSO (The Heading O&G Company of Pakistan).

Hypothesis 1

H0: EDI (Electronic Data Interchange) as IT tool is not an effective enabler of supply chain performance.

H1: EDI (Electronic Data Interchange) as IT tool an effective enabler of supply chain performance.

1.6 Significance of the study

Previous researches has talked about the impacts of Information Technology on supply chain on international context and many of the researches were completed on automobile and manufacturing companies. With aggressive growth spirit by oil and gas sector in rising market of Pakistan and training them with more innovative ERP structures, so there must be a need for creating a relationship b/w IT based systems and supply chain based systems. Tremendously few researches have been made especially in Pakistan about role of IT as active supply chain enabler especially in oil and gas organization. The importance of this research have been more enhanced due to Pakistan's rising market where rising trends and lifestyle getting place. In order to manage up with the future challenges on every oil and gas would be deeply trust on IT and supply chain for growth of market, improving customers range, taking more market shares, more healthy planning, cost effective purchasing, make partnering with suppliers and hearing to consumers. The outcomes of current research will

describe the conceptual frame work of "IT as enabler of Effective supply chain management".

1.7 Limitations of the study

The below given limitations were measured during the working process of this research:

- ✓ Information and data privacy policy at PSO will be a limitation in selected cases while collecting data.

- ✓ Data convenience will be depend on secondary sources where PSO will be not willing to share their numerical figures.

- ✓ Due to scope of this study and time duration, the research is limited to PSO.

1.8 Scope of the study

The opportunity of this study is limited to application of IT on supply chain management and appraising its impact and success in supply chain management. Pakistan state oil is particular for this research as it is undoubtly leading oil and gas sector of Pakistan and its outcomes are appropriate to whole oil and gas sector of Pakistan. Also due to ease in gathering and validation of information PSO is selected for this study. The period for this study lies of 4 months and would be focused on take out the success and efficiency which IT carries in supply chain better performance. Findings and outcomes of this research will not only be appropriate to whole oil and gas sector of Pakistan but it also would be a foundation stone in study.

2. Literature Review

2.1 Introduction

In this part of study, a categorization scheme has been devised to review the literature and information available on the relationship between Information technology (IT) and supply chain management (SCM). This classifications is ended with the purpose to determine the appropriate factors that would backing the professionals in their job and work for effectively running supply chain management which is supported by IT.

The study conducted by Fostar (2008) defined SCM as a system built approach for enhancing the performance level in addition to that also leverage the chances evolved due to up and down links with customers and vendor.

Hanfield and Nicholas (1999) highlighted in his study that SCM includes the combination of a set of responsibilities and actions through endlessly enhanced Supply chain connection for the sake of attaining justifiable advantages.

Several studies have describe as Information Technology in SC is a new aspect to it by using the methods like materials resource planning (MRP), bill of material (BOM) and master production scheduling (MPS), Information technologies in great number of IT softwares has been planned, introduced and applied for successfully meeting the different requirements of the SC happenings.

Carter and Ellram (1998) shows selected outbound activities e.g recycling, sales services, unused management plus reverse logistic could also managed more efficient way through Information technology integration with supply chain functions.

Integration and SC are compulsory for successfully managing firms actions outside its borders. Coleman and Austrian (2000)

Definition of EDI is computer to computer transmission of standard business transaction. Walton and Marucheck (1997).

It is highlighted by Lawrence & Morton (1997) that the combined supply chain operations are supported to upgraded performance.

Supply chain integrated essentially occurs when there is a solid connection and trust exists b/w distributor and vendor which outcomes are in reduced time on fingers, short time period delivery and lead-time and buyer facilities superiority. (Parnell, 1998).

Implementation of electronic data interchange are explored the businesse in the organization by Williams et al. (1998).

Information sharing between the consumer and seller is measured to be a good indicator of the usage of Supply chain management. When data flows effortlessly in between buyer and seller, the result is to generate a effective supply chain. Information and data transmission is used, to add the total value chain into the longer chain by (Shapiro et al., 1993; Rayportand Sviokla, 1995; Bhattacharya et al., 1995; Towill, 1997).

It is highlighted by (Konsynski, 1993) that Electronic data interchange is significant since it enables better and quick transfers of data and info: which is required for high level of integration and management under the SCM. Equally, usage of Electronic data interchange, devoid of integration of SC actions, it will only speedup an current course. This kind of integration needs the reformation and rearranging of the dealings b/w organization to attain the complete advantages from usage of EDI and SCM.

According to the Bakos and Barynjyoolfsoon (1993) specifies that Information Technology have formed helpful structures which carries in the decline in trades cost and more interaction in vendor- purchaser correspondence.

As Gunasekaran (1999) states that many of the researches created till now includes of strategies, individuals, equipment and system with a low focus on integration as an supporter of Supply Chain Management.

It is study of (Subramani, 2004) that Information Technology is a cooperative connection development has improved the data and information having transparency and sharing ability b/w distributors and vendors and thus making good relationship without vagueness.

According to (Swatman et al., 1994; Curran, 1991), Electronic data interchange is a supporting element and the initial step heading to integrated supply chain management.

The level of integration in supply chain management at some extent relying on the EDI usage in the firm. Evans et al. (1993)

(Stevens, 1989) defined that supply chain management depends on the flow of material and information, coordinated to the buyer's desires, from rawmaterials to the final purchaser.

This study consider on EDI usage and demographics of O&G companies that have routine to use Electronic data interchange. Supply chain management and its correlation to EDI usage are also discussed in this study. This study is related to another research in supply chain management where the consideration is on the correlation b/w vendors and purchasers (Ellram, 1991; Cavinato, 1992).

Data transparency is b/w the purchaser and vendor is measured to be a main sign of the use of supply chain management. Whenever information moving seamlessly in both ways, the result is to generate a virtual SC. Info transfer is in secondhand, in effect, this will take part the whole value chain into one longer and effective chain (Shapiro et al., 1993; Rayportand Sviokla, 1995; Bhattacharya et al., 1995; Towill, 1997).

Kauremaa et al., (2004) classified the use of IT in three ways viz, transaction, execution and information sharing as it has been described earlier. In addition researchers defined that IT is used when there are high volume transactions and to stable customer and business relationships. According to Dheeraj 2012, the supply chain managers has been facing the environment relating problems like global warming and greenhouse effect, carbon emulsion and pollutants increasing has reflected the importance of greening the supply and technologically edifying the sharing and transaction processes.

EDI is significant since it helps numerous and effective transfers of data and information necessary for high level of integration and management within supply chain. If opposite, the usage of EDI application, devoid of the integration of SC actions, will be purely speedup an current process. This integration needs the re-structuring and re-organization of the relation b/w company to reach out the full profit from operating of electronic data interchange in supply chain. (Konsynski, 1993).

A research conducted by Bidgoli (1999) that this is focused an electronic data interchange method might contain some difficulties related with traditional non-EDI method, but a

appropriate or successful implement of EDI system may exclude or minimize many of these weaknesses.

Chapter 3: Research Methodology

3.1 Introduction

The basic reason of this research is to search the impact of IT in over all supply chain performance of PSO. It is a quantitative study therefore it includes of wide primary and secondary sources. Information is gathered from the workers of PSO who are working in supply chain department.

3.2 Nature of Research

The nature of research is causal (cause & effect) in which study has been taken to gather the information with qualitative tools (questionnaire for survey based data collection) for the research. There are both dependent and independent variables, which are described clearly as two variables: IT as independent and Supply chain as dependent variables. This research will show either there is a significant relation among the variables or not.

3.3 Sample Size

The sample size of the study includes 100 employees (permanent and contractual) who are currently working in supply chain department. Population is about 200 plus including of permanent and contractual employees which are handling internal and external supply chain operations.

3.4 Sampling Method

This research is based on non-probability based purposive sampling and employees of supply chain will be considered for the data collection along with interviewing them to collect the information which has helped in completing the research.

3.5 Data Collection Methods

Information will be gathered through questionnaire. Questionnaire will be created on the finest practices of the SCM with respect of Information technology. Questionnaire is appropriate way in the atmosphere where respondents of questionnaire are educated, having well awareness of the topic and data collection need to be fast and exact.

