Impact of implementation of ERP system on Supply Chain Efficiency in an Automotive Industry in Pakistan: A Case Study of Exide Pakistan Ltd

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A thesis presented to the Department of Management Sciences, Bahria University Karachi Campus, in fulfilment of the requirement for the MBA degree Thesis

SPRING, 2015

Bahria University Karachi Campus

APPROVAL FOR EXAMINATION

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Thesis Title: Impact of implementation of ERP system on Supply Chain Efficiency in an Automotive Industry in Pakistan: A Case Study of Exide Pakistan Ltd

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

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Acknowledgement

Besides the effort I have put in, this research project has now finally completed with the support of various people to whom we wish to honor our appreciation.

Firstly, I like to thank Almighty Allah who gave me the strength and determination to complete this research project.

I am grateful to my thesis advisor, **M. Jiyad Shaikh** for giving me the opportunity to undergo this research project and especially for his assistance with respect to all my queries while I was working on my thesis. He was a great supporter and I will always be grateful to him for such kind behavior. He guided me throughout my thesis and extended all the facilities I needed to successfully complete this research project.

Finally, I would also like to thanks leadership team and senior management of Exide Pakistan Ltd for outstanding support and assistance provided during my various visits in collection of data for this research.

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Abstract

Purpose of the study: This research study is mainly about the use of information technology i.e ERP in enhancing the performance of supply chain drivers. For this purpose Pakistan's leading automotive industry Exide Pakistan Ltd was selected. In this research statistical analysis and empirical approach was used to find out the impact of ERP systems on supply chain efficiency.

Research Methodology/Sampling: The nature of research is quantitative, and for data collection primary sources were used. This research study includes only primary data because of its explanatory nature (i.e. quantitative nature). Present working employees of Exide Pakistan Ltd are the source of data collection. The sampling units for this research are the employees of Exide Pakistan Ltd. The Sampling Technique which will be used is Stratified sampling technique with disproportionate sampling and in this study focus is given to each employee's point of view. Statistical tools have also been applied in this regard including SPSS, Regression and ANOVA.

Findings: All the hypotheses were statistically proved and studied in detail narrating the relationship of supply chain and its transformational role in enhancing the performance of all the drivers consisting planning, sourcing, manufacturing, delivery and return in terms of ERP which is with no doubt transforming and shaping the world of supply chain.

Practical Implications: In the end, the conclusion of the study has been provided along with set of recommendations to suggest more rooms for improvements. For the success and betterment of organizations usage of ERP systems enhance the performance level of business practices and overall supply chain performance improvement.

Keywords: Information Technology, Supply Chain efficiency, SCOR Model

CHAPTER 1: INTRODUCTION

Supply chain management is a network consisting of suppliers, manufacturers, distributors, retailers and customer. All are linked and integrate each other in the form of chain. The ultimate purpose of supply chain is to meet the customer needs, wants and demand. To meet the requirement of customers we need connectivity between the suppliers, manufacturers, distributors, retailers and customer. Supply chain management is all about to manage the flow of information from the point of initiation to the point of consumption. There are essentially three goals of SCM: to reduce inventory, to increase the speed of transactions with real-time data exchange, and to increase revenue by satisfying customer demands more efficiently. ERP refers to automation and integration of a company's core business to help them focus on effectiveness & simplified success.

1.1 Background of the study

For recording and managing enterprise data a business software called 'ERP' has been developed and term 'ERP' is considered as not self-explanatory. Processes related to core business like scheduling operations, taking customer orders and keeping inventory records and financial data becomes integrated and automatic by using ERP System.

