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Impact of Collaborative Planning, Forecasting and Replenishment (CPFR) on Supply

Chain Performance

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Certification of Approval

We hereby grant the approval of this dissertation report. The student has compiled the dissertation work as per the requirements of the University.

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Declaration of Authenticity

I, Raghad Aljehani, declare that this thesis is my own personal and unique work. It has been done, gathered and used to satisfy the purposes of the study and the research. It has not been recently submitted to any other college.

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CHAPTER 1: INTRODUCTION

1.1 Background Information

The most important role in any business is of the operations management. It is a business function which is responsible for managing different process which includes creation and distribution of goods and services. It is a process which includes different steps such as planning, organizing and coordinating the resources in order for efficient use of company's goods (Ebrahimi & Sadeghi, 2013). One of the most research topic in operations management is Supply Chain Management. The operation manager is responsible for many duties and supply chain and its management is one of them. Supply chain management includes managing the production process which uses raw materials and produce a finished product. It involves all the steps of producing goods, shipping them, distribution and delivery of the products. Efficient supply chain management is required to avoid overhead costs, untimely deliveries of products to customer and ineffective production process. Efficient supply chain management also helps as a factor for competitive advantage in a vast market and also helps in setting benchmark for other rivals. It also improves the performance of the organization which helps the business to excel in the market and. It is considered a strong key point in the organization (Rahman & Singhry, 2018).

With the advancement of technology and globalization, the operational system of the businesses and organizations have evolved. With this advancement, supply chain management has also evolved and introduced various new concepts in the field of operations management (Rahman & Singhry, 2018). One of such widely discusses concept is Collaborative Planning, Forecasting

and Replenishment (CPFR). CPFR is a web based concept which is an attempt to coordinate and integrate various activities such as production, purchase planning, demand forecasting and inventory replenishment between the supply chain traders. CPFR helps in improving the performance of supply chain, also known as, Supply Chain Performance (SCP). Many organizations worldwide have implemented CPFR, and they all have received different results and performance based on the nature of the project, product and service which the organization is offering. CPFR has now become an important business process for the management of demand uncertainty, point-of-sale data, and promotional plans (Kubde, 2012). It is being used to reduce inventory cost, lead times and improving the forecasting accuracy. It also helps in improving the customer services and the volume of sales.

1.2 Problem Statement

A successful business and supply chain requires that the supply chain partners and traders work together well. Inter-firm collaboration is the key to enhance supply chain responsiveness and efficiency. One of the initiative to supply chain management which is proposed to improve supply chain responsiveness and performance is Collaborative Planning, Forecasting and Replenishment (CPFR). Out of many concept, this imitative is the most comprehensive and promises great efficiency. It is important for organizations to have greater customer services and cost reduction in the unpredicted competitive market. The success of any product or service lies in the response of customer to the product, hence it is important for businesses to achieve higher level of customer satisfaction by improving their supply chain performance (SCP). The benefits of CPFR application in the developed countries are document well in the form of case studies or simulation studies but

its implementation in the developing countries such as Saudi Arabia is slow (Fu, 2016). Manufacturing processes in Saudi Arabia currently contributes only 20% to the Gross Domestic Products (GDP). Saudi Arabian government as part of their Vision 2030 wants to improve it and find quality solutions so that manufacturing can increase its contribution from 20% to 60%. CPFR is one the strategy that organizations can use to improve their supply chain performance, manufacturing processes and customer services. Hence, the research question of this study is:

RQ1: What is the impact of CPFR on the supply chain performance in Saudi Arabia?

1.3 Aim and Objectives

The aim of the study is to identify the impact of collaborative planning, forecasting and replenishment (CPFR) on the supply chain performance. The objectives of the study are:

- Defining Supply Chain Performance and Collaborative Planning, Forecasting and Replenishment (CPFR) in the context of Saudi Arabia.
- Statistically test the relationship between the CPFR and Supply Chain Performance (SCP).

1.4 Significance of the study

The significance of conducting studies on the CPFR and Supply Chain Performance is twofold. It will have theoretical implications as well as practical implications. As the Vision 2030, wants to increase the private sector GDP contributions from 40% to 65% and increase the share of non-oil exports to 50% from 16%. Hence, the exploration of CPFR will contribute and will help the organizations to implement the initiative and reap the advantages. It will help the business manager

know about the impact of CPFR on their supply chain. The theoretical contribution of the study will be to fill gaps found in the literature review in developing countries regarding CPFR and Supply Chain Performance.

1.5 Contents of the Report

The rest of the report is divided into following chapters:

- Literature Review
- Methodology:
- Results and Discussion
- Conclusion, Limitations and Recommendations

CHAPTER 2: LITERATURE REVIEW

In this section of the study, literature from reputed journals and articles will be discussed related to supply chain and its management, collaborative planning, forecasting and replenishment as well as the relationship between them. This critical review will help in determining the research gaps present in the current literature and help in studying and making theoretical and practical implication to the literature.

