# Pharmaceutical Supply Chain Risk

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**Abstract-- This study will talk about about the assessment of supplier risks within a purchase department of pharmaceutical industry of Karachi, Pakistan with the aim to study how it is possible to efficiently manage these supply chain risks and to present an appropriate method for the purchase departments. Pharmaceutical supply chain is a major element of the healthcare system in supply of drugs, mainly in countries where major medicins are provided by national pharmaceutical companies. No any previous studies assess risks and problems in pharmaceutical companies during analysing the pharmaceutical supply chain risk specially supplier side risk. Any risks affecting the pharmaceutical companies could disturb supply of medicines and healthcare system effectiveness. These procurement risks disturb the supply of medicine in many ways like their quantity and quality and their delivery to the right place and customers and at the right time. Therefore risk identification in the supply process of pharmaceutical companies and manage them is highly recommended. The goal of this study was the risk identification of supply chain in pharmaceutical industry in Karachi, Pakistan considering process's precedence, risk and chances of risks.**

Keywords: Pharmaceutical supply chain, Risk assessment, risk management , procurement risk, method, Pakistan Pharmaceutical Industry

## CHAPTER :01

## INTRODUCTION:

In todays world pharmaceutical companies face variety of risks.although the pharmaceutical sector is one of the leading sector in the world.the pharmaceutical industry is not protected to the massive number of risks that hinder its way to compete in the world,powerful competition for land ,government regulations and strong demand of medicines .on the other hand ,pharmaceutical industry face huge number of risk during purchasing of raw material which effect the supply of product .the risk in pharmaceutical is same as face by other countries like textile industries and other sectors .inspite of that there is also a risk of fire ,machinery breakdown ,natural disasters,liabilities ,inventory risks,regulatory risk,marketing risk and patent expirations of medicines.

Pharmaceutical companies need to provide medicines in the right quantity, with the adequate quality, to the right place and to right customers, at the right time and with best possible cost to be reliable with healthcare system objectives . Any risks disturbing the pharmaceutical supply chain process, not only can desecrate the assets but also can intimidate the patients' life by hinder access to medicines . Risk management is not only important in the pharmaceutical supply chain, but also is a major player in other aspects of pharmaceuticals such as prescription and uses of medicine . assess and implementing the strategies to manage the risks in pharmaceutical supply chain is important in healthcare systems

Referring to International Conference on Harmonization (ICH) definition; risk evaluation is defined as "A systematic process of organizing information to support a risky decision to be made within a risk management process. It consists of the identification of hazards and the analysis and evaluation of risks associated with exposure to those hazards."

## CHAPTER:02

## LITERATURE REVIEW

It is commonly acknowledged that the literature review provides an accepting of the issues
Closely related to the research topic. It also helps to justify the research under study and to
find out the knowledge gap in the respective field. A number of books, articles, reports, websites on pharmaceutical supply chain risk have been studied for this research work

As opposed to the above proposed hypothesis, a null hypothesis is also proposed that states:
H 0: There is no link between pharmaceutical supply chain risk and supply of medicines.

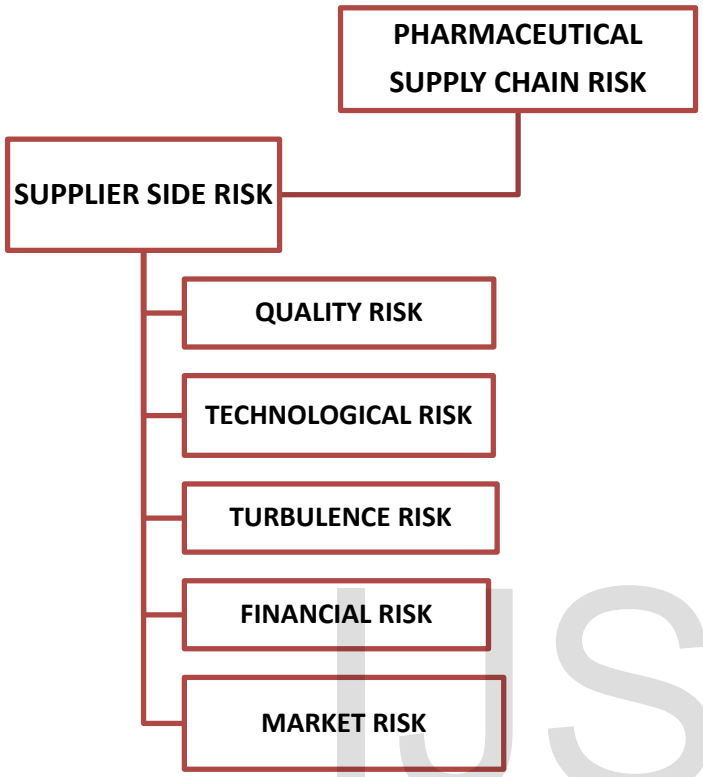



**FIG 2.1 PHARMACEUTICAL SUPPLY CHAIN RESEARCH MODEL**

The above mentioned study basically focused on pharmaceutical supply chain risk and mainly supplier and supply risk which causes hindrance in the smooth flow of supply chain processes in pharmaceutical industry of Karachi Pakistan.researcher need to find out the gaps and primarly analyase gaps in procurement process .
Therefore, in order to contribute to find out the risks, following hypothesis is proposed:

H1: Pharmaceutical Supply Chain Risk (procurement risk) in Karachi, Pakistan can effect and disrupt the efficiency of supply chain process and supply of medicine to the consumers.

**2.1PHARMACEUTICAL SUPPLY CHAIN**

Supply chain includes development of product /information / capital to fulfill customer Requirements and comprises of different elements - manufacturers and suppliers, transporters, stockrooms, retailers and partners. The pharmaceutical supply chain is to some extent unique in relation to the next supply chains of physical good on account of its need, importance, and transportation security, instruction and so forth.

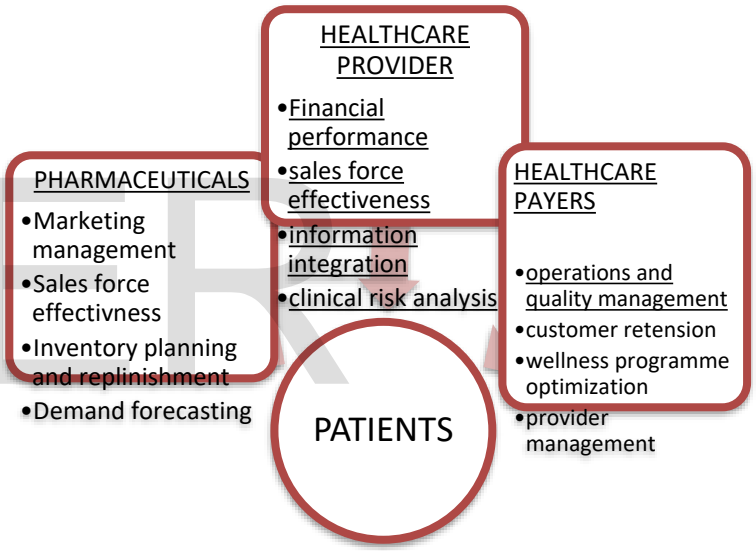



FIG.2.2 PHARMACEUTICAL SUPPLY CHAIN **(**Kapoor D1*, Vyas RB1 and Dadarwal D2, 2018)

**2.2PHARMACEUTICAL SUPPLY CHAIN RISKS**

Access to drugs is a human right, and one of the prime worries of the healthcare systems. The supply chain network interfacing pharmaceutical industry is a prime piece of the health care in appropriating medications to the network. Supply chain risk can squander assets also As crumble PSC execution. Accordingly, legitimate ID and examination of hazard are valuable in planning systems to limit the dangers in the PSC (Adam, 2013; Hulbert et al., 2008; Jaberidoost et al., 2013). Hazard the board in the pharmaceutical business setting is getting expanded consideration. Since medication items are significantly controlled things and comes under the authenticity of open

administrative specialists (Craighead et al., 2007; O'Connor et al. 2016). In addition, supply of drugs includes higher more vulnerabilities and vulnerabilities due to monetary, social and political shakiness in creating nations.
Overseeing dangers in supply chains can prompt superior exhibitions and can decrease store network powerlessness and vulnerabilities through reasonable plans and techniques (Breen, 2008; Mangla et al., 2015a). Analysts recommended that for hazard the board, associations ought to pursue a formal structure which encourages them to distinguish store network chance, measuring hazard lastly diminishing chance (Frosdick, 1997; Khan and Burnes, 2007; Mangla et al., 2016).

## 2.3PROCUREMENT RISKS

The combination of the probability of occurrence of harm and severity of that harm is risk. Risk Management has now become a fundamental piece of each part of business tasks. Most organizations are sick arranged to deal with the rising risk levels, brought about by additional worldwide and complex stockpile chains that are expanding provider disturbances, coordination's deferrals, and item reviews and security issues. Globalization and the mission forever cost successful methods for supply have significantlyexpandedtheunpredictability of the store network which can regularly diminish both the information and comprehension of the introduction to hazard.
Expanding risk because of rivalry, quality concerns, and shortage of regular assets are significant worries for supply chain supervisors. So as to protect business tasks from flighty, wild occasions that can possibly hamper material stockpile, creation and circulation, increasingly more production network supervisors are turning towards chance administration in SCM. The executives of hazard over the production network is critical to business sustenance what's more, proceeded with productivity. Hazard Management can assist associations with shielding the quality and supply of item to clients and at last the end client. It is tied in with foreseeing risks and controlling hazard through a progressing procedure of hazard mindfulness, decrease what's more,/or acknowledgment, and survey. The pharmaceutical industry in certain faculties might be viewed as exceptional in that as it has a fiducial duty in the board and generation capacities. The expressed objectives of the pharmaceutical industry are to make items with the most elevated quality, security and viability, at the most reduced conceivable expense. In request to accomplish these objectives the business needs to concentrate on destroying dangers in each progression of the store network process.
Supply chain risk management is another and novel approach that catches both the activities just as themoney related parts of basic leadership. Store networkthe executives, when all is said in done, is as yet a moderately new idea inmost creating nations, all the more so in India; and numerousorganizations have not started to think about the formal
the board of their inventory network.