Business organizations have faced significant challenges due to dynamic nature of business atmosphere. Today organizations and firms have entered in to a new complicated and competitive era of business environment as compared to the traditional and outdated business surroundings (Chen & Lin, 2009; Ellram, 1993). The strategies and roles of an organization has altered and improved with the introduction of information technology (IT) and now among firms in supplies and deliveries chain more importance are given to the strategic inter-linkages. Therefore complex chain of firms which are engaged in various roles is responsible for the success of a firm instead of individual performance. Designing of supply chain acquiring significant importance as a core competence due to continuously varying nature of business environment globally, stated by Fine (1998). Enterprise resource Planning (ERP) for conquering the business arena is treated as another business-driven phenomenon. The factors that play a major role in adoption of ERP system are supply chain system upgrading demand from customers and partners, or the reformations requirement or permutations in the current legacy

systems and the competitors exerted pressure. Primarily ERP and Supply Chain Management (SCM) are used to assist different aspects of an organization. Integration of ERP into SCM helps to fulfil the requirement of incorporation of IT into the management of a supply chain. For an organization to persist at competitive edge the integration of ERP into SCM is considered as a 'natural and essential process in strategic and managerial consideration' (Koh, Saad, & Arunachalam, 2006).

Now days for efficiently control over all supply chain in numerous industrial fields' managers play a vital role and for obtaining their goals they adopt several fruitful procedures and approaches including total quality management (TQM), just in time (JIT) and ERP. The main key tools that help organizations to control over their suppliers are information and effective SCM. Therefore for successful structure of domestic and global market businesses, giant investment in IT sector is the most fascinated approach for firms of all over the world. ERP systems are already in operation or targeted to use in numerous organizations and corporations.

By using ERP system the overall efficiency of business (production planning and order entry) is increased because ERP systems are particularly designed for this purpose (Mabert, Soni, & Venkataramanan, 2001).

Due to massive investment in IT sector the major advantages that a company acquired is that company and its partners of supply chain could share significant amount of information and data along the supply chain, which results in easiness of real-time collaboration among partners and also distribution is improved with efficiently managed inventory.

In views of some researchers, SCM competencies and synchronous decision-making is possible through data and information processing and transmission, with the help of ERP (Hsu, Tan, Kannan, & Keong Leong, 2009; Sanders, 2007).

In addition, in order to provide more e-business or e-commerce services plus to increase the functionalities of the supply chain to their suppliers and customers numerous ERP developed organizations have extended the ERP system scope. (Olhager & Selldin, 2003).

In business continuity, challenges faced by business organization with respect to atmospheric change has been studied by Chen & Lin, 2009; Ellram, 1993. Recently traditional business

atmosphere has been replaced by a new more competitive and complicated business environment in firms.

The several terms that are used by many researchers for IT revolutionizing supply are electronic data interchange (EDI), materials resource planning (MRP) and enterprise resource planning (ERP). Moreover for fulfilling the numerous requirements of supply chain activities a wide IT programs other than aforementioned technologies has been developed, launched and implemented.

A global non-profit association known as Supply-Chain Council (SCC) provides tools (methodology, diagnostic and benchmarking) for other organizations to speedy and dramatic improvements in supply-chain processes. One of the major products of Supply-Chain Council is Supply Chain Operation Reference model (SCOR). Supply Chain Operation Reference model (SCOR) is a major revolution in the field of supply chain management. SCOR Model is shown below.

Figure-1: SCOR Model
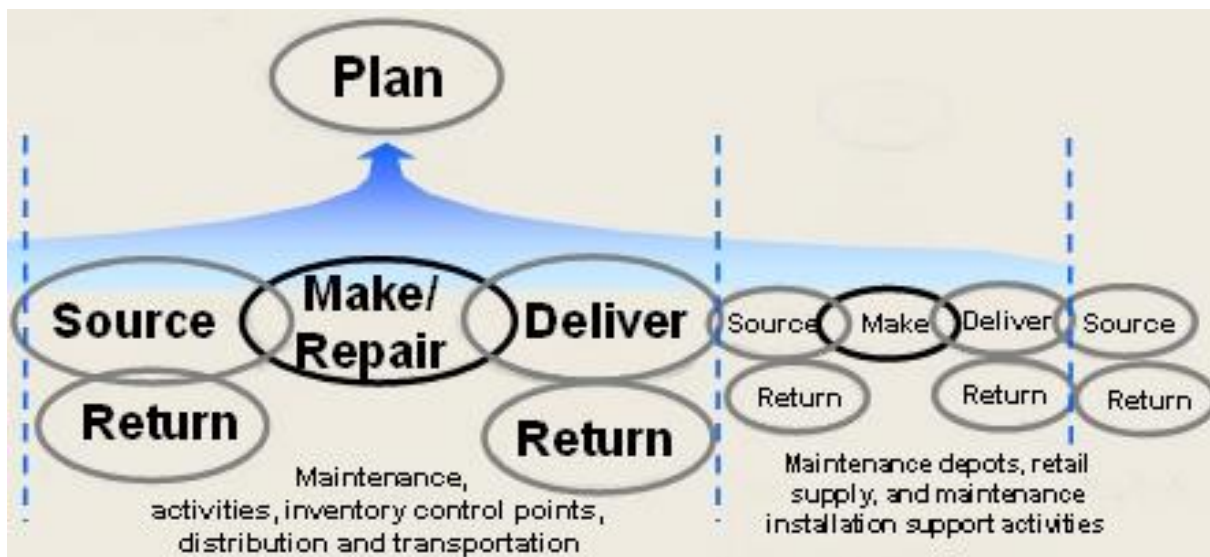
Source: SCC, 2009.