2.1 Concept of CPFR

The concept of Collaborative planning, forecasting and replenishment (CPFR) can be bounded to supply chain collaboration strategies. It is related to common agreed upon imitative among the supply chain partners. The purpose of having improved collaborations and jointly focusing on planning is sharing information and communicating with suppliers for the benefit of all the members involved in the process (Panahifar, Byrne & Heavey, 2015). The origin of this concept is not new and many prior researches and models that deals with collaboration is available in the field of operations management. Many researchers are studying this topic under the umbrella of supply chain management. They define it as a new practice of supply chain management where trading partners uses information technology (IT) and standard set of business procedure to learn and combine for intelligent planning and fullfiling their customer demands (VICS, 2004). Effective purchaser reaction is a technique in where retailers and providers cooperate in a helpful way to acquire items to the last customer a progressively proficient, quicker, more affordable yet at the same time beneficial path to the individuals from the supply chain (Corsten et al. 2005).

Numerous arrangements are out there in scan for this technique, one of them being CPFR (Tenhiala, 2003). CPFR is a procedure idea alluded to as collaborative planning, forecasting, and replenishment created to fulfill and foresee future requests by advancing coordinated effort between the organizations inside the supply chain. It is the combination of the considerable number of individuals from the supply chain including the retailers and all the distributors in question. The likely advantage of this process is seen with the sharing of the data all through the supply chain and is adequately planned (Fliender, 2003). The utilization of electronic techniques, for example, softwares encourages this movement of sharing of data. CPFR is for the most part engaged with process advancement which is the manner in which items and administrations are delivered and design, and relationship development which are the techniques that control buyer seller communications dependent on trust and responsibility as opposed to simple item development (Cassivi, 2006).

Profit is not, at this point the principle purpose behind change, in the real market this explanation is not enough for organizations taking an attempt at competitive advantage. Collaboration between the individuals and genuine banding together dependent on sharing and trust is what is driving organizations into a less fatty cost proficient furthermore, spry supply chains (Tenhiala, 2003). This collaboration between partners in the supply chain prompts common advantages by sharing of constant data. This data depends on customer conduct and most recent patterns in the market (Büyüközkan et al., 2012). Retailers which are the retail locations of the supply chain are the connection among makers and customers. Each accomplice along the supply chain is profited by this process development device. The development process of each accomplice fluctuates and

so do the exercises in question (Cassivi, 2006). Planning collaboration in this day and age requires mass collaboration instead of collaboration between close partners. This activity prompts a progressively vigorous replenishment and with IT frameworks include the planning process turns out to be progressively versatile in a business organize (Holmström et al., 2002).

The retailer's innovation process of the supply chain begins in the classification the board process; the provider innovation begins at the replenishment of the supply chain process. Classification the executives permits retailers to oversee in a deliberate structure the items that are being offered to the customer. This prompts productive retail space, and giving more an incentive to the customer. This is made by abstaining from purchasing advancements from providers or new item presentation in their process. In the other hand the provider demonstrations dependent on replenishment, rather than trusting that the requests will trigger supply, the provider demonstrations as per utilization. For a provider to renew inventories successfully data should be founded on stock records as opposed to requests and material developments. This permits mistakes to be remedied each inventory tally (replenishment dependent on inventory check information). Class the board and effective replenishment need to actualize collaborative forecasting and planning so as to set up win - win circumstances of trading partners. (Holmström et al., 2002).

A push pull framework is followed in a CPFR process. The push some portion of the supply chain is followed by upstream providers which work in a make to stock process in an in the nick of time premise. Figures are utilized to decide parcel sizes and stock level. This will guarantee a low inventory on downstream organizations. Downstream organizations work in a specially make

process or "pull" process. In view of chronicled information, they trigger the requests to the upstream providers to satisfy needs. The fundamental target of the framework is snappy reaction and quick change. (Yang-Fang, et al. 2012). Devices that assist data with arriving at the individuals from the supply chain are electronic purpose of deals and they fill in as a major aspect of the nonstop replenishment framework (Tenhiala, 2003). This prompts a progressively programmed collaborative planning and forecasting.

CPFR expands level of relationship between partners, improves the correspondence channels by mutually dealing with the process and sharing of data (Cassivi, 2006). A structure is required building up the skills of the partners, incorporates the obligations and authority of the CPFR exercises. It additionally delimits accomplice's investment by recognizing their delimitations. The members consent to share just one conjecture. This gauge is made and shared by the utilization of certain concurred data channels and innovations (Saha, 2012). This common forecasting permits a decrease on inventory levels brought about by bullwhip impact through a careful logical forecasting methodology to satisfy customer needs and successfully renew inventory (Yang-Fang, et al. 2012). It is conceded to the strategies used to determine distinction in sees. In general, the whole process is guided by just one shared estimate. The expulsion of limitations inside the supply chain is a significant advance towards viable CPFR execution. The portion of just one conjecture prompts evacuation of cushion inventories and an increasingly synchronized creation cycle (Saha, 2012).

2.2 Advantages and Drawbacks of CPFR

The concept of CPFR is based on the relationship between a buyer and a supplier (Varma et al., 2010). There are many benefits of implementing a CPFR system such as time to market, precise forecasting, efficient communication, less inventory deterioration and cost reduction (Pallab, 2012). The mutual data framework produces more information on all members in the supply chain, builds exactness of forecasting and the relationship between partners is expanded. Normal marketable strategy meeting, planning and forecasting gatherings and all CPFR based gatherings help fortify this relationship between partners (Varma et al. 2010). Stock outs which much of the time was the fundamental explanation behind execution of this ECR apparatus are decreased, lead times are abbreviated which makes a superior responsiveness framework towards customer conduct. Support inventories are limited by having a higher creation limit dependent on a greater conjecture skyline. Models like the Henkel furthermore, Eroski joining forces shows how CPFR execution helped diminished blunders in forecasting from half to just 20% (Varma et al. 2010). Figures likewise assume a significant job in decreasing dealing with also, authoritative expenses, and abbreviated set up times (Tenhiala, 2012). Bullwhip impact which in numerous supply chains leads upstream SME's into misfortunes is diminished significantly causing a more advantageous provider chain what's more, better duty by all partners included (Caridi et al., 2006).