### 2.3.1.SUPPLY SIDE RISK

These are risk that might influence or disturb the supply of products that the pharmaceutical supply chain offer its clients. Our investigation uncovers that the pharmaceutical supply chain might be influenced by the accompanying supply risk:

#### 2.3.1.1 TURBULENCE RISKS:

The organization imports its crude materials from various nations including China, Japan, Germany and so forth. The imports are exposed to vacillation because of different reasons. There could be delay in appearance of vessel/trip at goal port, delay in Customs, and postponement in development of payload or giving over of load to customs or postponement in preparing records because of framework mistake at Seaport/Airport. Too certain occasions, because of constant occasions, strike by workers customs may postpone clearances.The relief system recommended is to ensure the organization represents this time from their past
encounters and book their provisions a piece ahead of time with adequate lead time to defeat this deferral.

#### 2.3.1.2. QUALITY RISK

Certain crude materials are seen as of mediocre quality. These raw materials could be either the import items or the privately purchased items. Since the pharmaceutical items legitimately influence the lives of individuals, the organization can't stand to engage supplies with second rate quality. The alleviation system embraced is foundation of exclusive requirementquality conventions and severe authorization of these guidelines. Seller reviewing ought to be done routinely following very severe proportions of checking. Usage of Statistical quality control will improve the consistency and step towards six sigma usage.

#### 2.3.1.3. Non-accessibility of assets

- Raw Materials

The primary provider could all of a sudden become inaccessible due to different reasons, for example, inside administration issues; powerlessness to fulfill excellent guidelines, providers going out of business, breaking down of hardware and so forth, in such a circumstance the organization would confront a deficiency of crude material

supply. The moderation technique received is to have optional providers give the vital crude material to meet request when required. For instance the organization needs to have interchange providers for the distinctive crude materials.

- Packaging supplies

Bundling materials are an essential piece of the wrapped up item. Each organization has its own structure for the bundling materials, for example, bottles, and so forth and can not to bear to settle on quality. If there should arise an occurrence of loss of provider of the pressing materials, a substitution fulfilling the explicit needs absent a lot of bargain on quality is hard to discover. To handle this hazard we propose the organization to share a decent affinity with the bundling material provider, brief settling of bills and furthermore having satisfactory stock since it's to aenormous degree a durable product.

**2.3.1.4. Catastrophic events**

Abrupt event of cataclysmic events, for example, floods, seismic tremors could disturb supply. The alleviation procedures include understanding the powerlessness focuses and their effect in the inventory network and creating and testing emergency courses of action. For Example the organization faces a danger of losing key supplies during the storm season in India, since a large portion of the vehicle is by street. Additionally the ongoing wave in Japan has influenced the organization.

**2.3.1.5. Human -Made Disasters**

The significant wellspring of man-made calamities that could disturb the stockpile is psychological warfare. Provincial revolt in certain parts of India prompts delay or now and again even the loss of supply. These are low recurrence occasions, political meetings and fights could likewise prompt postponement in the stock.

**2.3.1.6. Determination of Supplier**

The determination of provider by the organization for its crude materials isn't just founded on the expense and quality yet in additionon different variables. One main consideration influencing the determination of provider is the life of the crude material. Since pharmaceutical items particularly the tablets and syrups have a short item life it is required to purchase the crude material which can give a more noteworthy life expectancy. The obtaining of the ideal crude material requires broad research with respect to the organization.

**2.3.1.7. Cost Risk (FINANCIAL RISK)**

The fundamental explanation behind cost dangers remember the expansion for cargo charges because of increment in fuel costs. The expansion in government charges/obligation will likewise affect the expenses of provisions. At the point when the expense of generation of crude material/bundling material expands, the cost hazard increments. One other explanation for increment in the cost supplies is because of the expansion in request of provisions.

The probability of exit costs is higher than expected or intended (with or without contract protection).Such risks can be triggered by an abrupt or unfavorable change in exchange rates or by the failure of a manufacturer. Among the common examples of financial risks are budget overruns, inadequate funds and positive changes.

**2.3.1.8.MARKETING RISK**

Marketing related risk in procurement are most link to demand of products and also consumer requirement according to consumer demand manufacturer need raw material from suppliers.

**2.3.1.9. TECHNOLOGICAL RISK**

Information technology is essential and key to success in pharmaceutical supply chain flow
because it is the base on which supply chain process implement communications.
They are forced to make assessments blindly. The company should use any Enterprise based software (ERP) system. We suggest use of ERP software such as SAP and ORACLE to increase productivity. They provide transactional tracking and high visibility of information from within a company. This helps the company to improve the quality of its Operating decisions and improve the supply chain of pharmaceuticals.

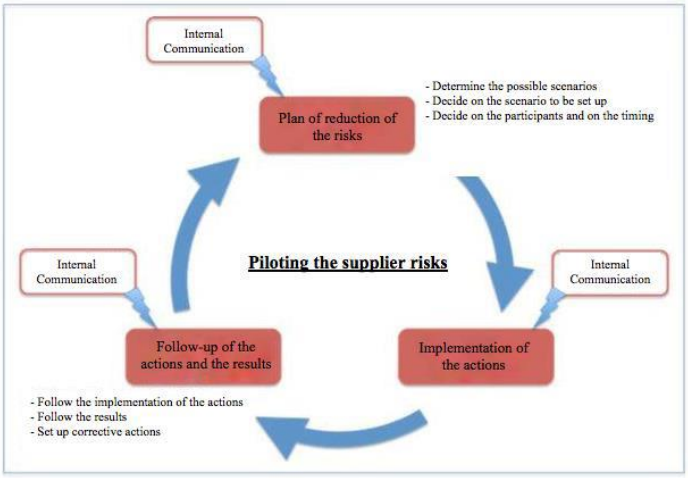



Figure.2.3 Piloting the risks. (Hassid, 2008)

## CHAPTER:03

## RESEARCH METHODOLOGY

### 3.1Research design:

Quantitative research design in which experiments are performed while using traditional mathematics and statistical measures toproduce conclusive results. Most of the scientists felt a need where a study should be justifiedandanalysed using scientific and statistical methods while using a standard format with minorinter-disciplinary differences . The development and testing of hypotheses can becarried out using different experiments therefore it is important to include control groups. The use of quantitative will help the researcher to finalise the results by approving or disapprovingthe hypothesis .The current study will use quantitative method and quantitative method is use to collect ,analyse and integrate data to get better and valid results.

### 3.2Sampling

Sampling refers to identifying a set of members of the target population that can be used as representative of the entire target population. The researcher collects data from sample participants and then conducts entire study design by using that data. The results and conclusions drawn from sample data are considered to be applicable to the entire target population . Sampling techniques are broadly categorised into probability and non-probability sampling. In probability sampling, the researcher needs to ensure that every member of the target population has equal opportunity or chance to participate in the study and become a member of a representative sample, but in case of non-probability sampling technique, there isno such requirement .Therefore, for thequantitative research, this research utilises the jugdemental sampling strategy in order to keep in mind to get information about specific catagories of people. Judgment samplingis honorable in providing detailed knowledge on difficulties in making the distinction.A random sample would be less biase.The breakdown of this method is important as any nonrandom sample brings into question bias, which restricts the forms of statistical analysis that you can actually carry out, and there are substantial limits to a researcher ability to select a best sample.Respondent of this study will be about 52 Respondents. This study of procurement risk based on who are working in the pharmaceutical industries of Karachi pakistan.

### 3.3Risk management

Risk the board is fundamental for all means in the obtainment process. To effectively complete hazard the board the accompanying moves must be made: Distinguish risk in advance and remember them for a

Guide

- Allocate risk: who is liable for which risk?
- Mitigate risk heretofore however much as could be expected
- what's more, make the most of the chances
- Monitor chances by utilizing the Roadmap
- Take activity if there should arise an occurrence of risk and openings

### 3.4Procurement Strategy in the Pharmaceutical Industry

Procurement is a key function in ensuring that its corporate goals are met.Although Procurement is an organization support function, it is a core function and essential to improving the delivery of the program / project.Procurement is part of the process of achieving project results for production.Therefore, in the sense of programs and initiatives, all procurement activities are presented.

Acquiring and improving those managerial skills, techniques, and including procurement risk management, procurement strategies creation, and procurement preparation is therefore a managerial discipline in this role.

The key benefit strategy of procurement risk assessment, procurement methods implementation and procurement preparation therefore act as a bridge to fill the gap between system and operations.We are also important for implementation of the system.Joint preparation between program and early procurement, good communication flow, understanding of procurement conditions, business awareness and associated risks, live process with organized revisions and feedback mechanisms are therefore effective criteria in procurement.

The procurement planning system is very important for the understanding of the researcher to meet the requirement of production demand and to achieve marketing objectives and to save the risk and lack of availability of quality products production and marketing respectively.Therefore, the implementation of procurement with the strategies should be gradually improved

## CHAPTER:04

## RESULTS AND FINDINGS

The chapter of results and findings has provided empirical information based on the
analysis conducted on SPSS, which reflected the opinions of the participants regarding the risk of pharmaceutical supply chain ( procurement risk) along with their strategies and approaches for rsk management. This chapter is of significant importance, as it has presented the results ofthe data obtained via questionnaire froma total of 54 respondents.

Reliability and Validity:

The first statistical test that was conducted was to assess the internal reliability of the research instrument, since it has generally been argued that if the research instrument has lower level of internal consistency; it may fail to provide the researcher with relevant data. Considering this particular aspect, Cronbach's Alpha test was conducted to investigate into the internal consistency of the instrument, which in this case was a questionnaire that was adopted from previous studies. The first element in the Cronbach's Alpha test is that of the case processing summary that provides information about the number of valid observations, and the observations that have been excluded from the test. The statistical test confirmed that all of the observations have been considered valid, and there was no particular observation that was excluded from the test. This can be further illustrated through the following Table

4.1Summary

| | | N | % |
|---|---|---|---|
| Cases | Valid | 54 | 100.0 |
| | Excluded[a] | 0 | .0 |
| | Total | 54 | 100.0 |

Once it was confirmed that all the observations were valid, the next test was to evaluate
the internal consistency of the items in the questionnaire. The alpha value for the 34 item
questionnaire had an alpha value of 0.81, which meant that the questionnaire and its items hadrelatively higher internal consistency, since the value was greater than 0.70. This leads to an understanding that 34-item questionnaire can provide valuable information regarding the constructs being investigated within this research. The results of Cronbach's Alpha are presented in the following Table

**4.2Reliability Statistics**

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
|---|---|---|
| .812 | .821 | 34 |

**4.3Findings**

The findings of this research has been divided into different sections of 1)descriptive statistics, 2) frequency analysis. Each of these sections have offered some valuable insights about the constructs beinginvestigated, which makes each section to be of significant importance.