In SCOR Model there are five main drivers i.e. Plan, Source, Make, Deliver and Return. The activities that undergoes in Plan are: material requirement for production, process requirement, schedule of assembly line, forecasting and supply. Whereas sourcing and procurement of materials deals in Source section. Make as its name a show is related to production of stock.

Deliver section handles the activities related to warehouse, logistics of stock at a quality service level and delivering of goods or products or services Post-delivery and after sales services to the customer are treated in Return.

Currently in most sectors, for creating competition various organizations are interested in implementation of ERP technology which is actually an enabler of SCOR and supply chain management. The basic purpose of this study is evaluating the effectiveness and significance of ERP in a growth mode and how ERP play its role in effective supply chain operation transformation of an organization.

One of the most growing and active field in Pakistan for a long time is Automotive industry. For being more productive, competitive, cost efficient and making supply chain more agile automotive industry understands the importance of ERP and implemented it for achieving their goals. Currently EXIDE is the most prominent manufacturer of Lead Acid Electric Storage Batteries in battery sector of Pakistan's automotive industry. FY12 for EXIDE was a remarkable 22.75 percent growth rate in the top line. Total asset gross revenue increases in FY12 (2.41 times) as compare to FY11 (1.92 times) due to efficient utilization of assets and culmination of branding efforts of the company. As a result recently the floating price of share is approximately six times (i.e. 2349.34) more than the price of last fiscal year i.e. 2013

1.2 Problem statement

In a very competitive environment companies going for integrated supply chain management and want to be successful organization globally, Information technology use as a key enabler tool for this type of integration. Now a day's companies face very aggressive attitude from his competitors and every one want to beat our opponent in the market so it can only possible through transforming their supply chain into efficient and effective supply chain management by integration. Timely sharing of information is also a very important aspect across the supply chain drivers Therefore it is imperative to find the level of effectiveness in supply chain drivers (plan, source, make, deliver and return) by virtue of ERP with special reference to Exide Pakistan Ltd as Exide is the leading Lead Acid Electric Storage Batteries in Pakistan.

1.3 Significance

Supply chain is an emerging field globally. During the past few years supply chain has gained huge importance and is today considered one of the building blocks of conducting successful business. It is the backbone of firms operations. Previous researches has addressed impacts of ERP on supply chain on a global perspective and many researches were conducted on fast moving consumer goods organizations. Currently there is a vast boom in automobile sector and business flourish drastically so there is a need created where like ERP systems must be implemented and established a relationship between ERP system and supply chain system. Very few studies has been conducted in Pakistan on ERP based system implications that helps in improving the performance of supply chain especially in Automobile sector. In this sector organization's moves towards ERP based system that helps in controlling supply chain process and also it helps in reducing cost. Cost factor is very important now days due to competitive environment. Every organization want to increase our market share. To achieve this target companies should go for cost effective strategy that help in compete the markets. To tackle the upcoming challenges where changes trend exists Automobile industry profoundly rely on ERP systems and supply chain efficiency, enhancing the efficiency to improve the market share, more robust planning, cost effective procurement, partnering with vendors and listening to consumers. The results of current study will explain the conceptual frame work of ERP as enabler of Effective Drivers.