3.6 Data Integration

Questionnaire was coded before entering the data to computer by the researcher. For data analysis, the statistical package for the social sciences (SPSS) was implemented. Answers would be articulated in percentages. Collected data by the research questionnaire were analyzed for reliability. This technique was used for the reasons that it is the best instrument to categorize, explain, compare and reach a conclusion

CHAPTER 4: FINDINGS, ANAYLSIS AND DISCUSSION

The core analysis of this chapters aim to present the study findings by using statistical tools. The results of the analysis are presented in tabular and graphical representation of facts and figure which helped in making better interpretations of the hypothesis that whether IT tool Electronic Data Interchange is an effective enabler of supply chain.

One of the main functions of statistics involves the description of the data; either through measures (estimates), graphs or tables that can clearly see the behavior and trends of the information collected. SPSS has a set of procedures to make this work, each of which offers various possibilities and their application depends on the characteristics of the information contained in each variable.

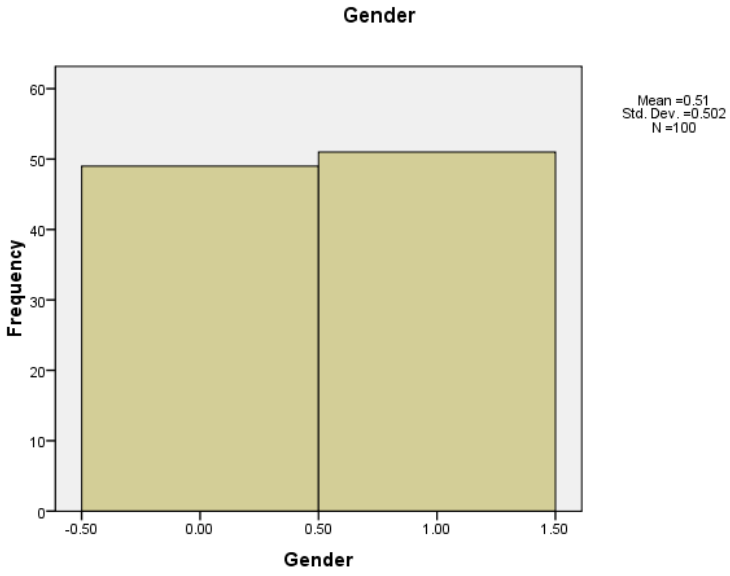
In this chapter we will concentrate solely on descriptive statistics and the procedures that are classified as measures of central tendency, measures of distribution and dispersion measures. In order to evaluate the degree of association or independence of two variables quantitative techniques must be used like correlation analysis. Correlation is a mathematical technique that evaluates the association or relationship between two quantitative variables, both in terms of directionality as power or intensity, providing a correlation coefficient (Pearson r). Correlation Coefficient (It is or nonparametric) is a dimensionless value ranging between -1 and +1. The zero value is given when do not exists any correlation between variables analyzed; the value -1 implies perfect correlation of character reverse (or indirect) and the value +1 a perfect correlation of type direct.

DESCRIPTIVE STATISTICS

Demographic of Participants

Gender

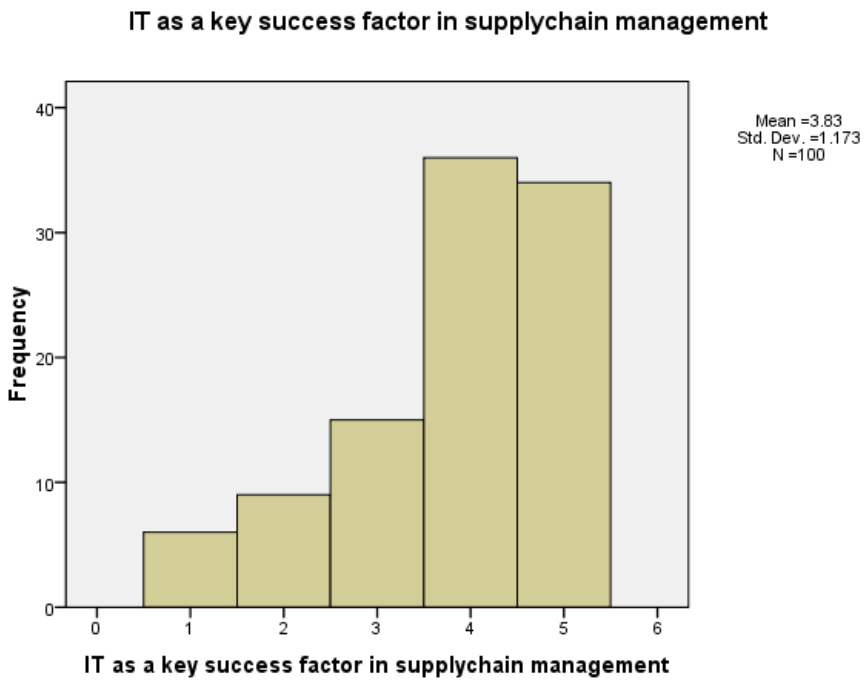
Outcomes of the descriptive statistics for gender of the participants in the study can be observed in the table 1 of the data analysis. It was found that there were 51% participants of the study were male and 49% were females. Therefore, majority of the participants were male in the study. This following chart allows us to identify and visually compare the outcomes of the categories of a gender of the participants.



IT as a key success factor in supply chain management

In response to significance of IT in supply chain management, IT was found that there were 34% participants that responded with strongly agree, 36% simply agreed with the significance of IT in supply chain management. Around 15% f the participants remained with an undecided opinion. A small number of participants disagreed, out of which 9% just

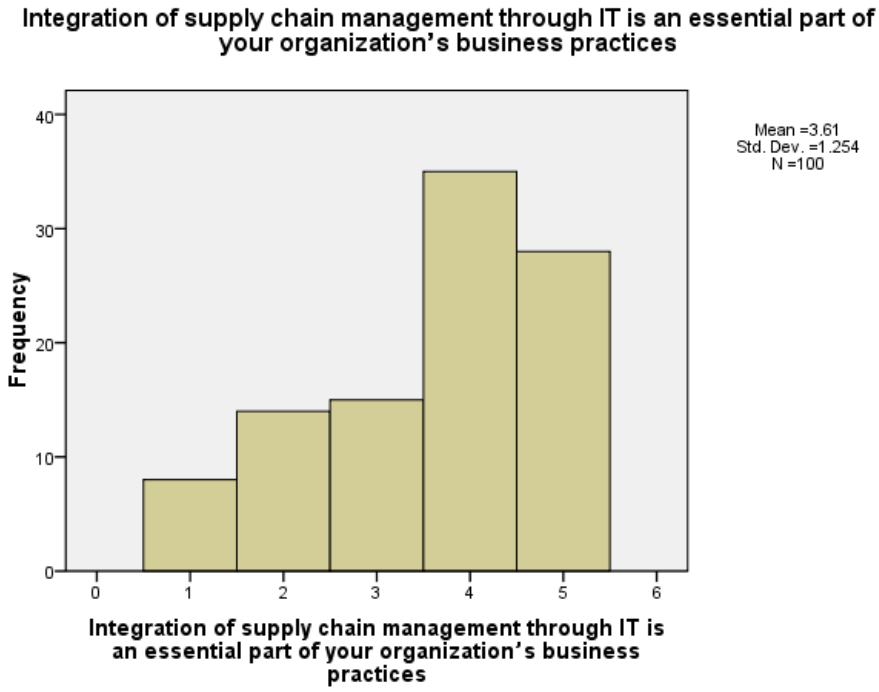
disagreed and 6% strongly disagreed with the importance of IT in supply chain management. Therefore, majority of the participants of the study agreed with the significance of IT in supply chain management. Outcomes of the descriptive statistics for IT as a key success factor in supply chain management can be observed in the table 2 of the data analysis. The following chart allows us to identify and visually compare the outcomes of the response of IT as a key success factor in supply chain management.