Some of the downsides of CPFR are costs required to address usage. IT frameworks should be executed and the partners include need a similar framework to work at the equivalent pace. Sharing of crucial data to partners is a key issue if there isn't sufficient trust and duty. The danger of manipulating is consistently an issue in a nearby joining forces like the CPFR model requires. An absence of forecasting understandings, helpless incorporation and normalization of data,

collaboration with partners that don't have a similar vision and targets brings about a poor CPFR execution (Pallab, 2012). Inner changes are viewed as more hazardous than financial changes so right execution requires planning and appropriate organizing in the interior processes and individuals (Varma et al. 2010).

2.3 Supply Chain Management and Supply Chain Performance

The supply chain management system became a phenomenon in the late 1980s with the emergence of the large group companies in the world. The globalization provided a greater means to the business community to reach most part of the worlds that were never explored by these businesses (Tseng, Islam, Karia, Fauzi, & Afrin, 2019). It became very clear in the start that there is a need of a new system that can handle and manage efficiently all of this delivery system. The raw material and the products were the two main parts of this system where companies have to work on it. Then came the supply chain management system here all of the business entities like business management, suppliers, distributors, employees, production line and transportation joined to form a steady supply of product in the market (Tseng, Islam, Karia, Fauzi, & Afrin, 2019).

In the business world and ecosystem the delivery of products, goods, services and raw material is very important and in this process a lot of other small process adds up. The time and quality of the products is very important because of the demand at the end user side. The business model is mostly based up on the transportation of this stuff from one place to another, and this is where the competition takes place (Tseng, Islam, Karia, Fauzi, & Afrin, 2019). The companies are trying to invest in the supply chain management because of the saturation of the products in the market. The same products in the market make it very difficult for the companies to compete with each other.

In many occasions it has been seen that the superior quality products lacks in comparison to other products because of the supply chain management issues. The management of these things makes a huge difference between companies and its products (Rajeev, Pati, Padhi, Govindan, 2017)

The supply chain management mostly deals with the transportation of the things from one place to another. The transportation of the raw material from its source to the store gives opportunity for the company to build more storage of the raw material and eventually the product. The inventory is also an important part of the supply chain which takes full record of the movement with its specific code. That enables the companies to track down each and every material moving through its system (Rajeev, Pati, Padhi, Govindan, 2017). The availability of the raw material than gives more space for the company speed up its production and development. That gives an edge to the company to provide the product in time to the suppliers and distributors which are also an essential part of this system (Hong, Zhang, Ding, 2018).

The distribution of the product from the company's warehouse from the end user is the most crucial part where a lot of the branches connect to make a perfect system. The system has to rely on the calculated move by the suppliers and distributors to supply the right kind and right product in the consumer market. The suppliers are responsible to market the specific product in the demography where it is needed (Hong, Zhang, Ding, 2018). The supply chain management enables the company to coordinate with the supplier to supply the product from warehouse to the consumer market. The main thing that makes most of the company tries to catch up is to get the consumer before the saturation. The supply chain than enables the company to continuously supply the products in the

market so the consumer will not buy any other product of another company (Kazancoglu, Kazancoglu, Sagnak, 2018)

The inventory system also plays an important part in the supply chain system at user end. The supplier and the company management need to be at the same page using a same system that can ensure the synchronization of the data in real time. The system can allow them to manage the products and its need in the market so the company can produce more of some specific products (Kazancoglu, Kazancoglu, Sagnak, 2018). It is very important to make order of products depending upon their demand. The company can save a lot of its resources by doing this as the products that are not in more demand can be produced in lesser numbers. The company can store a lot of products in the warehouses that will also save their space and resources in the end. The warehouse is where the company has to store most of its products after producing it through production line. The management has to make sure that the warehouses are capable of storing and then delivering the products at the time of need (Kazancoglu, Kazancoglu, Sagnak, 2018).

The products are transported through different channels using air, sea or road that depends upon the geography and the resources available to company. The supply chain management also makes it simpler for the company to choose the right way of the delivery in the market. Now days the online synchronizing system enables companies to track the material and product through different sections. The updating of the data is very crucial that update the entities about the current state of the work (Hasibuan, Arfah, Parinduri, Hernawati, Harahap, Sibuea, & Sulaiman, 2018).

The performance of the system solely depends upon the data that we updated in the system and mostly this is where the competition between companies is decided. Many companies are still

using the analogue system to update other entities thorough phone calls and paper that enables their rival to take advantage. The performance of the system is very important in the overall production system because the raw material delivery is the main pillar of the production line (Hasibuan, Arfah, Parinduri, Hernawati, Harahap, Sibuea, & Sulaiman, 2018). The production cannot go smoothly without the reliable transportation of the material from source to the company. The system manages to give more control to the management that can change the quality and type of the material in no time depending upon the demand of the specific product (Hasibuan, Arfah, Parinduri, Hernawati, Harahap, Sibuea, & Sulaiman, 2018).