1.4   Ethical considerations

It has been assured by the researcher that there is no plagiarism and all the references which are provided on the study conducted are true and ensure ethics.

1.5   Organization of the Thesis

The thesis will comprise six chapters, a list of references / bibliography and appendices.

Chapter 1 will constitute the problem background, aim of the research, research questions/hypothesis and objectives and introduction to the organization/sector over which the research is being conducted etc.

Chapter 2 will provide information on research methodology – nature and kind of research, sample size, sampling method, data collection methods employed during the study, kind of data collected, and the way the data is integrated.

Chapter 3 will provide critical review of the existing literature containing the critical academic debate about (the topic) with the views of the academicians' and practitioners' on the matter.

Chapter 4 will comprise the research data of both kinds – primary as well as secondary – collected and integrated. It will also show findings of the data and their interpretation and analysis.

Chapter 5 will comprise a critical debate on the study drawing on the literature review and contrasting it with the findings of this study.

Chapter 6 will constitute recommendations and conclusions to the study.

1.6 Limitations

Following limitations would most likely to be observed while conducting the study.

Firms Exide Pakistan is quite protective about their internal information. Therefore their data confidentiality policy would be a hurdle while gathering data.

Data accessibility would also be a problematic area because of confidentiality policy of not sharing the firm's numeric data publically.

Due to time constraint the research is restricted to Exide Pakistan.

CHAPTER 2: RESEARCH METHOGOLGY AND TECHNIQUES

This section outlines all the tools and procedures that have been used for the data collection process. Keeping in view the quantitative nature of the study, the research comprises of comprehensive primary sources. The research study designed and conducted in the following manner to explore the impact of variables within the limited time frame.

2.1 Research methodology

For determining the contribution of ERP in performance improvement of supply chain drivers (plan, source, make, deliver and return) we use regression due to its suitability for quantitative nature of research. For this purpose we would distribute 30 questionnaires among the company's employees. Each questionnaire has 15 questions which cover all the variables that are given in aforementioned conceptual framework.

2.2 Nature of Research

In Exide Pakistan Ltd, what is the impact of ERP on overall supply chain performance is the basic emphasis in this research .This research study includes only primary data because of its explanatory nature (i.e. quantitative nature). Present working employees of Exide Pakistan Ltd are the source of data collection and in this study focus is given to each employee's point of view.

2.3 Sampling Technique and Sample Size

The sampling units for this research are the employees of Exide Pakistan Ltd. The Sampling Technique which will be used is Stratified sampling technique with disproportionate sampling. Stratified sampling is one of the best method in getting the most accurate result and provide more information with a given sample size. Stratified random sampling that involves the division. At first stage population is divided into groups on the basis of shared attributes or characteristics. Sample drawn from the company's employees for filling the questionnaire is defined as below.

- Senior Managers
- Managers
- Assistant Managers

2.4 Data Collection Method

Since this research is quantitative in nature. It consists of only primary data. Data would be collected by using primary approaches and a total of 30 questionnaires will be filled from Exide Pakistan's employees.

2.5 Data Integration Method

Data integration method use in this research consists of questionnaires which will be designed on the basis of Likert scale and the data collected and gathered from the respondents will be tested using statistical methods like regression and SPSS to further check the impact of each identified variable.

CHAPTER 3: LITERATURE REVIEW

The purpose of this literature review is to explore usefulness of ERP systems and also explore the variables that are mentioned in conceptual framework through the past researches and information availability. This chapter aims to study and highlight the contribution of information technology i.e. ERP in improving the efficiency of supply chain performance.