Integration of SCM through IT is an essential part of your organization's business practices

The response to the question given above have positive response. Results shows that there were 28 % participants that strongly agreed, 35% simply agreed, 15% remained undecided, 14% disagreed and 8% strongly disagreed. Majority of the participants supported the idea, Outcomes of the descriptive statistics can be observed in the table 3 of the data analysis. The following chart allows us to identify and visually compare the outcomes of the

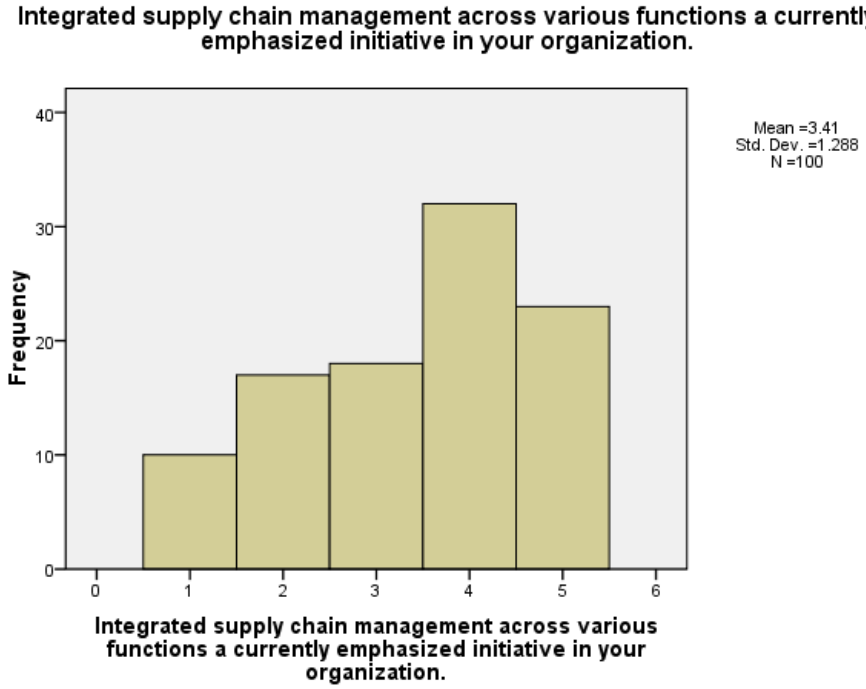
response of IT as a key success factor in SCM.



Integrated SCM across various functions are currently emphasized initiative

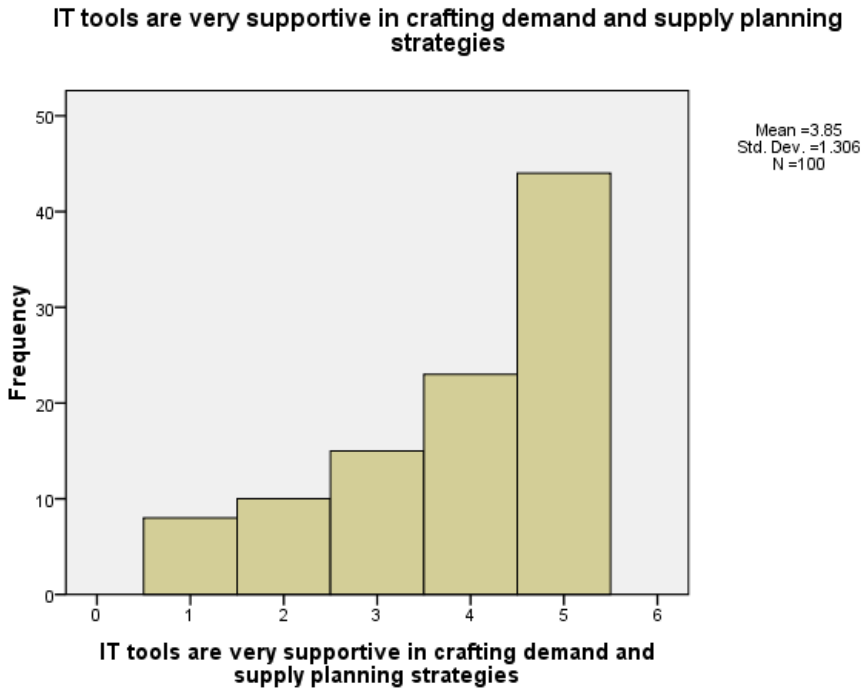
In response to question, it was found that there were 23% participants that responded with strongly agree, 32% simply agreed with the fact that integrated SCM across various functions are currently emphasized initiative. Around 18% f the participants remained with an undecided opinion. A small number of participants disagreed, out of which 17% just disagreed and 10% strongly disagreed with the fact that integrated SCM across various functions are currently emphasized initiative. Therefore, majority of the participants of the study agreed with the integrated SCM across various functions are currently emphasized initiative. Outcomes of the descriptive statistics for integrated SCM across various functions are currently emphasized initiative can be observed in the table 4 of the data analysis. The following chart allows us to identify and visually compare the outcomes of the response of

integrated SCM across various functions are currently emphasized initiative.



IT tools are very supportive in crafting demand and supply planning strategies

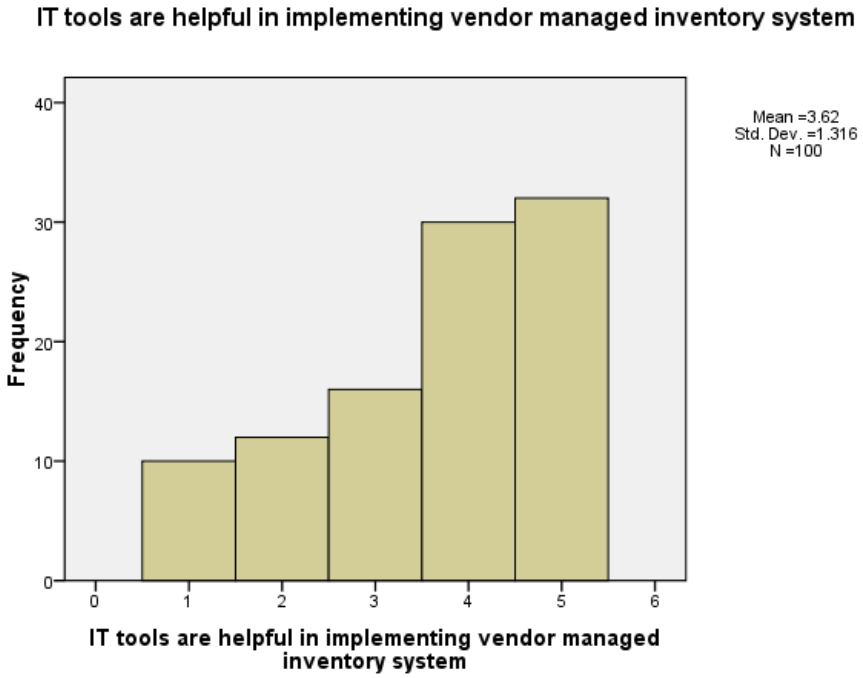
The fact that IT tools are very supportive in crafting demand and supply planning strategies depicts positive outcomes. Results shows that there were 44 % participants that strongly agreed, 23% simply agreed, 15% remained undecided, 10% disagreed and 8% strongly disagreed for the fact that IT tools are very supportive in crafting demand and supply planning strategies. Therefore, majority of the participants supported the idea that IT tools are very supportive in crafting demand and supply planning strategies. Outcomes of the descriptive statistics for IT tools are very supportive in crafting demand and supply planning strategies can be observed in the table 5 of the data analysis. The following chart allows us to identify and visually compare the outcomes of the response of IT tools are very supportive in crafting demand and supply planning strategies.