This kind of control is the real performance of the system that set apart companies from their rivals. The online synchronization is the root of the system and it also strengthens by automation in the system. The automation monitors the over all that and its reporting that saves a lot of time. It takes a lot of time to generate certain reports in the system that requires a lot of accounting and tracking of the numbers. But the automation algorithm in the system makes it very easier to control the reporting in supply chain management. The automation provides less time and less human involvement to complete the tasks. The overall supply chain management performance is enhanced by this feature that is used by the top companies in the world (Hasibuan, Arfah, Parinduri, Hernawati, Harahap, Sibuea, & Sulaiman, 2018).

2.4 Collaboration in Supply Chain Management

In supply chain collaboration happens when two or more independent parties working in a firm jointly work together to plan and execute their supply chain operations for greater success as compared to when the parties are acting alone. The idea of collaboration is connected to the idea

of cooperative energy and its turn of events, which supports joint planning and continuous trade of data (Whipple & Russell, 2007). Different ways to deal with collaboration in the supply chain exist, for example, merchant oversight inventory (VMI), CPFR, and customer relation (CR). This examination explicitly centered around CPFR because of its advantageous possible that has demonstrated hard to actualize effectively and, consequently, its full advantages have not generally been acknowledged (Smaros, 2007). Collaboration between firms should possibly be actualized if the two elements are willing and able to do contributing time and exertion, and if the anticipated advantages are more prominent than can be accomplished separately (Lehoux, D'Amours & Langevin, 2014). Taking into account that collaboration is presently comprehended as probably the most ideal approaches to build the probability of accomplishing a suffering upper hand, firms should focus on collaborative execution rules to build up and oversee proficient collaborative relationships. The process of developing collaborative relationships between two firm is illustrated in Figure 1.



Figure 1 Collaboration Process in Supply Chain Management

As indicated by Lehoux, D'Amours and Langevin (2014), the beginning stage in the four primary parts of making collaboration is building collaboration. This includes the choice of partners, creating a legal framework, and overseeing relationships and their modifications. The subsequent angle involves executing coordination components for information-sharing and quick exchange processes. The third perspective spotlights on estimating execution and advantages, which involves the general appraisal of collaborative endeavors and whether these endeavors are maintainable and worth the exertion for working together individuals. The fourth perspective features the usage of motivations; their choice and arrangement.

2.5 Hypothesis Development

Singhry and Rahman (2018) referenced in their research that the collaborative planning, forecasting, and replenishment (CPFR) significantly affects the presentation of the supply chain. This may help in picking up enthusiasm from the investor's viewpoint and they can likewise increment in riches, help in the plan of nation's broadening and improve GDP of the nation. Various organizations will improve in the process of manufacturing and supplying items and administrations. It will coordinate various markets and along these lines decrease costs and improve deals of the association. "Supply chain execution is a significant driver of authoritative and market execution", according to Adams et al. (2014). It helps in turning into a key driver and player in the market execution. Through appropriate planning, forecasting and mix of the markets, one can accomplish the best in the supply chain.

Hence, the hypothesis for this study is:

H1: There is positive relationship between CPFR and supply chain performance.

The research model of the study is as follows:

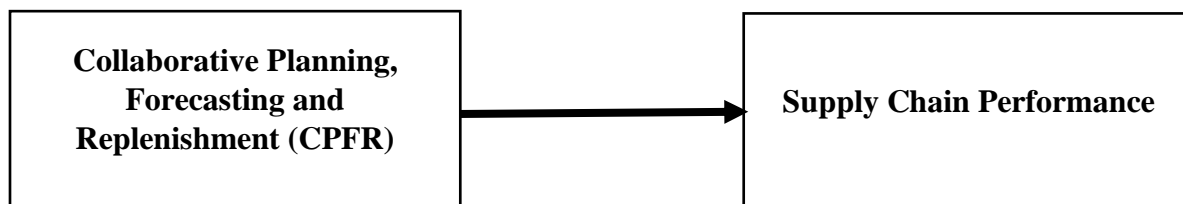


Figure 2 Research Model

2.6 Chapter Summary

In this chapter, detailed research and article related to CPFR and supply chain performance were reviewed. In conclusion, there were three major themes identified in the literature. The first theme is that CPFR is now a well-known concept from an academic point of view but is difficult to put in the practice. The second theme found was that there are many benefits of its usage for all the trading partners but it also has its own drawbacks. The last idea derived is that it is difficult to implement instead of vast well document guidelines available. The gaps in the study were identified and helped in developing hypothesis and research model for the study. The next chapter of the study discusses the research methodology and strategy.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

Methodology is the specific procedures or techniques used to identify, select, process and analyze information to conduct a research along with the justification for using those specific procedures. It allows the researcher to critically evaluate reliability and validity of the information, literature review, facts and all the aspects related to their study. Without the methodology section the research paper will not be seen as authentic and its legitimacy can be challenged easily. The methodology section of the research paper answers two main questions: How the data was collected or generated? And how was it analyzed?