**4.4Descriptive Statistics**

Descriptive statistics was also conducted to know more about the da make rational decisions from the findings. The data collected via the after the coding process led to the following findings;

**4.5Scale Statistics**

| Mean | Variance | Std. Deviation | N of Items |
|---|---|---|---|
| 77.4074 | 169.001 | 13.00003 | 34 |

**4.6Frequency Analysis**

This particular section has presented information about the individual responses of the
participants, and the analysis of individual questions can be worth discussing. The findings of the frequency analysis are divided into the variables of procurement risks.

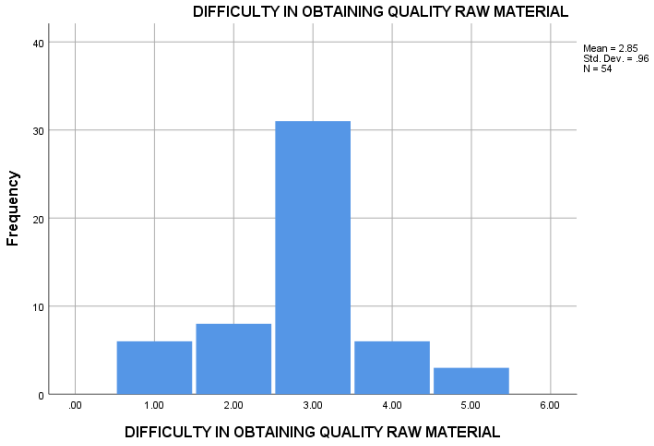
### PHARMACEUTICAL SUPPLY CHAIN RISK:

**QUALITY RISKS:**

1. **DIFFICULTY IN OBTAINING QUALITY RAW MATERIAL**

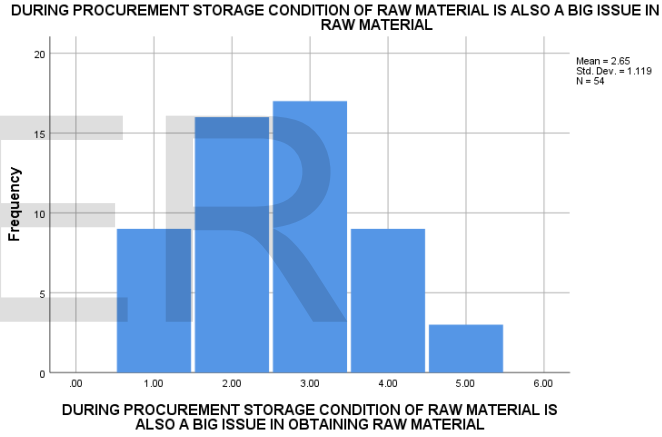
| | F | % | Valid % | Cumulative % |
|---|---|---|---|---|
| ALWAYS | 6 | 11.1 | 11.1 | 11.1 |
| QUITE OFTEN | 8 | 14.8 | 14.8 | 25.9 |
| SOMETIMES | 31 | 57.4 | 57.4 | 83.3 |
| RARELY | 6 | 11.1 | 11.1 | 94.4 |
| NEVER | 3 | 5.6 | 5.6 | 100.0 |
| Total | 54 | 100.0 | 100.0 | |

Above Table has presented the findings of the 1 st question that inquired the participants about the difficulty in obtaining raw material from suppliers. The analysis helped in understanding that 31 participants face this situation sometimes with the statement. However, only 3 participants never face this problem, and 6 participants always face this problem and 6 participents rarely face this issue the remaining 8 participants quite often face this problem.hadConsidering the findings, the statistics confirm that the purchaser sometimes face this issue and this is not a critical risk.




## 2. DURING PROCUREMENT STORAGE CONDITION OF RAW MATERIAL IS ALSO A BIG ISSUE IN OBTAINING RAW MATERIAL

| | F | % | Valid % | Cumulative % |
|---|---|---|---|---|
| ALWAYS | 9 | 16.7 | 16.7 | 16.7 |
| QUITE OFTEN | 16 | 29.6 | 29.6 | 46.3 |
| SOMETIMES | 17 | 31.5 | 31.5 | 77.8 |
| RARELY | 9 | 16.7 | 16.7 | 94.4 |
| NEVER | 3 | 5.6 | 5.6 | 100.0 |
| Total | 54 | 100.0 | 100.0 | |



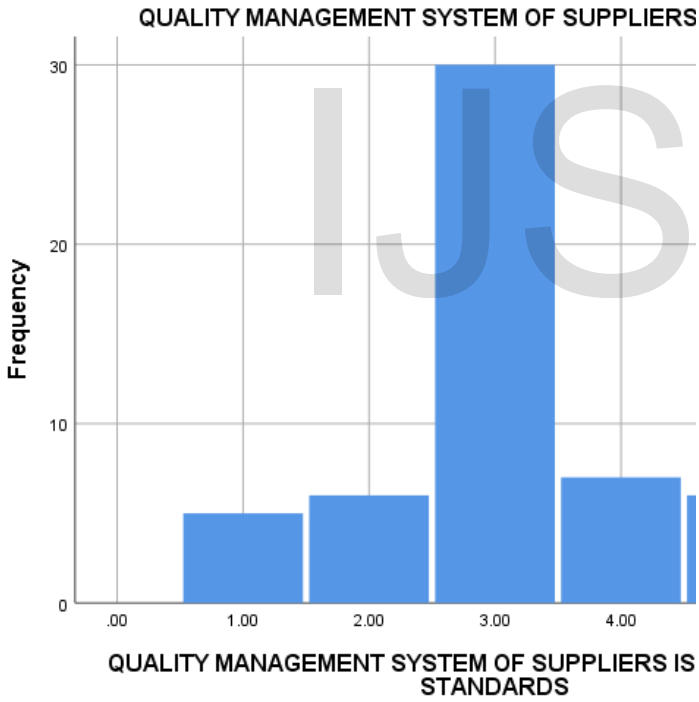

Above Table has presented the findings of the 2 nd question that inquired the participants aboutthestorage condition of raw materials is not according to the standards . The
analysis helped in understanding that 17 participants sometimes face this issue , and this
statement was further supported by 16 participants who selected the frequency of quite often.However, only 3 participants had never face this issue, 9 participants rarely and 9 participants always face this problem.

## 3. QUALITY MANAGEMENT SYSTEM OF SUPPLIERS IS NOT UP TO THE STANDARDS

| | F | % | Valid % |
|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| ALWAYS | 5 | 9.3 | 9.3 | |
| QUITE OFTEN | 6 | 11.1 | 11.1 | |
| SOMETIMES | 30 | 55.6 | 55.6 | |
| RARELY | 7 | 13.0 | 13.0 | |
| NEVER | 6 | 11.1 | 11.1 | |
| Total | 54 | 100.0 | 100.0 | |

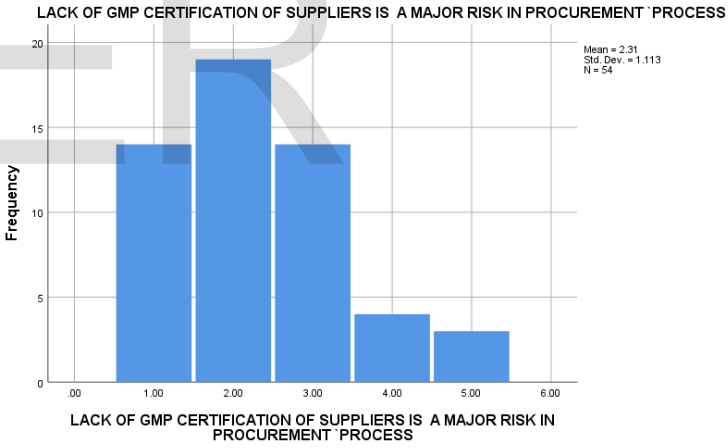
Above Table 10 shows the findings of the 3 rd question that inquired the participants about
the importance of quality management system of suppliers, and it is very critical. The analysis helped in understanding that 30 participants sometimes face this issue and 6 participants quite often face this issue and 6 participants never face this problem, 7 participants rarely face this issue. However, only 5 participants had never face this issue.




**4. LACK OF GMP CERTIFICATION OF SUPPLIERS IS A MAJOR RISK IN PROCUREMENT `PROCESS**

| | F | % | Valid % | Cumulative % |
|---|---|---|---|---|
| ALWAYS | 14 | 25.9 | 25.9 | 25.9 |
| QUITE OFTEN | 19 | 35.2 | 35.2 | 61.1 |
| SOMETIMES | 14 | 25.9 | 25.9 | 87.0 |
| RARELY | 4 | 7.4 | 7.4 | 94.4 |
| NEVER | 3 | 5.6 | 5.6 | 100.0 |
| Total | 54 | 100.0 | 100.0 | |

Above Table has presented the findings of the 4 th question that inquired whether the
participants believed that GMP certification of supplier is very necessary and if they are not certified so it is a big issue.The analysis helped in understanding that 19 participants quite often face this issue and 14 participants support this statement that they always face this issue and 14 participants sometimes face this problem of certification. However, only 4 participants rarely and 3 participants never had this problem.



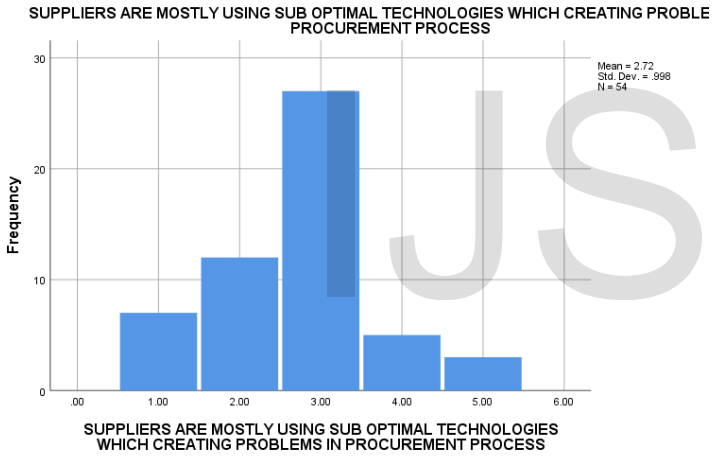

**TECHNOLOGICAL RISK**

**1. SUPPLIERS ARE MOSTLY USING SUB OPTIMAL TECHNOLOGIES WHICH CREATING PROBLEMS IN PROCUREMENT PROCESS**

| | F | % | Valid % | Cumulative % |
|---|---|---|---|---|
| ALWAYS | 7 | 13.0 | 13.0 | 13.0 |

| | | | | |
|---|---|---|---|---|
| QUITE OFTEN | 12 | 22.2 | 22.2 | 35.2 |
| SOMETIMES | 27 | 50.0 | 50.0 | 85.2 |
| RARELY | 5 | 9.3 | 9.3 | 94.4 |
| NEVER | 3 | 5.6 | 5.6 | 100.0 |
| Total | 54 | 100.0 | 100.0 | |