IT tools are helpful in implementing vendor managed inventory system

In response to question that IT tools are helpful in implementing vendor managed inventory system, it was found that there were 23% participants that responded with strongly agree, 32% simply agreed with the fact that IT tools are helpful in implementing vendor managed inventory system. Around 18% f the participants remained with an undecided opinion. A small number of participants disagreed, out of which 17% just disagreed and 10% strongly disagreed with the fact that IT tools are helpful in implementing vendor managed inventory system. Therefore, majority of the participants of the study agreed with the IT tools are helpful in implementing vendor managed inventory system. Outcomes of the descriptive statistics for IT tools are helpful in implementing vendor managed inventory system can be observed in the table 6 of the data analysis. The following chart allows us to identify and visually compare the outcomes of the response of question that IT tools are helpful in

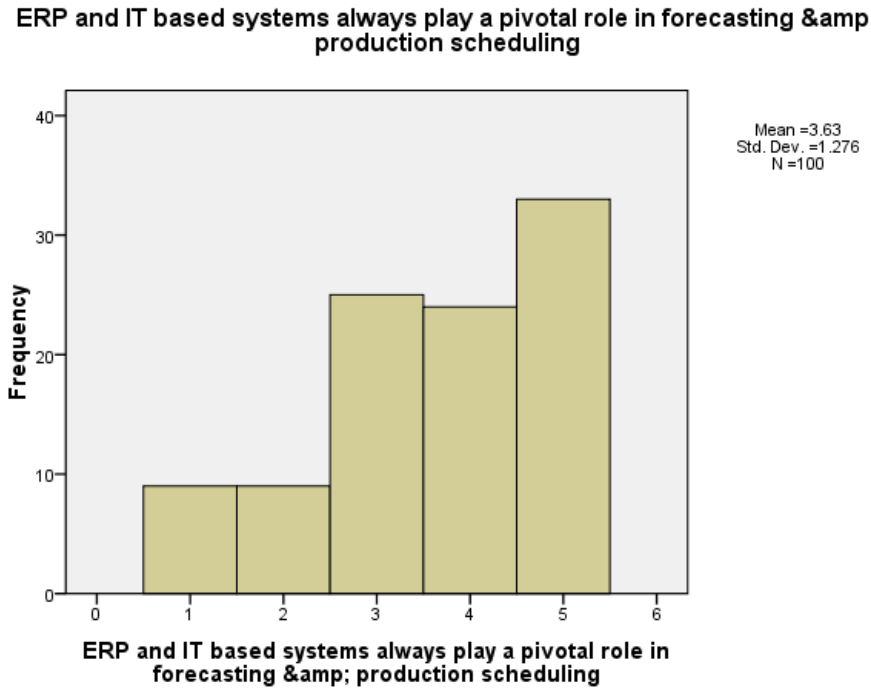
implementing vendor managed inventory system.



ERP and IT based systems always play a pivotal role in forecasting & production scheduling

The response to the question that ERP and IT based systems always play a pivotal role in forecasting & production scheduling depicts positive outcomes. Results shows that there were 33% participants that strongly agreed, 24% simply agreed, 25% remained undecided, 9% disagreed and 9% strongly disagreed for the fact that ERP and IT based systems always play a pivotal role in forecasting & production scheduling. Therefore, majority of the participants supported the idea that ERP and IT based systems always play a pivotal role in forecasting & production scheduling. Outcomes of the descriptive statistics for ERP and IT based systems always play a pivotal role in forecasting & production scheduling can be observed in the table 7 of the data analysis. The following chart allows us to identify and visually compare the outcomes of the response of ERP and IT based systems always play

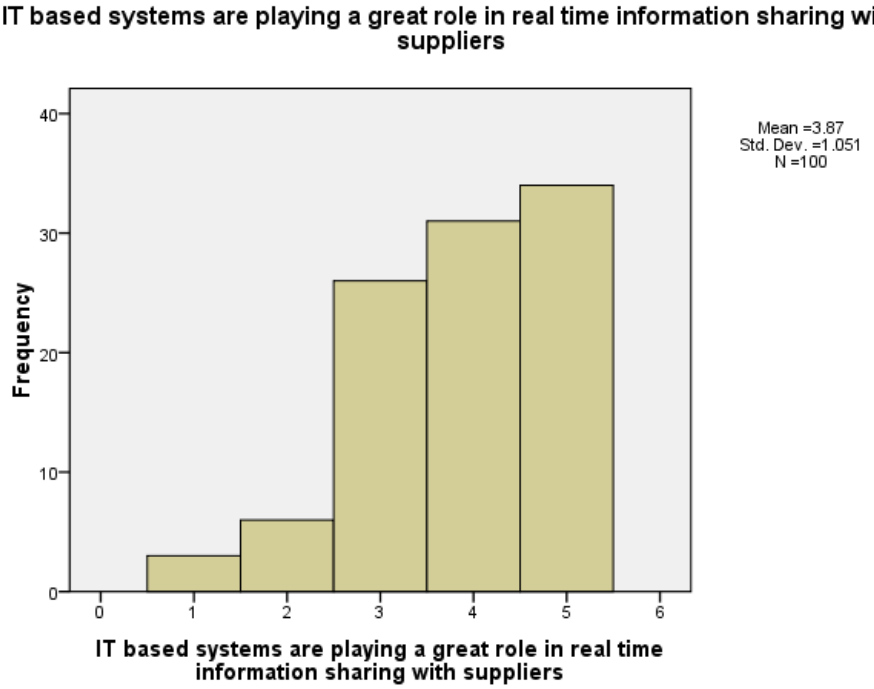
a pivotal role in forecasting & production scheduling



IT based systems are playing a great role in real time information sharing with suppliers

The facts that IT based methods are playing a significant role in real time information sharing with suppliers depicts positive outcomes. Results shows that there were 34 % participants that strongly agreed, 31% simply agreed, 26% remained undecided, 6% disagreed and 3% strongly disagreed for the fact that IT based methods are playing a imp: role in real time information sharing with suppliers. Therefore, majority of the participants supported the idea that IT based methods are playing a better role in real time information sharing with suppliers. Outcomes of the descriptive statistics for IT based systems are playing a great role in real time information sharing with suppliers can be observed in the table 8 of the data analysis. The following chart allows us to identify and visually compare the outcomes of the response of IT systems are playing a significant role in real time information

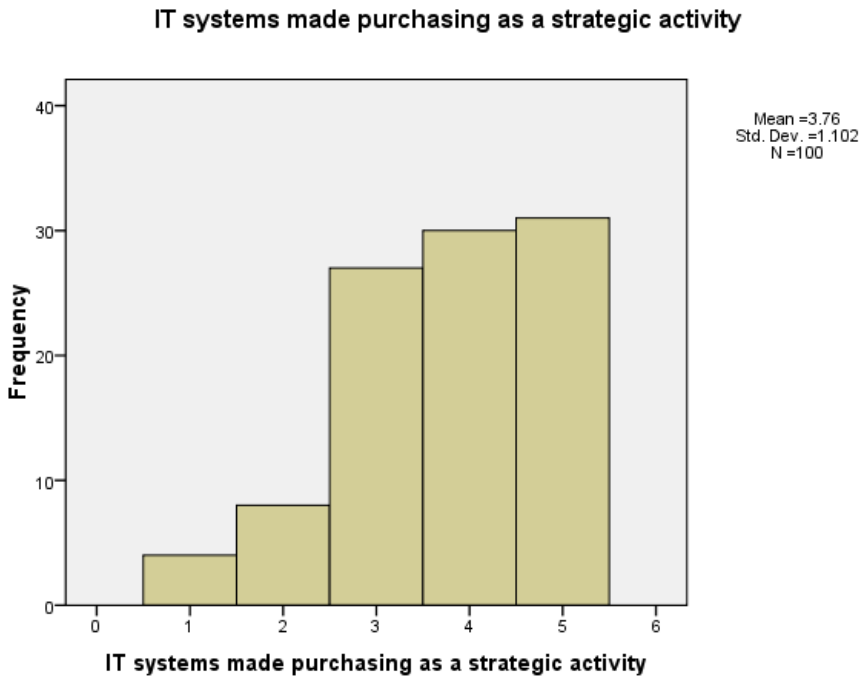
sharing with suppliers.