Every researcher has to show his research to the panel which will check its authenticity and evidence about the facts. The methodology is usually used as an evidence to showcase the authenticity and validity of the procedures used, to the panel that will analyze the study after the research analyses. It is the record of how the research needs to be carried out. It is generally the part where researchers explain their study. The researchers must include all the procedures and aspects of their work in methodology that includes the collection of data, the procedure of analysis and also the method which they have utilized in it (Kallet, Richard, 2004)

The methodology also showcases the ways in which the data will be processed, the procedures that will be used to analyze that data and the specific research tools or strategies that will be utilized to study the underlying hypothesis and research questions. They can include, numbers, statistics, formulas, previous studies, recommendations, proven results, facts, journals and authentic reading

material related to the research (L.F. et al, 2011). A researcher needs to design the right methodology to arrive at the conclusion of the problem and if the results are not matching with the mechanism than the methodology or results are wrong.

3.2 Research Approaches

Research can be conducted through different approaches. Five research approaches that are widely used are: Descriptive study, explanatory study, remedial study, methodological study and historical study. A research may include two or more of these approaches.

Descriptive study

This research approach is used to identify the characteristics of a problem through description in which facts are collected through pre-determined criteria that is used to demonstrate relationships of interest.

Explanatory study

This approach is used to find the solution to an enigmatic question. The approach is designed to identify cause effect relationships which includes the collection of empirical data for hypothesis development and then test the hypothesis by any of the ways available to the researcher.

Remedial study

This approach is used to formulate plans to improve or enhance undesirable social, economic, political or environmental situation. Different strategies are formulated to remedy the undesirable situations and implementation methods are also analyzed.

Methodological study

The methodological study is used to test or improve new research methods in planning, and develop a specific technique for the discipline in attempt to apply it to a planning context.

Historical study

This study is not only used to fill gaps in factual knowledge but also to facilitate a deeper understanding of historical process. This approach is very useful.

3.2.1 Types of methodology

Types of methodologies can be classified into several categories according to the nature and purpose of the study and other attributes. The main attribute is the data collection method that is different for different methodologies. There are any types of researches that may require more than one kind of methodology or a mixture of more than one.

Each research hypothesis requires different types of analysis so, different types of research methodology are available to work out different theories and hypothesis. There are three basic methodologies used by the researchers while establishing facts and mechanism in their study, they are:

- i. Qualitative methodology
- ii. Quantitative methodology
- iii. Mixed methodology

Qualitative methodology:

Qualitative research provides rich, contextual exploration of the topic that are often culturally meaningful. In qualitative research the objective stance is obsolete, the researcher is the instrument, and subjects become participants who may contribute to data interpretation and analysis. Qualitative researchers defend the integrity of their work by different means: trustworthiness, credibility, applicability and consistency. This is an unstructured or semi-structures type of methodology in which the information is collected through interviews, direct observation, analysis of artifacts, documents, and cultural records, or use of visual materials or personal experience. The sample size is typically small and respondents are selected to fulfil a given quota. It provides insights into a problem or helps develop hypothesis for a potential quantitative research.

The purpose of the qualitative research is to understand the social reality of individuals, groups and culture as its participants feel it. Thus the participating people or groups are studied in their natural settings. This type of research seeks to explain how and why a particular phenomenon, or behavior operates as it does in a particular setting (McLeod, S. A, 2019).

This kind of methodology is used in the studies related to philosophies and emotions which cannot be utilized in the fields of science or where the current statistical data is required. The time and costs involved, qualitative designs do not generally draw samples from large-scale data sets. It is difficult to apply conventional standards of reliability and validity based on the subjective nature of the qualitative data and its origin in single context.

Quantitative methodology:

Quantitative methodology gathers data in a numerical form which can be put into categories, ranks or in units of measures. The data collected can be used to construct graphs and tables of raw data. Quantitative methodology aims to establish general laws of behavior and phenomenon across different settings. Research is used to test a theory and ultimately support or reject it. The data collected through this methodology can be very huge and unstructured that needs to be compiled and put in a structured table. The numbers and statistics coming from one source cannot be the same from another source. So in this case the researchers must be precise in choosing their source and the design of the study is determined before it begins. Quantitative experiments do not take place in natural settings and does not allow participants to explain their choices or the meaning of the questions may have for those participants.

For the quantitative researcher reality is objective and exist separately to the researcher, and is capable of being seen by anyone. The data can be interpreted with statistical analysis based on the principles of mathematics that is why the quantitative methodology is viewed as scientifically objective and rational and is useful for testing and validating already constructed theories (Denscombe, 2010).

Mixed methodology:

Mixed methodology is a research approach in which researcher used both qualitative and quantitative methods for data collection and analysis within the same study. The researchers may need to get data from both kind of analysis in order to fulfil the demand of the research and result. In many cases the researchers are mixing the data from both sources and then formulating a

comprehensive result. For example; the researcher may need to take interview of some individual and also needs to take the data from previous researches to strengthen its viewpoint or quantitative analysis. This methodology allows the researcher to explore diverse perspectives and uncover relationships that exist between complex layers of multifaceted research questions (Bowers, Cohen, Elliot, 2013).

3.3 Population and Sampling

A population is the entire group that a researcher wants to draw conclusion from. It can be an aggregate of creatures, objects, cases and so on. For instance, the population of Saudi Arabia is the total number of people living within Saudi Arabia's boundaries. A population contains all or too many individuals to carry out the study conveniently, so a sample is drawn from it. A well-chosen sample will include all the characteristics and information of the particular population and the relation between the sample and the original population should be such that a true inference can be made about the particular population from the chosen sample. (Chapman & Hall, 1991).