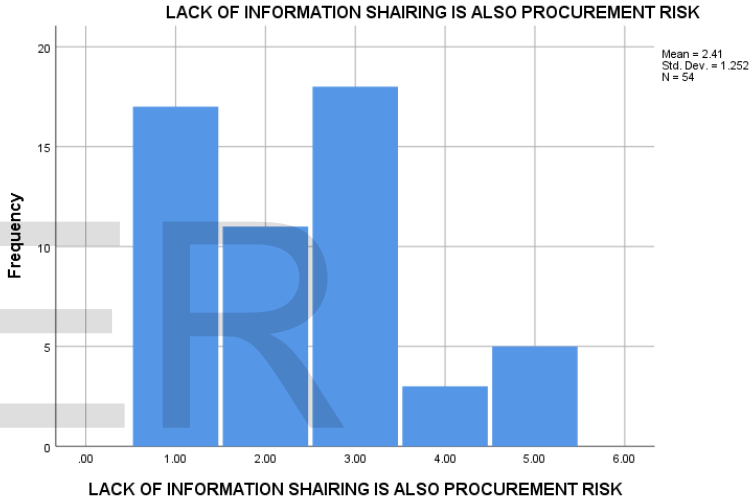
Above Table has presented the findings of the above question that inquired the participants about the sub optimal technologies used by the suppliers. Theanalysis helped in understanding that 27 participants sometimes face this issue , and thisstatement was further supported by 12 participants who selected the frequency of quite often.However, only 3 participants had never face this issue, 5 participants rarely and 7 participants always face this problem




## 2. LACK OF INFORMATION SHAIRING IS ALSO PROCUREMENT RISK

| | F | % | Valid% | Cumulative % |
|---|---|---|---|---|
| ALWAYS | 17 | 31.5 | 31.5 | 31.5 |
| QUITE OFTEN | 11 | 20.4 | 20.4 | 51.9 |
| SOMETIMES | 18 | 33.3 | 33.3 | 85.2 |
| RARELY | 3 | 5.6 | 5.6 | 90.7 |
| NEVER | 5 | 9.3 | 9.3 | 100.0 |
| Total | 54 | 100.0 | 100.0 | |

Above Table has presented the findings of the above question that inquired the participants about The lack of information sharing by the suppliers. Theanalysis helped in understanding that 18 participants sometimes face this issue , and thisstatement was further supported by 11 participants who selected the frequency of quite often. However, only 5 participants had never face this issue, 3 participants rarely and 17 participants always face this problem.

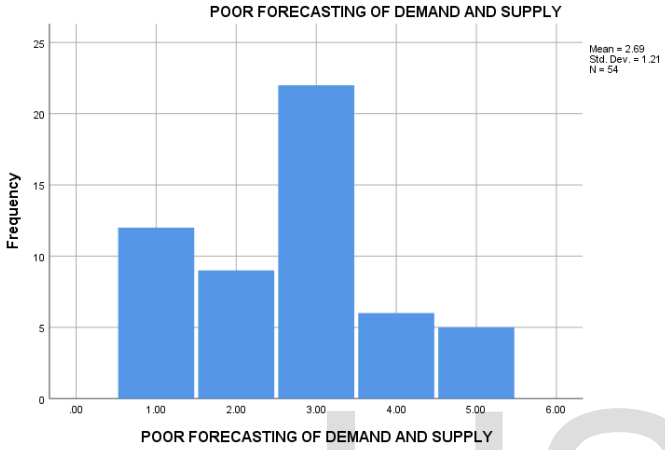



## 3. POOR FORECASTING OF DEMAND AND SUPPLY

| | F | % | Valid % |
|---|---|---|---|
| ALWAYS | 12 | 22.2 | 22.2 |
| QUITE OFTEN | 9 | 16.7 | 16.7 |
| SOMETIMES | 22 | 40.7 | 40.7 |
| RARELY | 6 | 11.1 | 11.1 |
| NEVER | 5 | 9.3 | 9.3 |

| | | | |
|---|---|---|---|
| Total | 54 | 100.0 | 100.0 |

Above Table has presented the findings of the above question that inquired the participants about The poor forecasting of demand and supply. Theanalysis helped in understanding that 22 participants sometimes face this issue , and thisstatement was further supported by 9 participants who selected the frequency of quite often. However, only 5 participants had never face this issue, 6 participants rarely and 12 participants always face this problem.

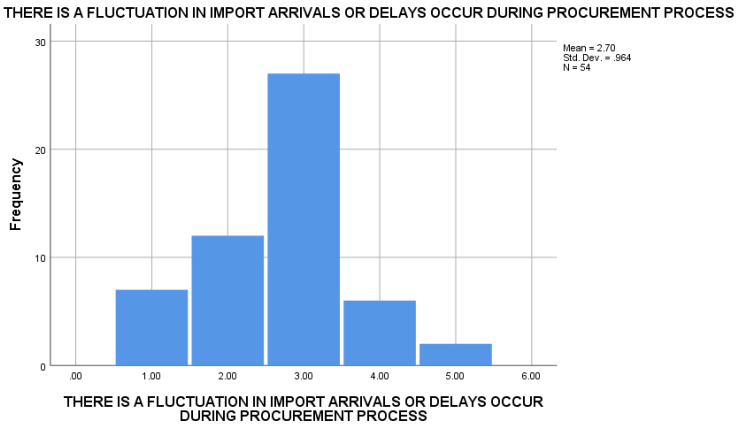



**TURBULANCE RISK:**

1. **THERE IS A FLUCTUATION IN IMPORT ARRIVALS OR DELAYS OCCUR DURING PROCUREMENT PROCESS**

| | F | % | Valid % | Cumulative % |
|---|---|---|---|---|
| ALWAYS | 7 | 13.0 | 13.0 | 13.0 |
| QUITE OFTEN | 12 | 22.2 | 22.2 | 35.2 |
| SOMETIMES | 27 | 50.0 | 50.0 | 85.2 |
| RARELY | 6 | 11.1 | 11.1 | 96.3 |
| NEVER | 2 | 3.7 | 3.7 | 100.0 |
| Total | 54 | 100.0 | 100.0 | |

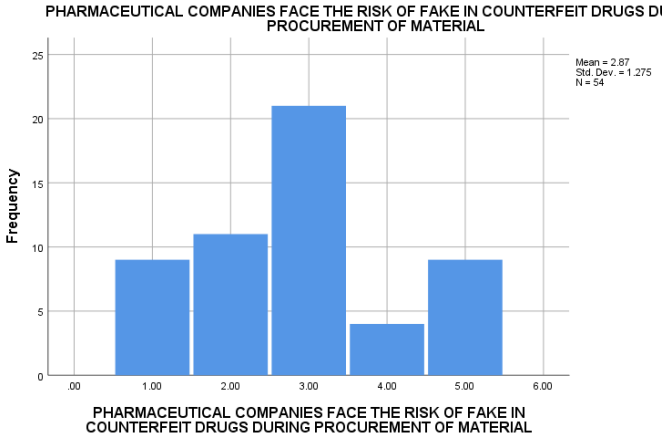
Above Table has presented the findings of the above question that inquired the participants about the fluctuation in import arrivals or delays occur during procurement process. Theanalysis helped in understanding that 27 participants sometimes face this issue , and thisstatement was further supported by 12 participants who selected the frequency of quite often. However, only 2 participants had never face this issue, 6 participants rarely and 7 participants always face this problem.

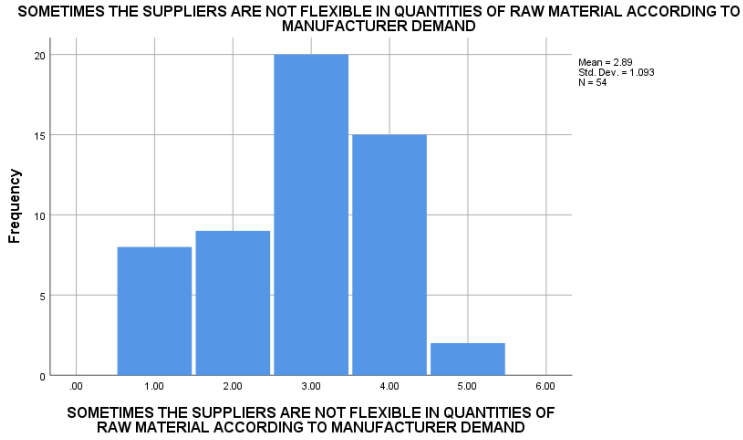



2. **PHARMACEUTICAL COMPANIES FACE THE RISK OF FAKE IN COUNTERFEIT DRUGS DURING PROCUREMENT OF MATERIAL**

| | F | % | Valid % | Cumulative % |
|---|---|---|---|---|
| ALWAYS | 9 | 16.7 | 16.7 | 16.7 |
| QUITE OFTEN | 11 | 20.4 | 20.4 | 37.0 |
| SOMETIMES | 21 | 38.9 | 38.9 | 75.9 |
| RARELY | 4 | 7.4 | 7.4 | 83.3 |
| NEVER | 9 | 16.7 | 16.7 | 100.0 |
| Total | 54 | 100.0 | 100.0 | |

Above Table has presented the findings of the above question that inquired the participants about the fluctuation in import arrivals or delays occur during procurement process. Theanalysis helped in understanding that 21 participants sometimes face this issue , and thisstatement was further supported by 11 participants who selected the frequency of quite often. However, only 9 participants had never face this issue, 4 participants rarely and 9 participants always face this problem.