IT systems made purchasing as a strategic activity

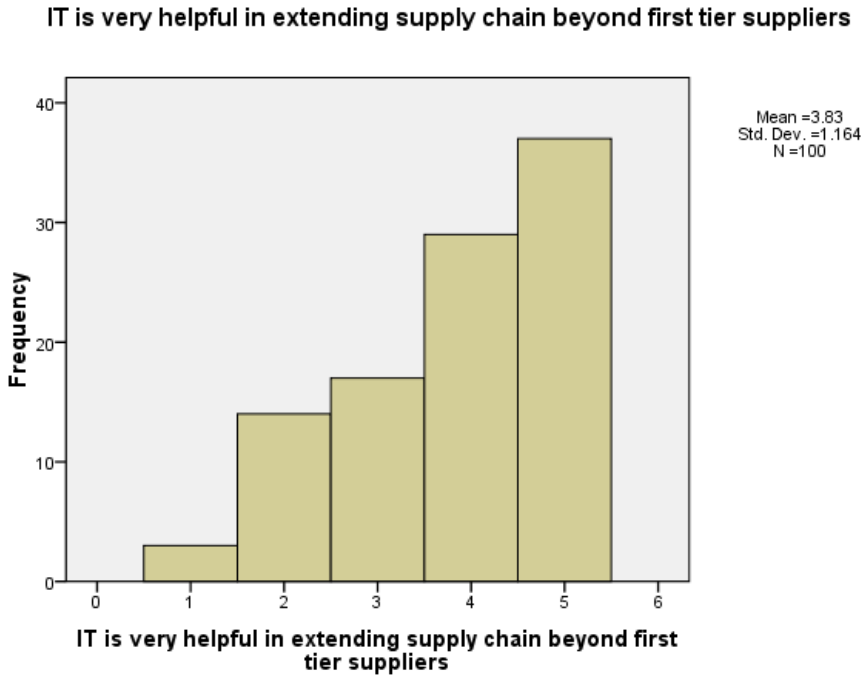
In response to question IT systems made purchasing as a strategic activity, it was found that there were 31% participants that responded with strongly agree, 30% simply agreed with the fact that IT systems made purchasing as a strategic activity. Around 27% f the participants remained with an undecided opinion. A small number of participants disagreed, out of which 8% just disagreed and 4% strongly disagreed with the fact that IT systems made purchasing as a strategic activity. Therefore, majority of the participants of the study agreed with the fact that IT systems made purchasing as a strategic activity. Outcomes of the descriptive statistics for IT systems made purchasing as a strategic activity can be observed in the table 9 of the data analysis. The following chart allows us to identify and visually compare the outcomes of the response of IT systems made purchasing as a strategic

activity.



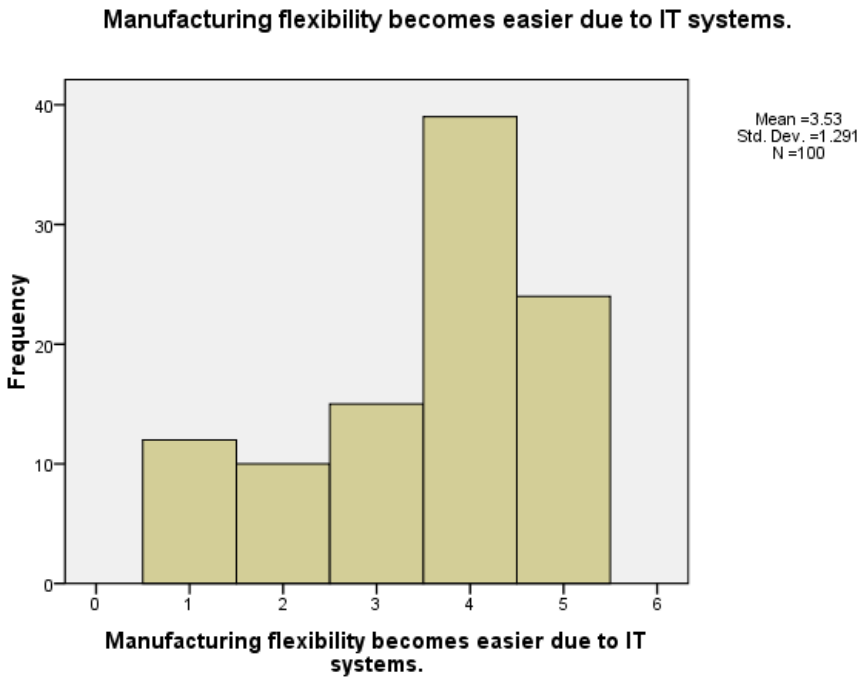
IT is very helpful in extending supply chain beyond first tier suppliers

The response to the question depicts positive outcomes. Results shows that there were 37% participants that strongly agreed, 29% simply agreed, 17% remained undecided, 14% disagreed and 3% strongly disagreed for the fact that IT is very helpful in extending supply chain beyond first tier suppliers. Therefore, majority of the participants supported the idea. Outcomes of the descriptive statistics for the question can be observed in the table 10 of the data analysis. The following chart allows us to identify and visually compare the outcomes of the response that IT is very helpful in covering SC beyond first tier suppliers.



Manufacturing flexibility becomes easier due to IT systems

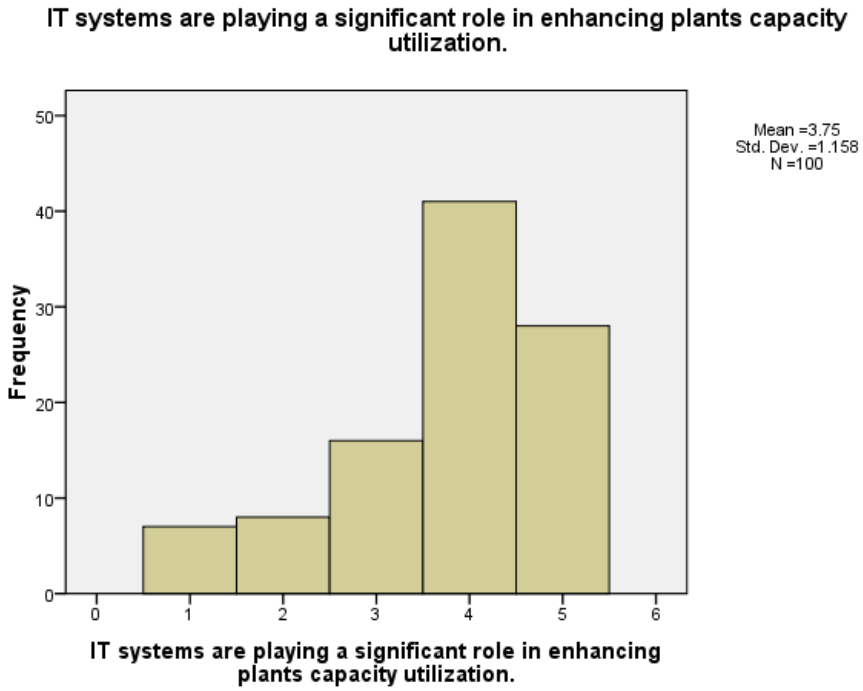
In response to question that manufacturing flexibility becomes easier due to IT systems, it was found that there were 24% participants that responded with strongly agree, 39% simply agreed with the fact that manufacturing flexibility becomes easier due to IT systems. Around 15% f the participants remained with an undecided opinion. A small number of participants disagreed, out of which 10% just disagreed and 12% strongly disagreed with the fact that manufacturing flexibility becomes easier due to IT systems. Therefore, majority of the participants of the study agreed with the fact that manufacturing flexibility becomes easier due to IT systems. Outcomes of the descriptive statistics for manufacturing flexibility becomes easier due to IT systems can be observed in the table 11 of the data analysis. The following chart allows us to identify and visually compare the outcomes of the response of question that manufacturing flexibility becomes easier due to IT systems.



IT systems are playing a significant role in enhancing plants capacity utilization

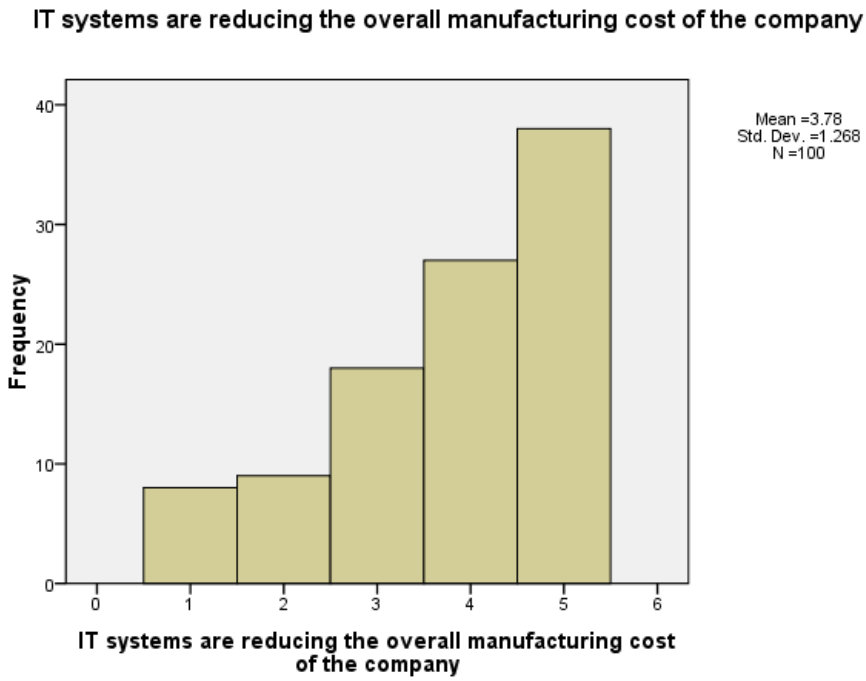
In response to question that IT systems are playing a significant role in enhancing plants capacity utilization, it was found that there were 23% participants that responded with strongly agree, 32% simply agreed with the fact that IT systems are playing a significant role in enhancing plants capacity utilization. Around 18% f the participants remained with an undecided opinion. A small number of participants disagreed, out of which 17% just disagreed and 10% strongly disagreed with the fact that IT systems are playing a significant role in enhancing plants capacity utilization. Therefore, majority of the participants of the study agreed with the fact that IT systems are playing a significant role in enhancing plants capacity utilization. Outcomes of the descriptive statistics for IT systems are playing a significant role in enhancing plants capacity utilization can be observed in the table 12 of the data analysis. The following chart allows us to identify and visually compare the outcomes of

the response of IT systems are playing a significant role in enhancing plants capacity utilization.