The population of the study is Grocery Retail Stores in Jeddah, Saudi Arabia. The sample of the study involved employees of three major grocery retail stores in Jeddah: Panda Hypermarket, Lulu and Danube.

3.4 Sampling selection procedure

There are two main type of sampling procedure

Probability sampling- this process includes random selection thus allowing the researcher to make inferences about the whole group. It is further classified into four types: Simple random sample, systematic sample, stratified sample and cluster.

Non-probability sampling- this process involves nonrandom selection based on any convenience or any criteria. It is further classified into four main types: convenience sample, voluntary response sample, purposive sample and snowball sample.

In this study, non-probability sampling procedure is used. Convenient sampling was used to select the sample and collect the data.

3.5 Questionnaire Design

Questionnaire is used by the researcher to collect responses from the respondents to answer a particular research question. The design of the questionnaire is very important and should be designed very carefully so that it ensures that the data collected is accurate and the results can be interpreted from it. A good questionnaire should be valid, reliable, clear and concise. (Greenhalgh, 2014)

3.6 Data collection

Data collection is the process of gathering and measuring information on variables of interest in an established systematic manner that enables one to answer the research questions, test hypothesis and evaluate outcomes.

In this study, data is collected through Google Forms. The questionnaire was distributed to the participant using Emails and some were filled in store on the I-pad of the researcher.

3.7 Data analysis

Data Analysis is the process of systematically applying statistical or logical techniques to describe, illustrate and evaluate data. During the data collection the researchers may get a huge amount of data that is secondary or not related to the topic directly. The analysis will help the researchers to take out the unnecessary data and formulate a more comprehensive data needed for the research.

In this study, data is analyzed using IBM SPSS 25.0. Correlation coefficient and regression analysis is used understand the relationship between CPF_R and supply chain performance.

3.8 Consent form

A consent form is an agreement between the researcher and the research participant outlining the roles and responsibilities they are taking towards one another throughout of the whole research process. This form ensures that the participants are willingly giving the information in a legalized way with breaking any law.

3.9 Chapter Summary

In this chapter, overview of the research methodology, approaches, strategies, population, sampling procedures and data analysis was given. The next chapter discusses the result and their discussion.

CHAPTER 4: RESULT AND DISCUSSION

4.1 Introduction

In this section of the report, the data which was collected through the questionnaire will be analyzed. The Questionnaire was responded by 49 participants. The response rate of the survey was 100%. In this section, we study the demographic profile of the participants, test reliability of the questionnaire and analyze the correlation and regression model to test our hypothesis.

4.2 Demographic Profile

The survey was filled by 49 employees working in grocery retail stores in Jeddah, Saudi Arabia. Most of the participants who filled the survey were General Manager (30.6%), Director (26.5%), Assistant Director (14.3%), Assistance manager (22.4%) and rest were sales contact agents as shown in Figure 3. The Ownership structure of the company was local firms (71.4%) and foreign-local firm (26.5%) as shown in Figure 4. Most of the firm had 201 to 500 employees (61.7%) in their stores, 101-200 (14.9%) and 17% more than 500 and above as shown in figure 5.