3. **SOMETIMES THE SUPPLIERS ARE NOT FLEXIBLE IN QUANTITIES OF RAW MATERIAL ACCORDING TO MANUFACTURER DEMAND**

| | F | % | Valid % | Cumulative % |
|---|---|---|---|---|
| ALWAYS | 8 | 14.8 | 14.8 | 14.8 |
| QUITE OFTEN | 9 | 16.7 | 16.7 | 31.5 |
| SOMETIMES | 20 | 37.0 | 37.0 | 68.5 |
| RARELY | 15 | 27.8 | 27.8 | 96.3 |
| NEVER | 2 | 3.7 | 3.7 | 100.0 |
| Total | 54 | 100.0 | 100.0 | |

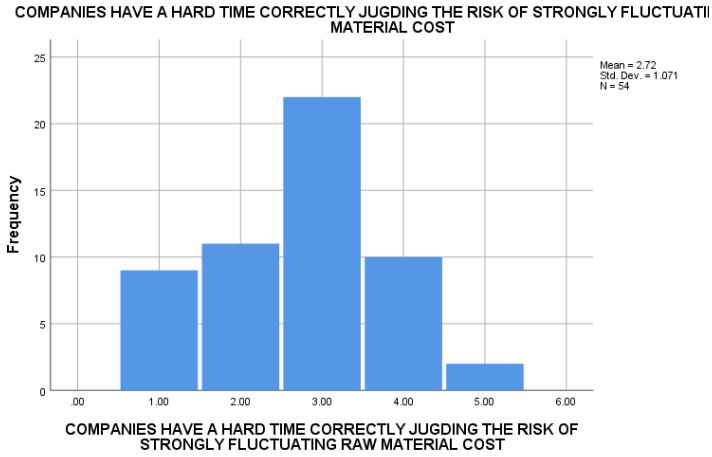
Above Table has presented the findings of the above question that inquired the participants about the suppliers who are not flexible in quantities of raw materials according to the manufacturer demand. Theanalysis helped in understanding that 20participants sometimes face this issue ,and thisstatement was further supported by 9 participants who selected the frequency of quite often.However, only 2participants had never face this issue, 15 participants rarely and 8 participants always face this problem.

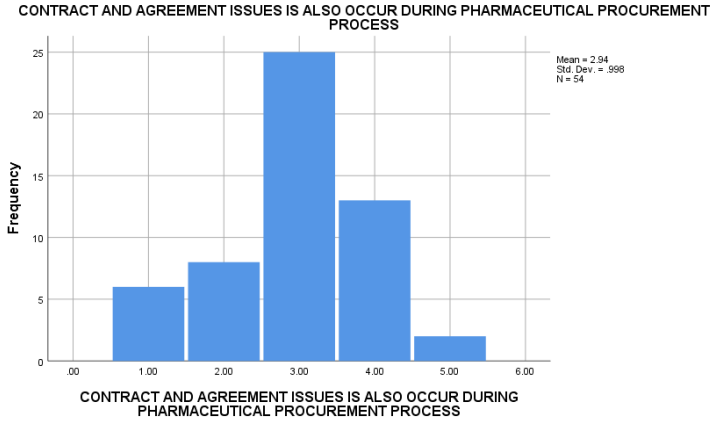
**FINANCIAL RISK:**

1. **COMPANIES HAVE A HARD TIME CORRECTLY JUGDING THE RISK OF STRONGLY FLUCTUATING RAW MATERIAL COST**

| | F | % | Valid % |
|---|---|---|---|
| ALWAYS | 9 | 16.7 | 16.7 |
| QUITE OFTEN | 11 | 20.4 | 20.4 |
| SOMETIMES | 22 | 40.7 | 40.7 |
| RARELY | 10 | 18.5 | 18.5 |
| NEVER | 2 | 3.7 | 3.7 |
| Total | 54 | 100.0 | 100.0 |

Above Table has presented the findings of the above question that inquired the participants about the fluctuation in import arrivals or delays occur during procurement process. Theanalysis helped in understanding that 21 participants sometimes face this issue , and thisstatement was further supported by 11 participants who selected the frequency of quite often. However, only 9 participants had never face this issue, 4 participants rarely and 9 participants always face this problem.




**2. CONTRACT AND AGREEMENT ISSUES IS ALSO OCCUR DURING PHARMACEUTICAL PROCUREMENT PROCESS**

| | F | % | Valid % | Cumulative % |
|---|---|---|---|---|
| ALWAYS | 6 | 11.1 | 11.1 | 11.1 |
| QUITE OFTEN | 8 | 14.8 | 14.8 | 25.9 |
| SOMETIMES | 25 | 46.3 | 46.3 | 72.2 |
| RARELY | 13 | 24.1 | 24.1 | 96.3 |
| NEVER | 2 | 3.7 | 3.7 | 100.0 |
| Total | 54 | 100.0 | 100.0 | |

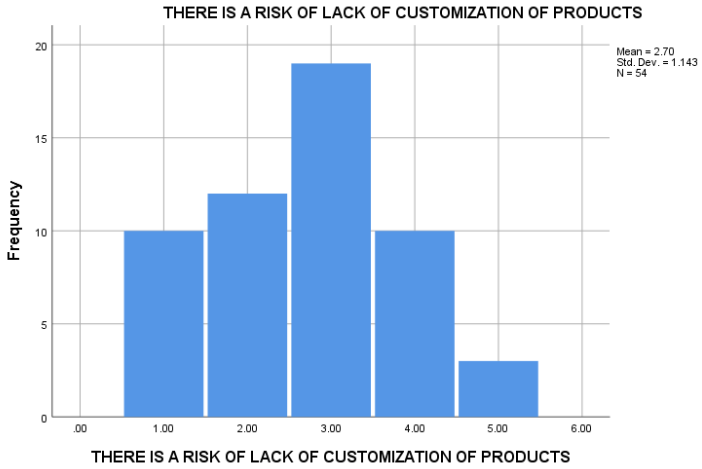
Above Table has presented the findings of the above question that inquired the participants about the contract and agreement issues related to suppliers. Theanalysis helped in understanding that 25 participants sometimes face this issue , and thisstatement was further supported by 8 participants who selected the frequency of quite often. However, only 2 participants had never face this issue, 13 participants rarely and 6 participants always face this problem.

**MARKET RISK:**

**1. THERE IS A RISK OF LACK OF CUSTOMIZATION OF PRODUCTS**

| | F | % | Valid % | Cumulative % |
|---|---|---|---|---|
| ALWAYS | 10 | 18.5 | 18.5 | 18.5 |
| QUITE OFTEN | 12 | 22.2 | 22.2 | 40.7 |
| SOMETIMES | 19 | 35.2 | 35.2 | 75.9 |
| RARELY | 10 | 18.5 | 18.5 | 94.4 |
| NEVER | 3 | 5.6 | 5.6 | 100.0 |
| Total | 54 | 100.0 | 100.0 | |

Above Table has presented the findings of the above question that inquired the participants about the customization of product during procurement process. Theanalysis helped in understanding that 19 participants sometimes face this issue , and thisstatement was further supported by 12 participants who selected the frequency of quite often. However, only 3 participants had never face this issue, 10 participants rarely and 10 participants always face this problem.

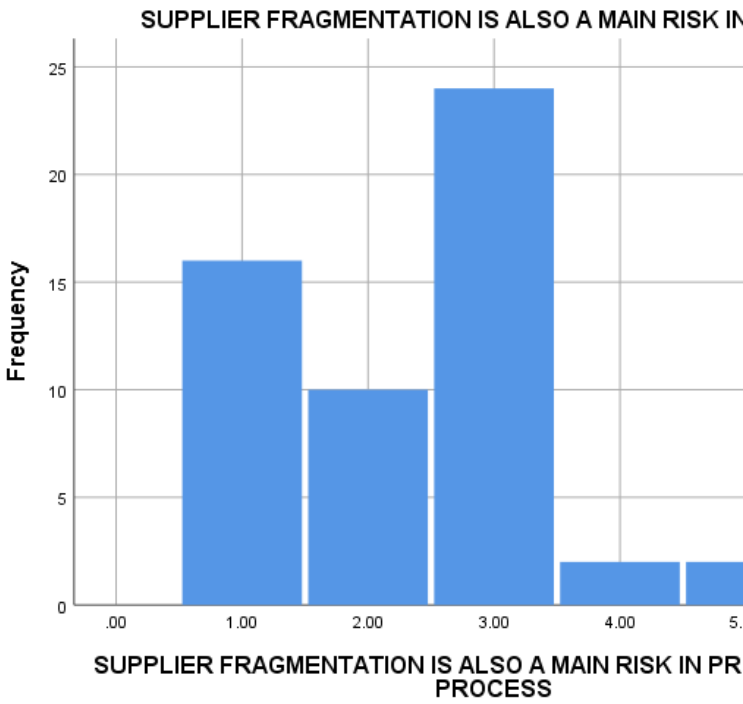



## 2. SUPPLIER FRAGMENTATION IS ALSO A MAIN RISK IN PROCUREMENT PROCESS

| | F | % | Valid % | Cumulative % |
|---|---|---|---|---|
| ALWAYS | 16 | 29.6 | 29.6 | 29.6 |
| QUITE OFTEN | 10 | 18.5 | 18.5 | 48.1 |
| SOMETIMES | 24 | 44.4 | 44.4 | 92.6 |
| RARELY | 2 | 3.7 | 3.7 | 96.3 |
| NEVER | 2 | 3.7 | 3.7 | 100.0 |
| Total | 54 | 100.0 | 100.0 | |

Above Table has presented the findings of the above question that inquired the participants about the supplier fragmentation is also a main risk in procurement process

. Theanalysis helped in understanding that 24 participants sometimes face this issue , and thisstatement was further supported by 10 participants who selected the frequency of quite often. However, only 2 participants had never face this issue, 2 participants rarely and 16 participants always face this problem.

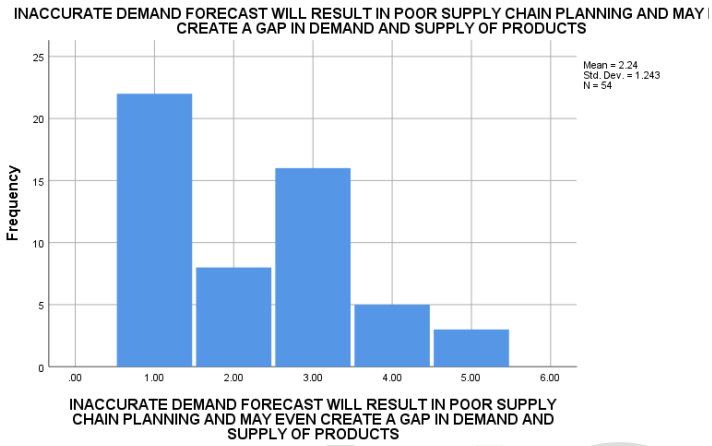



## 3. INACCURATE DEMAND FORECAST WILL RESULT IN POOR SUPPLY CHAIN PLANNING AND MAY EVEN CREATE A GAP IN DEMAND AND SUPPLY OF PRODUCTS

| | F | % | Valid % |
|---|---|---|---|
| ALWAYS | 22 | 40.7 | 40.7 |
| QUITE OFTEN | 8 | 14.8 | 14.8 |
| SOMETIMES | 16 | 29.6 | 29.6 |
| RARELY | 5 | 9.3 | 9.3 |
| NEVER | 3 | 5.6 | 5.6 |
| Total | 54 | 100.0 | 100.0 |

Above Table has presented the findings of the above question that inquired the participants aboutinaccurate demand forecast will result in poor supply chain planning and may even create a gap in demand and supply of products. The analysis helped in understanding that 16

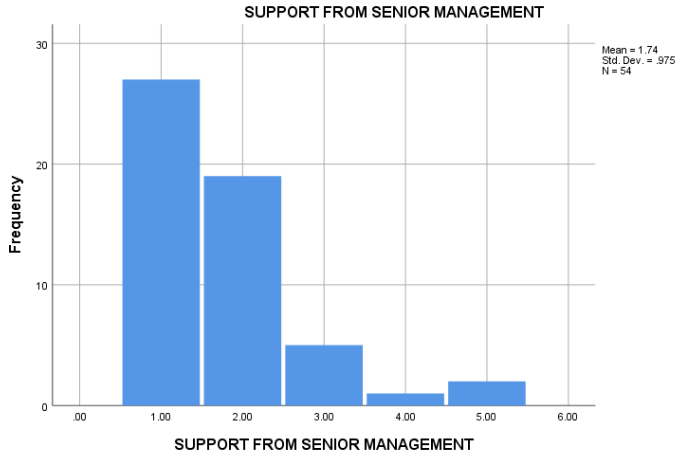
participants sometimes face this issue , and this statement was further supported by 8 participants who selected the frequency of quite often. However, only 3 participants had never face this issue, 5 participants rarely and 22 participants always face this problem.