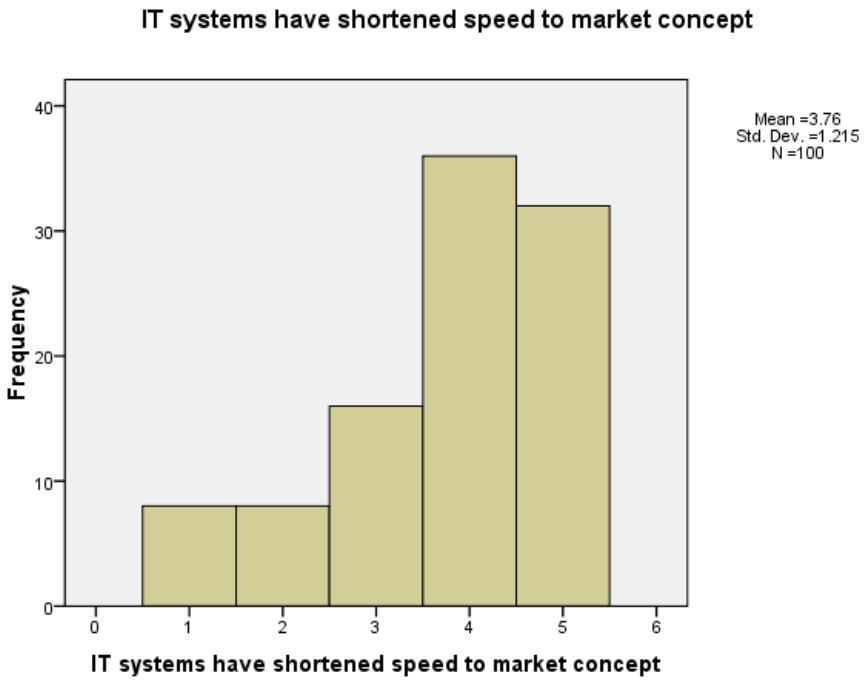
IT systems are reducing the overall manufacturing cost of the company

In response to above given question, it was found that there were 38% participants that responded with strongly agree, 27% simply agreed with the fact that IT systems are reducing the overall manufacturing cost of the company. Around 18% f the participants remained with an undecided opinion. A small number of participants disagreed, out of which 9% just disagreed and 8% strongly disagreed, Therefore, majority of the participants of the study agreed with the fact. Outcomes of the descriptive statistics is can be observed in the table 13 of the data analysis. The following chart allows us to identify and visually compare the outcomes of the response of IT systems are reducing the overall manufacturing cost of the company.



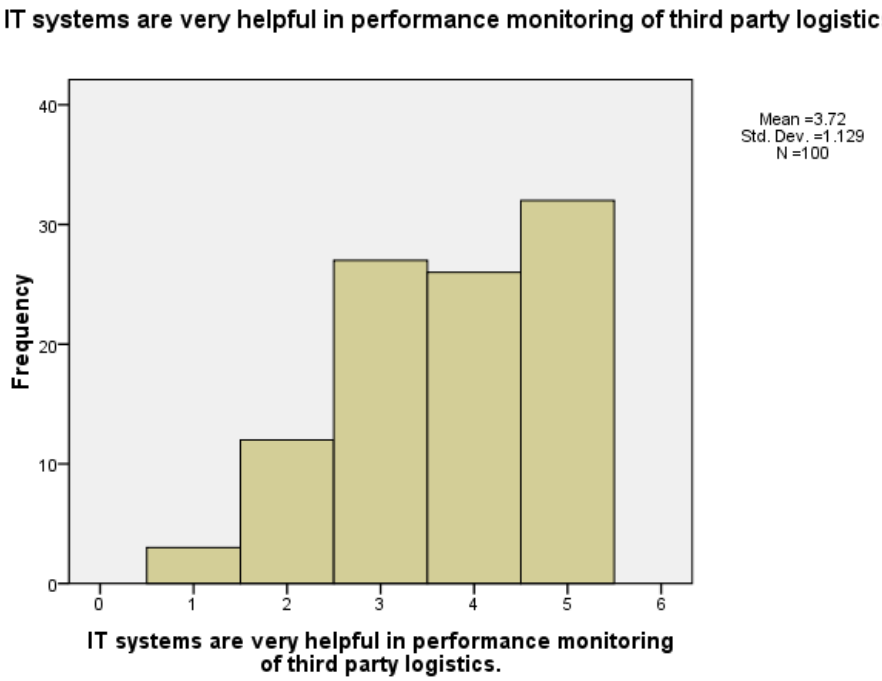
IT systems have shortened speed to market concept

The response to the question that IT systems have shortened speed to market concept depicts positive outcomes. Results shows that there were 32% participants that strongly agreed, 36% simply agreed, 16% remained undecided, 8% disagreed and 8% strongly disagreed for the fact that IT systems have shortened speed to market concept. Therefore, majority of the participants supported the idea that IT systems have shortened speed to market concept. Outcomes of the descriptive statistics for IT systems have shortened speed to market concept can be observed in the table 14 of the data analysis. The following chart allows us to identify and visually compare the outcomes of the response that IT systems have shortened speed to market concept.



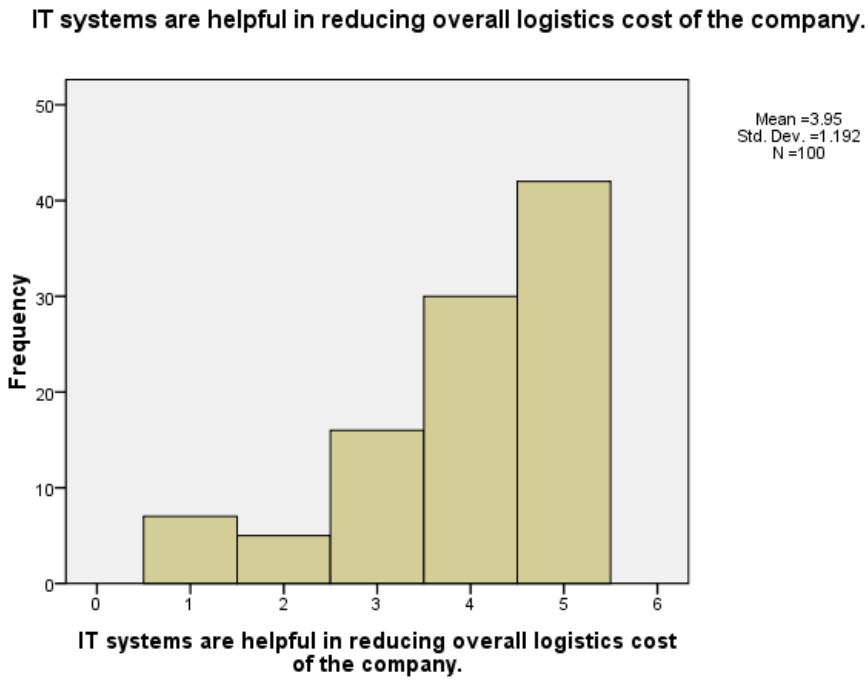
IT systems are very helpful in performance monitoring of third party logistics

In response to above given question, it was found that there were 32% participants that responded with strongly agree, 26% simply agreed with the fact that IT systems are very helpful in performance monitoring of third party logistics. Around 27% of the participants remained with an undecided opinion. A small number of participants disagreed, out of which 12% just disagreed and 3% strongly disagreed with the fact. Therefore, majority of the participants of the study agreed with the fact. Outcomes of the descriptive statistics of the question can be observed in the table 15 of the data analysis. The following chart allows us to identify and visually compare the outcomes of the response of question.