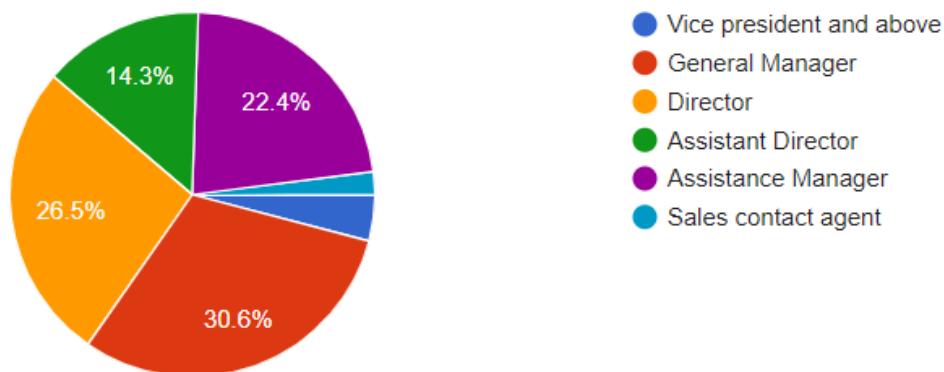


Figure 3 Job Position of the Participants

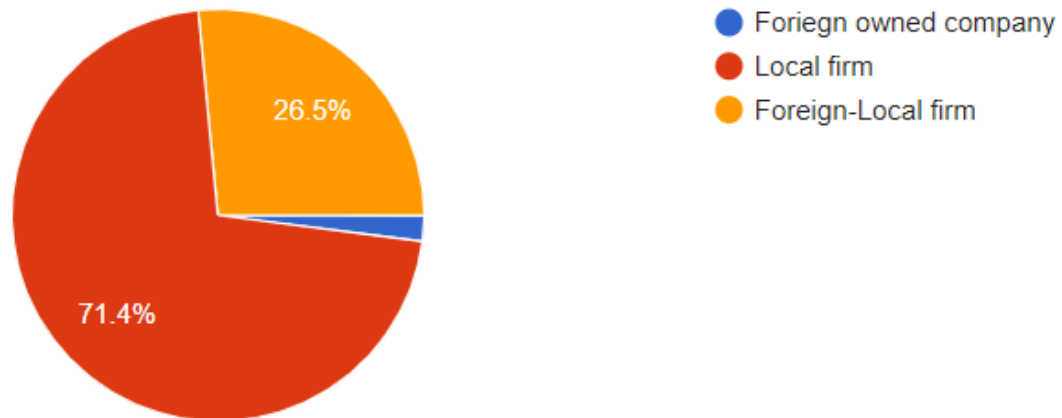


Figure 4 Ownership Structure of the Company

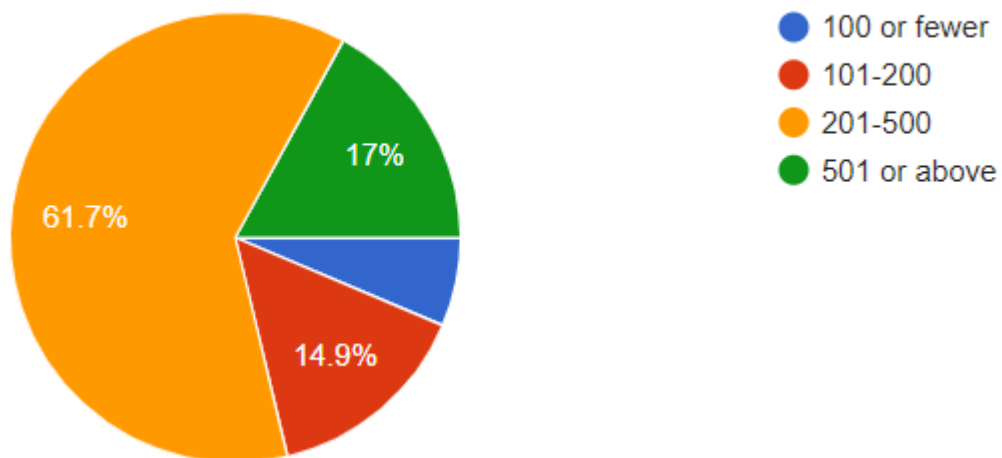


Figure 5 Employees in the Stores

4.3 Reliability Analysis

A reliability scale test refers to the degree to which the scale which is being used in the questionnaire is producing a reliable and consistent result. It also measures the central tendency of the questionnaire. The central tendency of the data tests if the questionnaire is measuring what it is supposed to measure. One of the most common and efficient way of checking the reliability of the questionnaire is the Cronbach's Alpha coefficient test. This test was developed by Lee Cronbach in the year 1951. It measures the internal consistency of the questionnaire. If the score of the Cronbach's Alpha is equal to or more than 0.65, then the questionnaire is considered reliable (Yarnold & Soltysik, 2005).

The reliability statistics for Collaborative Planning, Forecasting and Replenishment (CPFR) is as follow:

Reliability Statistics	
Cronbach's Alpha	N of Items
.822	7

Table 1 Reliability Statistics for CPFR

The Cronbach's Alpha coefficient for collaborative planning, forecasting and replenishment (CPFR) is 0.822, which shows that the scale is reliable.

Reliability Statistics	
Cronbach's Alpha	N of Items
.945	8

Table 2 Reliability Statistics for Supply Chain Performance

The Cronbach's Alpha coefficient for supply chain performance is 0.945. This shows that the scale is reliable.

4.4 Pearson's Correlation Analysis

Pearson's Correlation test the relationship between two variables. It produces a correlation coefficient, r , which measures the strength and direction of the relationship between two variables. The value of +1 indicates a positive strong relation whereas the value of -1 indicates a negative strong relationship.

The correlation matrix between CPFR and supply chain performance is as follows:

Correlations		
	AVGSP	AVGCPFR

AVGSP	Pearson Correlation	1	.851
	N	49	49
AVGCPFR	Pearson Correlation	.851	1
	N	49	49

Table 3 Correlation Coefficient Between CPFR and SCP

In the matrix given above, correlation coefficient analysis has been done in order to check the relationship between CPFR and SCP. The value of Pearson correlation coefficient is 0.851. This shows that the CPFR and supply chain performance are significantly and positively related at significance level of 0.01. Both the variables are closely related as the value generated is close to +1.

4.5 Regression Analysis

Regression analysis allows the researcher to check the relationship between two or more variables. It examines the influence of one variable (independent) on another variable (dependent).

Variables Entered/Removed ^a			
Model	Variables Entered	Variables Removed	Method
1	AVGCPFR ^b	.	Enter

Table 4 Values Entered

a. Dependent Variable: AVGSP

b. All requested variables entered.

It can be seen from the table 4 that the independent variable of the study is CPFR and the dependent variable is supply chain performance.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.851 ^a	.724	.715	.613140

Table 5 Regression Model Summary

It can be seen from the Table 5 that the R Square value of the model is 0.724 or 72.4%. The model coefficient of determination is 72.4% that there will be significant changes upon the CPF. This shows that our hypothesis is supported and there is a positive relationship between these variables.