**RISK MANAGEMENT :**

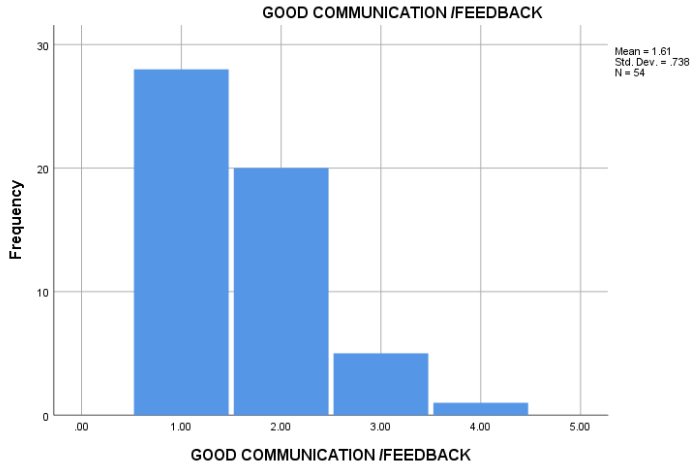
**1. SUPPORT FROM SENIOR MANAGEMENT**

| | F | % | Valid % | Cumulative % |
|---|---|---|---|---|
| Strongly agree | 27 | 50.0 | 50.0 | 50.0 |
| Agree | 19 | 35.2 | 35.2 | 85.2 |
| Neutral | 5 | 9.3 | 9.3 | 94.4 |
| Disagree | 1 | 1.9 | 1.9 | 96.3 |
| Strongly disagree | 2 | 3.7 | 3.7 | 100.0 |
| Total | 54 | 100.0 | 100.0 | |




**2. GOOD COMMUNICATION /FEEDBACK**

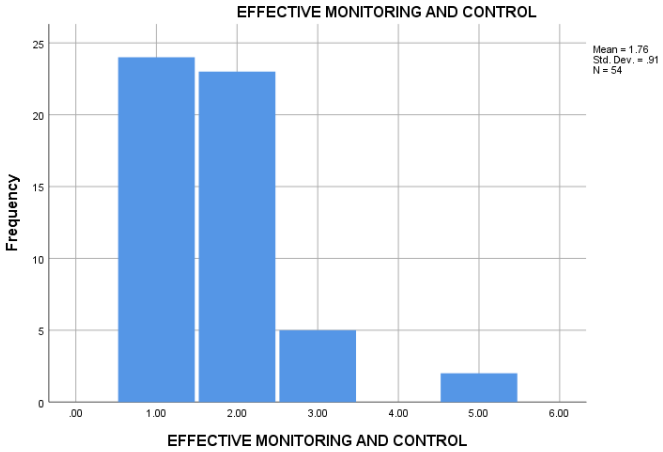
| | F | % | Valid % | Cumulative % |
|---|---|---|---|---|
| Strongly agree | 28 | 51.9 | 51.9 | 51.9 |
| Agree | 20 | 37.0 | 37.0 | 88.9 |
| Neutral | 5 | 9.3 | 9.3 | 98.1 |
| Disagree | 1 | 1.9 | 1.9 | 100.0 |
| Strongly disagree | 1 | 1.2 | 1.2 | 12 |
| Total | 54 | 100.0 | 100.0 | |

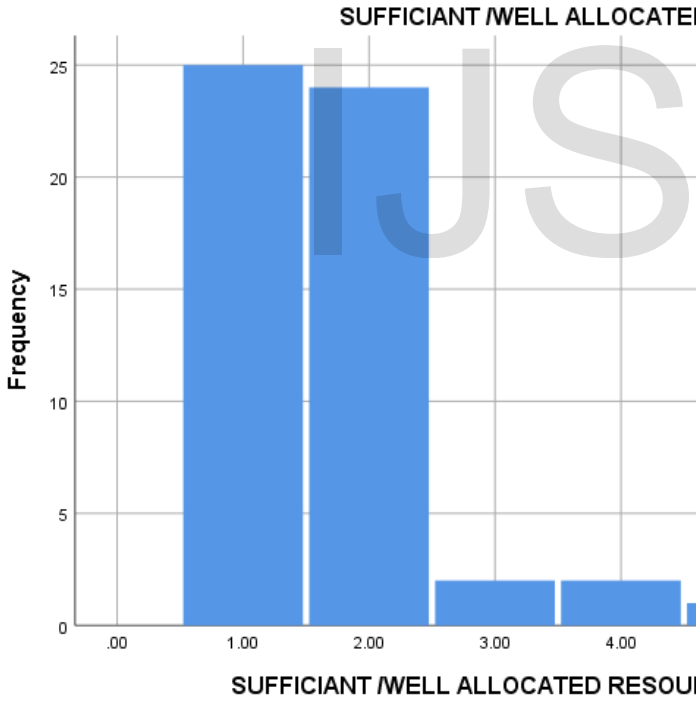


| | | | |
|---|---|---|---|
| | Disagree | 1 | 1.1 |
| | Strongly disagree | 2 | 3.7 |
| | Total | 54 | 100.0 |

### 3. SUFFICIANT /WELL ALLOCATED RESOURCES

| | F | % | Valid % | Cumulative % |
|---|---|---|---|---|
| Strongly agree | 25 | 46.3 | | |
| Agree | 24 | 44.4 | | |
| Neutral | 2 | 3.7 | | |
| Disagree | 2 | 3.7 | | |
| Strongly disagree | 1 | 1.9 | | |
| Total | 54 | 100.0 | | |



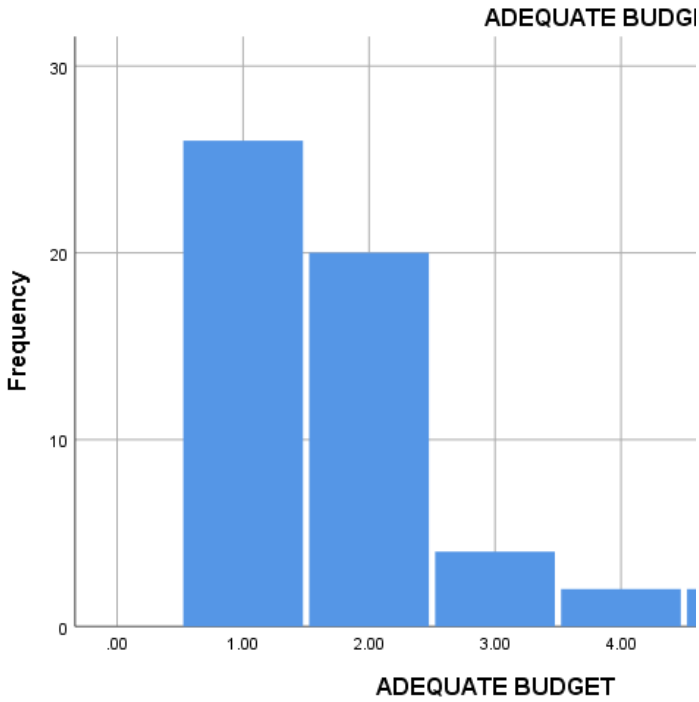

### 5. ADEQUATE BUDGET

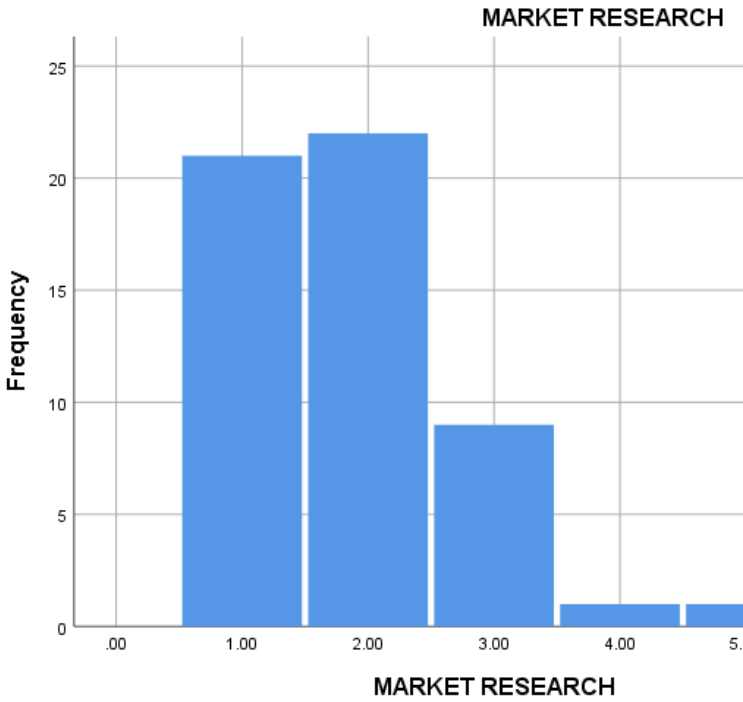
| | F | % | V |
|---|---|---|---|
| Strongly agree | 26 | 48.1 | |
| Agree | 20 | 37.0 | |
| Neutral | 4 | 7.4 | |
| Disagree | 2 | 3.7 | |
| Strongly disagree | 2 | 3.7 | |
| Total | 54 | 100.0 | |