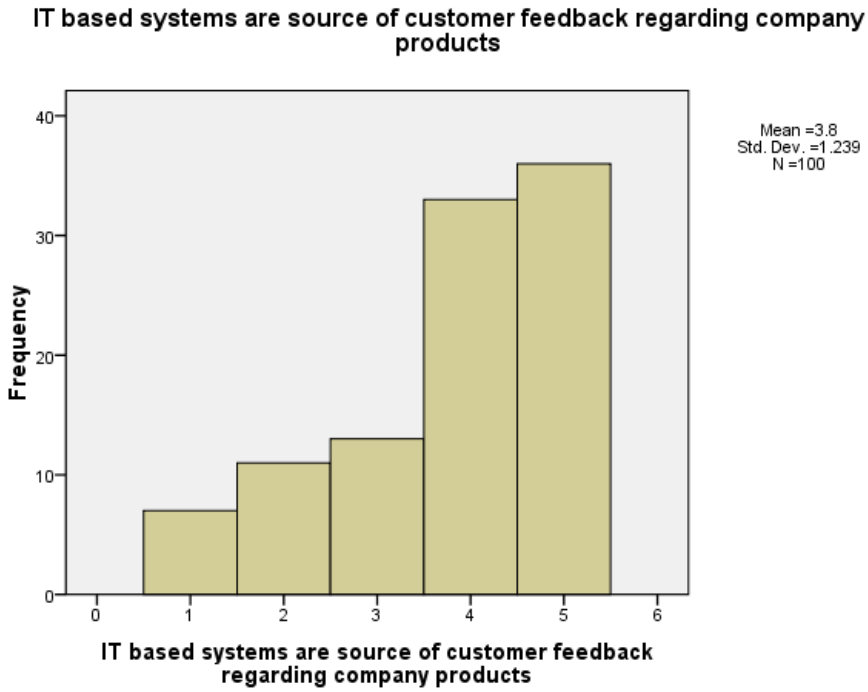
IT systems are reducing the overall logistics cost of the company

In response to above given question, it was found that there were 42% participants that responded with strongly agree, 30% simply agreed with the fact that IT systems are reducing the overall logistics cost of the company. Around 16% f the participants remained with an undecided opinion. A small number of participants disagreed, out of which 15% just disagreed and 7% strongly disagreed with the fact. Therefore, majority of the participants of the study agreed with the fact. Outcomes of the descriptive statistics of question is can be observed in the table 16 of the data analysis. The following chart allows us to identify and visually compare the outcomes of the response.



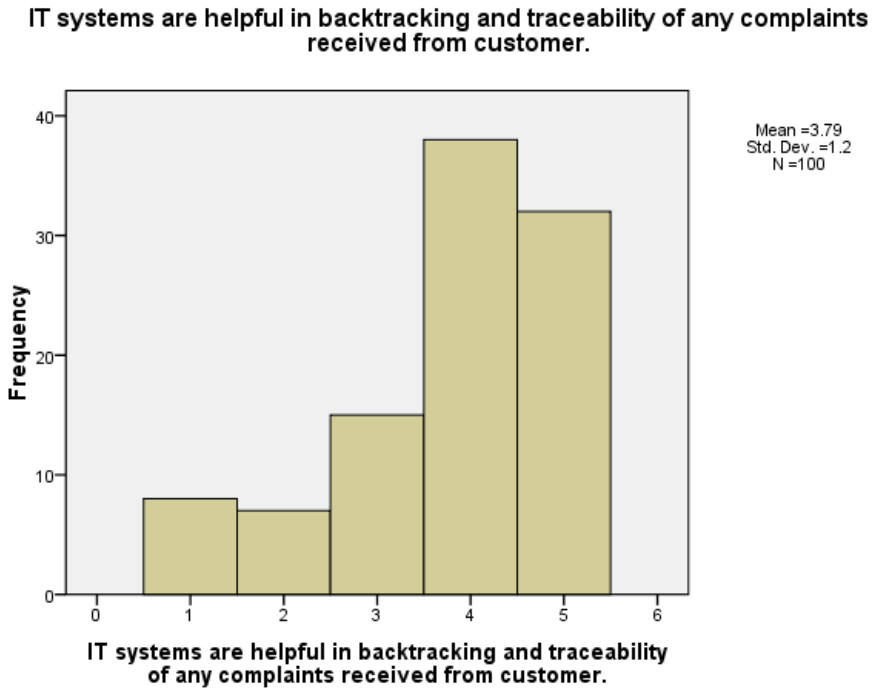
IT based systems are source of customer feedback regarding company products

In response to above given question, it was found that there were 36% participants that responded with strongly agree, 33% simply agreed with the fact that IT based systems are source of customer feedback regarding company products. Around 13% of the participants remained with an undecided opinion. A small number of participants disagreed, out of which 11% just disagreed and 7% strongly disagreed with the fact. Therefore, majority of the participants of the study agreed with the fact. Outcomes of the descriptive statistics for IT based systems are source of customer feedback regarding company products can be observed in the table 17 of the data analysis. The following chart allows us to identify and visually compare the outcomes of the response of question.



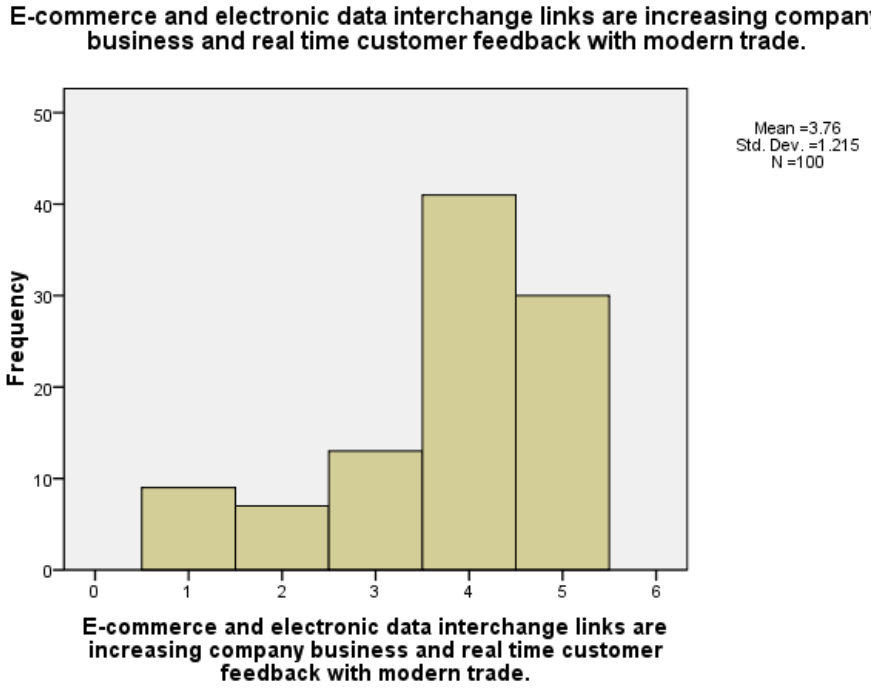
IT systems are helpful in backtracking and traceability of any complaints received from customer

The response to the question depicts positive outcomes. Results shows that there were 32% participants that strongly agreed, 36% simply agreed, 15% remained undecided, 7% disagreed and 8% strongly disagreed for the fact. Therefore, majority of the participants supported the idea. Outcomes of the descriptive statistics for IT systems are helpful in backtracking and traceability of any complaints received from customer can be observed in the table 18 of the data analysis. The following chart allows us to identify and visually compare the outcomes of the response.



E-commerce and electronic data interchange links are increasing company business and real time customer feedback with modern trade

The response to the question depicts positive outcomes. Results shows that there were 30 % participants that strongly agreed, 41% simply agreed, 13% remained undecided, 7% disagreed and 9% strongly disagreed for the fact. Therefore, majority of the participants supported the idea. Outcomes of the descriptive statistics is can be observed in the table 19 of the data analysis. The following chart allows us to identify and visually compare the outcomes of the response of question.