CHAPTER 5: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Discussion and Conclusion

The main purpose of the research was to study the impact of Collaborative planning, forecasting and replenishment (CPFR) on supply chain performance (SCP). Our result analysis shows that there is a significant positive impact of CPFR on SCP. This study extends the direct findings of the CPFR and SCP into the limited literature available. Supply chain and its performance is really a critical job in the life of the business to keep up. It not just prompts the advancement of the business organize yet in addition decreases costs successfully. They include achievability and openness of the items in the business. It goes about as a benchmark for others to contend and in like manner rival rivals in the market. It really gives an indication of better administration. Collaborative planning, forecasting, and replenishment is perhaps the best strategy to improve the exhibition of the supply chain execution. CPFR is set to improve the execution of the SCP.

Various associations are presently utilizing it to drive the exhibition of the supply chain and build up its objectives in like manner. The study has been acted in the association named OKAM and these are the outcomes demonstrated that there is a positive relationship among CPFR and SCP which implies that CPFR have direct effect on the SCP. The speculation proposed is endorsed in the exploration as bolstered by the factual and spellbinding investigation. Also, the outcomes are in indicating that there is no huge contrast between the factors with the utilization of unwavering quality test, relationship, ANOVA, and relapse investigation. This is steady with the writing text referenced in the exploration also.

This showed the association performed better in the supply chain with the utilization of collaborative planning, forecasting, and replenishment. This examination has added to the information on relationship of the SCP and CPFR and has included an organization in Saudi Arabia to extend its specific circumstance. More associations can be urged to utilize the CPFR to improve their supply chain. This process will assist them with driving the presentation of the association when all is said in done. As indicated by CPFR literature this process includes activities of the two retailers and providers on various components of the process. The retailer fills in as a Point of Sales so he gangs the most refreshed furthermore, genuine information dependent on customer's necessities and most recent patterns. This recorded log fills in as significant information for creating conjectures. In view of this information an estimate skyline is created and the requests become the gauge itself. Levels of inventory are likewise refreshed and envision by both individuals from the supply chain to recharge at whatever point is required. This is the provider's fundamental reason for the CPFR process. (Holmström et al., 2002).

Executing CPFR in an organization can be to some degree progressive to certain organizations and for others it could simply suggest little changes in accordance with their process. Organizations deprived for better outcomes in terms of lower their inventory levels, making quicker, increasingly viable and proficient supply chains as well requires the attributes depicted above in this sub area. Finding the need is the most significant advance of the process. As we have seen all through the theory finding the need suggests realizing your inventory levels, are they high, or low, your capacity to respond to customers is sufficiently quick, or then again are you being toppled by different organizations responding preferred and quicker over you. Other significant issues is cost, are your items being bought on time maintaining a strategic distance from burnouts or stockouts, is the process responding to customer needs dependent on irregularity and extraordinary advancements. These issues are imperative to remember while considering an alternate system dependent on CPFR.

5.2 Limitations of The Research

Although, the study has received consistent result in relationship between CPFR and SCP, the study is not without its limitations. One of the main limitation was the collection of data. Due to the ongoing pandemic COVID-19, it was difficult to collect more data from the participant, so the sample size was relatively small. The small number of sample size makes it difficult to generalize the result on other sectors or countries. Apart from these, the biasness of the employees of the companies can also add as a limitation of the study.

5.3 Future Direction

For future studies, the researchers should increase the number of respondents. Other sectors such as manufacturing, retail, and construction should be explored in Saudi Arabia.

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7. APPENDIX A: QUESTIONNAIRE

Impact of CPFR on Supply Chain Performance

* Required

1. Your Name?

2. Job title

Mark only one oval.

- Vice president and above
 General Manager
 Director
 Assistant Director
 Assistance Manager
 Other: _____

3. Ownership structure of the company?

Mark only one oval.

- Foreign owned company
 Local firm
 Foreign-Local firm
 Other: _____

4. Year of Establishment?

5. Number of employees in the firm?

Mark only one oval.

- 100 or fewer
- 101-200
- 201-500
- 501 or above

Collaborative Planning, Forecasting and Replenishment

6. We often adjust our production system to meet the requirement of our customers *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

7. We often work with major customers to determine the delivery schedules that will best meet their needs *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

8. We try to incorporate our suppliers' and customers' forecasts into our forecast *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

9. We work with major suppliers and customers to help them improve their forecast accuracy *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

10. We work with supply chain partners to develop joint sales forecasts for replenishment *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

11. We can depend on our suppliers to provide us with good market forecasts and planning information *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

12. If we request forecasting data from our customers, they will respond constructively and caringly *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

13. Supply chain helps us reduce manufacturing cost *

Mark only one oval.

	1	2	3	4	5	
Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Disagree

14. Supply chain helps us reduce total cost *

Mark only one oval.

	1	2	3	4	5	
Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Disagree

15. Supply chain helps us reduce inventory cost *

Mark only one oval.

	1	2	3	4	5	
Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Disagree

16. Supply chain helps us increase customer responsiveness/service *

Mark only one oval.

	1	2	3	4	5	
Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Disagree

17. Supply chain helps us deliver products on time *

Mark only one oval.

	1	2	3	4	5	
Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Disagree

18. Supply chain helps us reduce out of stock rate *

Mark only one oval.

	1	2	3	4	5	
Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Disagree

19. Supply chain helps us improve market share *

Mark only one oval.

	1	2	3	4	5	
Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Disagree

20. Supply chain helps us improve sales growth *

Mark only one oval.

	1	2	3	4	5	
Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Disagree

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