### 4. EFFECTIVE MONITORING AND CONTROL

| | F | % | Valid % | Cumulative % |
|---|---|---|---|---|
| Strongly agree | 24 | 44.4 | 44.4 | 44.4 |
| Agree | 23 | 42.6 | 42.6 | 87.0 |
| Neutral | 5 | 9.3 | 9.3 | 96.3 |



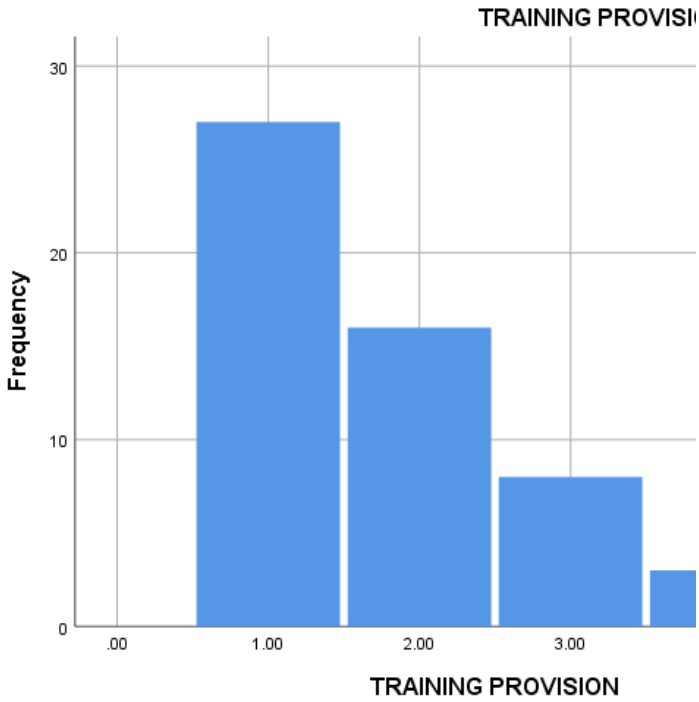



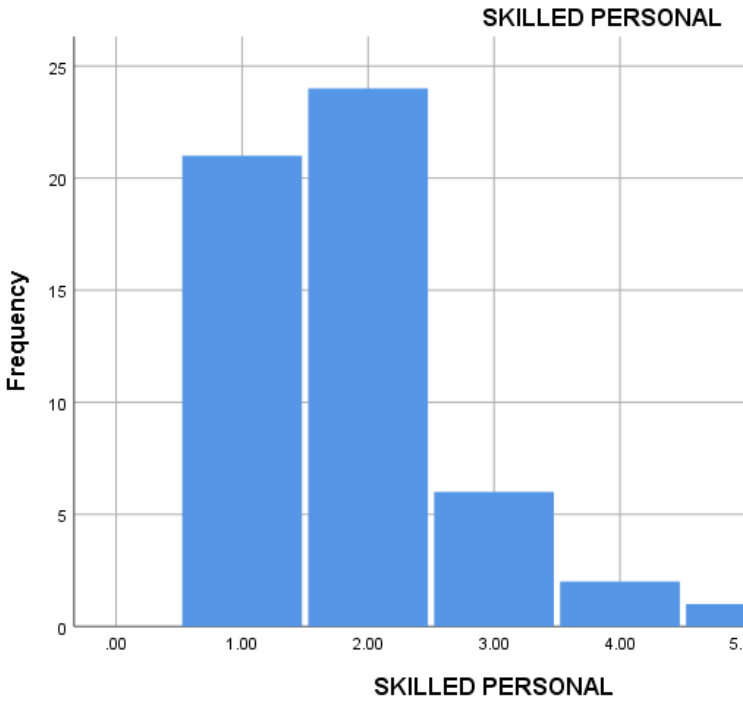

6. **MARKET RESEARCH**

| | F | % | V |
|---|---|---|---|
| Strongly agree | 21 | 38.9 | |
| Agree | 22 | 40.7 | |
| Neutral | 9 | 16.7 | |
| Disagree | 1 | 1.9 | |
| Strongly disagree | 1 | 1.9 | |
| Total | 54 | 100.0 | |

7. **TRAINING PROVISION**

| | F | % | Valid |
|---|---|---|---|
| Strongly agree | 27 | 50.0 | |
| Agree | 16 | 29.6 | |
| Neutral | 8 | 14.8 | |
| Disagree | 3 | 5.6 | |
| Strongly disagree | 1 | 1.1 | |
| Total | 54 | 100.0 | |



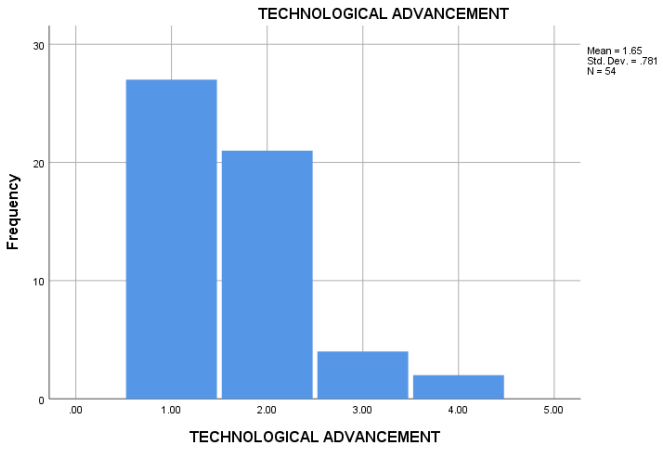




8. **SKILLED PERSONAL**

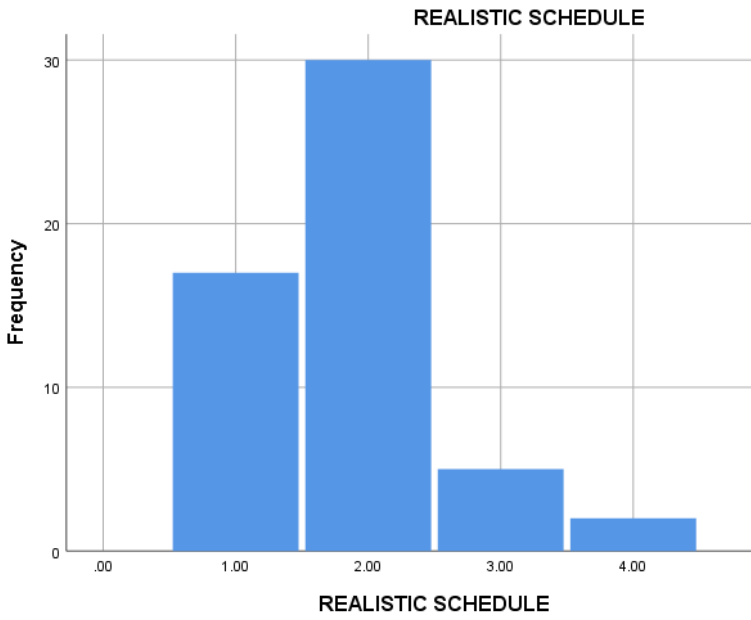
| | F | % | Valid % | Cumulative % |
|---|---|---|---|---|
| Strongly agree | 21 | 38.9 | 38.9 | 38.9 |
| Agree | 24 | 44.4 | 44.4 | 83.3 |
| Neutral | 6 | 11.1 | 11.1 | 94.4 |
| Disagree | 2 | 3.7 | 3.7 | 98.1 |
| Strongly disagree | 1 | 1.9 | 1.9 | 100.0 |
| Total | 54 | 100.0 | 100.0 | |

9. **TECHNOLOGICAL ADVANCEMENT**

| | F | % | Valid |
|---|---|---|---|
| STRONGLY AGREE | 27 | 50.0 | |
| AGREE | 21 | 38.9 | |
| NEUTRAL | 4 | 7.4 | |
| DISAGREE | 2 | 3.7 | |
| Strongly disagree | 1 | 1.2 | |
| Total | 54 | 100.0 | |



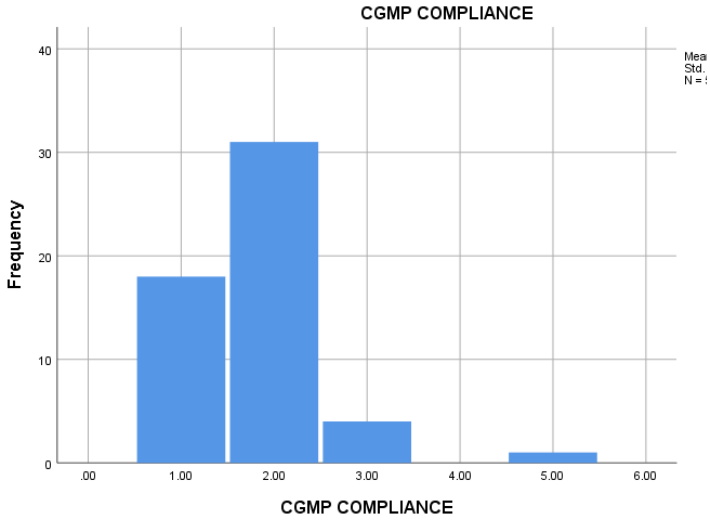

10. **REALISTIC SCHEDULE**

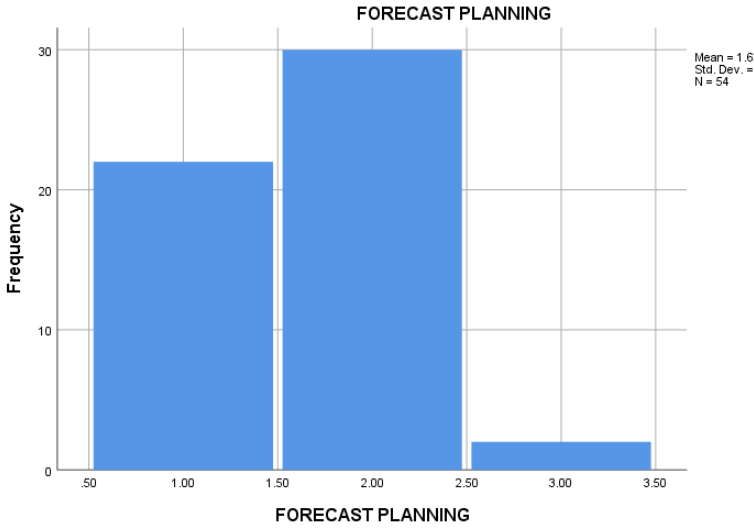



| | F | % | Valid % | Cumulative % |
|---|---|---|---|---|
| Strongly agree | 17 | 31.5 | 31.5 | 31.5 |
| Agree | 30 | 55.6 | 55.6 | 87.0 |
| Neutral | 5 | 9.3 | 9.3 | 96.3 |
| Disagree | 2 | 3.7 | 3.7 | 100.0 |
| Strongly disagree | 1 | 1.9 | 1.9 | 19 |
| Total | 54 | 100.0 | 100.0 | |