E-commerce and electronic data interchange links are increasing company business and real time customer feedback with modern trade.
Mean =3.76
Std. Dev. =1.215
N =100
Frequency
50
40
30
20
10
0
0
1
2
3
4
5
6
E-commerce and electronic data interchange links are increasing company business and real time customer feedback with modern trade.

Regression Analysis

Model Summary

Model	Change Statistics				
	R Square Change	F Change	df1	df2	Sig. F Change
1	.840	1.338	3	96	.002

a. Independent Variable: Information Technology

b. Dependent Variable: Supply Chain

In order to assess the relationship among the dependent variable (Manufacturing flexibility becomes easier due to IT systems) and various other independent variables (E-commerce and electronic data interchange links are increasing company business and real time customer feedback with modern trade, Integrated supply chain management across various functions a currently emphasized initiative in your organization, and ERP and IT based systems always play a pivotal role in forecasting & production scheduling), regression analysis is conducted. The outcomes of the regression analysis depicts that there is a significant relation among the dependant and independent variable with a value of significance less than 0.05. On the basis of regression outcomes presented in Data analysis, we can support the hypothesis of the study that IT tool Electronic Data Interchange is an effective enabler of supply chain performance.

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.619	3	2.206	4.938	.027[a]
	Residual	158.291	96	1.649		
	Total	164.910	99			

a. Predictors: Information Technology (EDI)

b. Dependent Variable: Supply Chain

The value of significance in following anova table was used to determine that if out conditional mean for the support of independent variable, i.e. manufacturing flexibility becomes easier due to IT systems is found to be relatively similar to other independent variable of the study. Briefly, it can be said that value of significance calculated via ANOVA helped us to identify that IT has a significant effect on supply chain management. Following ANOVA analysis depicts a significance value of .027. Since, .027 is less than 0.05. Therefore, we can conclude that there is a statistical significance that there is no significant difference between responses of the participants. Hence, we can conclude that IT plays a significant role in the maintenance and management of supply chain management via electronic data interchange.

CHAPTER 5: DISCUSSION & FINDINGS

The result of hierarchical regression analysis is performed in the data analysis of the study. Model 1, which only includes the control variables, only shows a significant positive relation b/w SCM and the level of implementation of IT, The utilization of internal IT has a significant effect on the success factor in supply chain management. These outcomes indicate that the utilization of internal IT has a postive relationship with the level of implementation of EDI in supply chain management. Indeed, the highest level of R-square is achieved with this latest model. These outcomes allow us to accept the hypothesis of the study.

As for the influence of the control variables, there emerges a clear impact, since both Electronic Data Interchange and the percentage of procurement costs significantly influence on performance improvement of EDI in supply chain management in all models tested.

The results of the study show that IT tools are exercising significant influence on the electronic integration with suppliers. Indeed, both isolated and jointly, the impact that external IT on electronic integration with suppliers is robust. However, the effect exerted by the internal IT tool Electronic Data Interchange is only significant when external IT tools are not controlled. Furthermore, the explanatory power of performance of supply chain management is much higher in the presence of Electronic Data Interchange than the performance of supply chain management without IT, as can be seen by the percentage of variance explained in the model. These results support the hypothesis of the study

The role of Electronic Data Interchange in the implementation of effective supply chain performance is a pitch that has not been adequately studied, because the little empirical evidence does not provide conclusive results about the influence of IT in the development

and implementation of supply chain practices. Similarly, there is little previous research that has studied the relationship between IT and supply chain when there adoption of IT practices, and so far have not yielding conclusive empirical results (Cagliano et al., 2006 , Ward and Zhou, 2006). This paper has provided empirical evidence showing, while external IT, by themselves, a direct relationship between the degree of use of IT and the level of implementation of Electronic Data Interchange is giving good support of supply chain performance. It has also identified a combined effect that shows that there is a strong relationship between internal IT and the implementation of Electronic Data Interchange for enhanced supply chain performance when external IT are introduced into the model, and in this case a significant negative association between external IT occurs and the implementation of Electronic Data Interchange in supply chain performance. Thus, our findings contradict, in part, (Ward and Zhou, 2006), as these authors find that both internal and external IT facilitates the use of Electronic Data Interchange in efficient supply chain management.

We have also found that the internal IT, despite its importance in internal efficiency, do not influence the electronic integration with suppliers. This finding agrees with the results found by (Cagliano et al., 2006). In our work, this result could be attributed to differences in the production processes of the companies analyzed. Thus, the degree of electronic integration with suppliers may be influenced by the use of deliveries Just in Time. It is also likely that the degree of internal use of IT depends on whether plants have capacities in product design or the importance of having manufacturing activities against the distribution.

CHAPTER 6: CONCLUSION & RECOMMENDATIONS

The findings of this study indicate that external IT can explain the degree of electronic integration with suppliers, which would complement the results of (Cagliano et al., 2006) to focus this exclusively on the impact of use of Electronic Data Interchange in efficient supply chain management.

It also shows that the internal information technology overshadow the result of external information technology on the implementation of effective enabler of supply chain performance. Thus, provided that the adoption of internal IT is high, the connection between external IT and effective enabler of supply chain performance is important and positive. This outcome implies that the greater investment in internal IT and less on external IT, will be the most progressive implementation of the practice of supply chain management.

These results are very interesting because they allow explaining the level of implementation of effective enabler of supply chain performance liable on the level of usage and type of information technology used. These outcomes are related to those found by (Boane and Ganesham, 2001), which indicate that the use of technology is the aspect that defines the relation b/w the implementation of ICT and effective productivity. Therefore, high level use of internal IT would give a higher level of productivity, Its due to be made in the level of implementation of Effective enabler of supply chain performance.

Furthermore, this paper does not integrate the supply chain as a whole is analyzed. However, we have not focused on the relationship of first-tier suppliers to manufacturer-and analyzed in other studies on the integration of the supply chain, but in the relationship between providers of first level to the second level, which is an extension of the analysis to

these agents in the chain. In this regard, we are aware of the limitations of not studying the entire chain, but we have focused on a part of it is important and little studied. On the other hand, we have only analyzed the transfer of information provider for the supervision and control of this as relevant to the integration of the supply chain factor. This includes other important dimensions that can be considered. However, recent studies in which this dimension is highlighted as one of the most relevant (Kim et al., 2006). Similarly, in this study we investigated the industry, and cannot advise that the results are universally applicable to different businesses and countries.

Indeed, a logical extension allowance of this work will be to replicate the empirical relationships identified in other contexts. Future work could also extend the analysis to all actors in the supply chain. It would also be interesting to test the identified relationships using larger sample sizes and multiple informants within each company. On the other hand, it would be used in future longitudinal methodology for the study of causality in the observed relationships, as the cross-sectional nature of the data handled not permit causal inferences. It would also be necessary to examine in the future the gap (or time delay) occurred between the time the company forward in the level of IT use, the type of information technology tools are actually used (internal v/s external) and progress the level of implementation of effective enabler of supply chain performance and electronic integration of the supply chain.

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Questionnaire

S.No	Questions	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
		5	4	3	2	1
1	Integration of supply chain management through IT is an essential part of our organization's business practices					
2	Integrated supply chain management across various functions a currently emphasized initiative in your organization.					
3	IT tools are very supportive in crafting demand and supply planning strategies					
4	IT tools are helpful in implementing vendor managed inventory system					
5	ERP and IT based systems always play a pivotal role in forecasting & production scheduling					
6	IT based systems are playing a great role in real time information sharing with suppliers					
7	IT systems made purchasing as a strategic activity					
8	IT is very helpful in extending supply chain beyond first tier suppliers					
9	Manufacturing flexibility becomes easier due to IT systems.					
10	IT systems are playing a significant role in enhancing plants capacity utilization.					
11	IT systems are reducing the overall manufacturing cost of the company					
12	IT systems has shortened speed to market concept					

13	IT systems are very helpful in performance monitoring of third party logistics.					
14	IT systems are helpful in reducing overall logistics cost of the company.					
15	IT based systems are source of customer feedback regarding company products					
16	IT systems are helpful in backtracking and traceability of any complaints received from customer.					
17	E-commerce and electronic data interchange links are increasing company business and real time customer feedback with modern trade.					