11. **CGMP COMPLIANCE**

| | F | % | V |
|---|---|---|---|
| Strongly agree | 18 | 33.3 | |
| Agree | 31 | 57.4 | |
| Neutral | 2 | 2.1 | |
| Disagree | 4 | 7.4 | |
| Strongly disagree | 1 | 1.9 | |
| Total | 54 | 100.0 | |



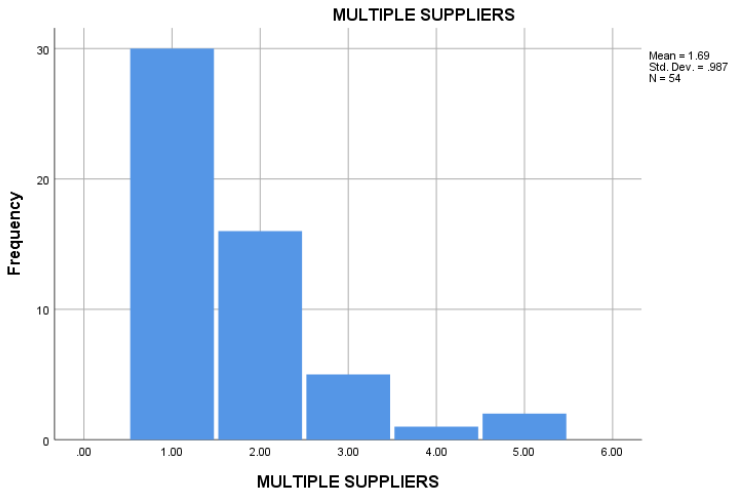




12. **FORECAST PLANNING**

| | F | % | Valid % | Cumulative % |
|---|---|---|---|---|
| Strongly agree | 22 | 40.7 | 40.7 | 40.7 |
| Agree | 30 | 55.6 | 55.6 | 96.3 |
| Neutral | 2 | 3.7 | 3.7 | 100.0 |
| Disagree | 1 | 1.9 | 1.9 | 94.4 |
| Strongly disagree | 3 | 3.7 | 3.7 | 96.3 |
| Total | 54 | 100.0 | 100.0 | |

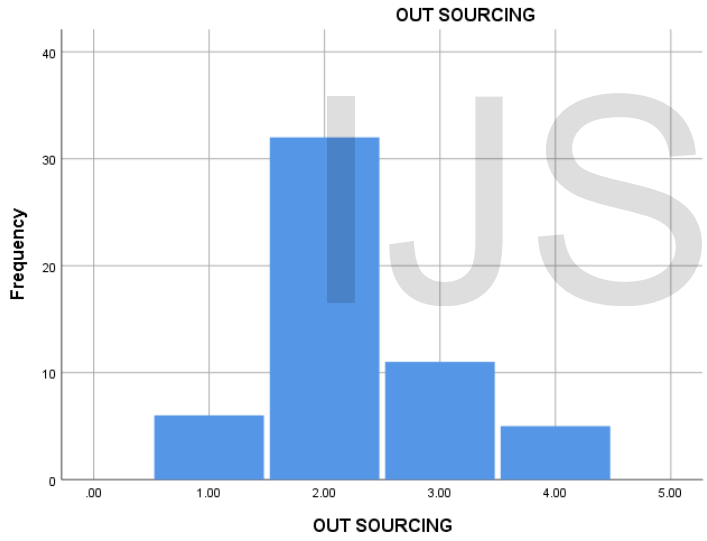
13. **MULTIPLE SUPPLIERS**

| | F | % | V |
|---|---|---|---|
| Strongly agree | 30 | 55.6 | |
| Agree | 16 | 29.6 | |
| Neutral | 5 | 9.3 | |
| Disagree | 1 | 1.9 | |
| Strongly disagree | 2 | 3.7 | |
| Total | 54 | 100.0 | |



14. **OUT SOURCING**

| | F | % | Valid % | Cumulative % |
|---|---|---|---|---|
| Strongly agree | 6 | 11.1 | 11.1 | 11.1 |
| Agree | 32 | 59.3 | 59.3 | 70.4 |
| Neutral | 11 | 20.4 | 20.4 | 90.7 |
| Disagree | 5 | 9.3 | 9.3 | 100.0 |
| Total | 54 | 100.0 | 100.0 | |




Above Tables and graphs has presented the findings of the risk management strategies that inquired the participantsabout which strategy is best to manage risks. The results from the question led to an understanding that most of the participants strongly agree with all these statements and participants felt that it is highly likely to be the case, and this was further supported by someparticipants who agree with these strategies. Moreover, it was worth mentioningthat very few participants selected the frequency of disagree and neutral. Considering the findings, it can be argued that the statistics have confirmed that the participantswere under the impression that all the strategies of risk management is important and has a significant effect on management of procurement risk.

## CHAPTER: 05

## CONCLUSION

Conclusively, the study has confirmed that all the risk related to procurement process has a significant impact on the supply chain process in pharmaceutical industry of Karachi Pakistan. It means 40% of risks in supply chain process is related to the procurement or supplier side risk.In particular, the study found that all the risk which researcher highlighted in this study can effect procurement process of pharmaceutical industry sometimes not in a frequent basis but its effect is critical on the output of production. because smooth or timely flow of procurement process can result increased frequency of purchase, in addition to the spread of positive brand image in the mind of purchaser.further more the strategies of management of risk which studied in this research play a important role in the management of risk.This means that when companies,focus on above mentioned risk management strategies and mainly contingency planning then no such type of risk will create problems in the procurement processes.they are able to be in better position to improve their competitive advantage and value in the market. Success Of Pharmaceutical companies play a major role in the pharmaceutical supply chain and it has a significant impact on the quality of supply chain management. Identifying and reducing risks in pharmaceutical companies can not only lead to process improvement, increase productivity and reduce business risk, but it will also help health systems achieve supply chain management objectives. There are so many risks which are reportedin this study are procurement risks due to processes,people and functions and problems in the management system in a firm which can be easily managed by suitable risk management strategies. Although only a few of the risks occurring rarely buttheir impact on business disruption is critical. Therefore identifying the risk impacts of risks on business processes and functions and investigating mitigation strategies to manage them is considered in this study.

## CHAPTER: 06

## RECOMMENDATIONS

The following recommendations were made:

It is impossible to avoid risk
Because some of the best supplier incentives will come from
companies located in risky areas, it is impossible to avoid ri sks posed by sustainability
issues entirely, nor would purchasing organizations want t o.Contingency planning( forecasting) is very necessary to avoid risk .We can also avoid risk through strong follow ups with vendor and marketing, manage operation meetings, comply the process of demand and S&OP meetings.By monitoring demand and forecast and also inventory levels. we should keep an eye on market trend and situation of country operating. Risk assessment should be undertaken, reviewed andmanaged throughout the procurement .Reduce the cost and give best quality raw materials forproduction is the aim of manufacturer. They need to have strong data bank of reliable suppliers.The purchaser must study the material MSDS and COA before procurement. Forceast base MRP is way out for proper material arrangement .Better research about suppliers and having direct communication rather than through indentors onlyBy managing the things properly.They willsuggest best practices for GMP compliance and for better improvement further towards upgradesystem.Purchaser must induct good suppliers and multiple and strong follow-up as well.By performing details risk assessment play a key role in avoiding risk. Addition of safety stock ,Bulk procurement can also help in solving these issues.Managing risks is a critical component of Procurement Management and the Procurement Function. Procurement Professionals are also responsible for ensuring a steady supply of Mission Critical Inputs that meet quality, price, and delivery criteria. The modern supply chain poses a growing number of risk factors that affect the modern business landscape. Protecting their organizations from risks is a critical part of the Procurement Function Mandate. Demand Planning is one of the Key Factor in Procurement Process.

## REFERENCES

Jaberidoost, M., Nikfar, S., Abdollahiasl, A. *et al.* Pharmaceutical supply chain risks: a systematic review. *DARU J Pharm Sci* **21,** 69 (2013) doi:10.1186/2008-2231-21-69

Jaberidoost, M., Olfat, L., Hosseini, A. *et al.* Pharmaceutical supply chain risk assessment in Iran using analytic hierarchy process (AHP) and simple additive weighting (SAW) methods. *J of Pharm Policy and Pract* **8,** 9 (2015) doi:10.1186/s40545-015-0029-3

**N Shah - Computers & chemical engineering, 2004 - ElsevierPharmaceutical supply chains: key issues and strategies for optimisation**

C Enyinda, C Briggs, K Bachkar - Asbbs annual …, 2009 - pdfs.semanticscholar.org

Naresh kumar Hasija*1 , S.B.Puranik2 and Mithun E.G.3 February 2017 Vol.:8, Issue:3 Evaluation of the Pharmaceutical Supply Chain Risk and Resolution,international Journal of Pharmacy and Pharmaceutical Research

S Brako, D Asante, NB Akosah - International Journal of Academic investigating the risk in the pharmaceutical supplychain in ghana, 2016 - hrmars.com

Moktadir, M.A., Ali, S.M., Kumar Mangla, S., Sharmy, T.A., Luthra, S., Mishra, N., Garza-Reyes, J.A. (2017), "Decision modeling for evaluating risks in pharmaceutical supply chains", Industrial Management & Data Systems

Dr Devesh Kapoor, Dr Dayaram Patel Pharmacy College, Sardar baug, Station Road, Bardoli, Surat, Gujarat, India ,March 29, 2018, An Overview on Pharmaceutical Supply Chain: A Next Step towards Good Manufacturing Practice

H Mahendran, K Narasimhan, N Nagarajan… - Proceedings of the World …, 2011

Bucalo Nina & Jereb Borut, 2017. "**Risk Management in the Pharmaceutical Industry in Slovenian Companies**," Logistics & Sustainable Transport, Sciendo, vol. 8(1), pages 42-49, May.

Pauline Bour, May 2016, Managing The Supplier Risks In A Purchasing Department

Dr. Md. Moniruzzaman, April 15, 2016, Supply Chain Management in Pharmaceutical Industries: A Study on Eskayef Bangladesh Lt