There was almost no company that could afford no computer in 1960's so record of manufacturing and inventories were gathers to carry enough stock in order to satisfy customer current demand, future demands and their past orders effectively and efficiently. In 1970s and 1980s, material requirement planning MRP and master production schedule MPS grabbed the very attention of industries when computers became inexpensive and slight. MRP emerged as a structure for planning requirement of raw materials in industrial environment this idea was later proceeded "closed loop MRP" then it prolonged to (MRP II). It had foundation of MRP system but some factor like scheduling and capacity planning activities were new to promote the section. Enterprise resource planning introduce in early 1990's after the further promotion of MRP II, which involves all the functions of MRP II in which finance , supply chain , Human resource and project management functions were integrated

Now days for efficiently control over all supply chain in numerous industrial fields' managers play a vital role and for obtaining their goals they adopt several fruitful procedures and approaches including total quality management (TQM), just in time (JIT) and ERP. The main key tools that help organizations to control over their suppliers are information and effective SCM. Therefore for successful structure of domestic and global market businesses, giant investment in IT sector is the most fascinated approach for firms of all over the world. ERP systems are already in operation or targeted to use in numerous organizations and corporations.

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In addition, in order to provide more e-business or e-commerce services plus to increase the functionalities of the supply chain to their suppliers and customers numerous ERP developed organizations have extended the ERP system scope. (Olhager & Selldin, 2003).

In business continuity, challenges faced by business organization with respect to atmospheric change has been studied by Chen & Lin, 2009; Ellram, 1993. Recently traditional business atmosphere has been replaced by a new more competitive and complicated business environment in firms.

Theoretically, there are various researchers who defined the concepts of supply chain management, supply chain operation reference model (SCOR) and role of IT in drivers of SCOR. From these numerous studies of researchers some of them are stated as follows:

Van Donk [2008] explained that plentiful amount of capital is spent for purchasing, implementing and upgrading of ERP system that means in supply chain the capabilities of ERP system is ineffectively explored. Therefore, objectives of implementing ERP system seldom achieved to the adequate level

Another researchers, Akkermans, Bogerd, Yücesan, and Van Wassenhove [2003], found that for multiple partners the designed ERP system is not comprehensive solution due to one feature of ERP system i.e. it is supposed to integrate the functions of the system of an organization. This feature makes the designed ERP system impact in improving and upgrading the performance of a supply chain insignificant

Information technology(IT) applications due to ability of costs reduction and improved sensitivity of supply chain functions has achieved a great importance in the field of supply chain

management (SCM) stated by [Mc Laren et al , 2004: Chopra & Meindl, 2001; Dagenais & Gaustchi , 2002; Lee, 2000; Ndubisi & Jantan, 2003].

Both facilitation and blockage of integration of a supply chain could be done simultaneously with the help of ERP system, discovered by Kelle and Akbulut [2005].

Companies for achieving increase in 'competitive advantage' [Byrd & Turner, 2001] and increased productivity [Sabherwal & Chan, 2001], use IT solutions like ERP (Enterprise Resource Planning) systems.

According to [Bartlett, Julien, & Baines, 2007; Cooper, Lambert, & Pagh, 1997; Derocher & Kilpatrick, 2000; Evans & Wurster, 1997; Forslund, 2007; Griffith & Myers, 2005; Myers & Cheung, 2008; Thatte, 2007] for successful supply chains the key component is information exchange. Also [Bilek, 2010; Hsu, Kannan, Tan, & Leong, 2008] explained that performance of supply chain greatly enhanced due to sharing of information.

The difficulty of managing various interfaces and information systems are planned to reduce by implementing ERP which has one continuous updated application [Allen, 2011]. This helps to provide efficient knowledge integration throughout the company and within an organization makes supply chain visible [Allen, 2011].

Core competencies of organizations are increased by proper knowledge integration that helps to connect different functions within organization [Wadhwa, Saxena, & Chan, 2008]. This study also explored that knowledge sharing with supply chain partners increases with the increase in knowledge integration [Wadhwa et al., 2008].

In view of Patnayakuni et al. [2006] , in phases of development positive influence on performance development occurred due to collaborative sharing, exchange and integration of knowledge.

It is also examined that as a result of sharing information between buyers and suppliers, the ability of suppliers to adapt to buyers' needs improved Myers and Cheung [2008].

In the field of supply chain, Supply chain operation reference model (SCOR model) is another current development. A global known association Supply Chain Council (SCC), because of its

distinction and proficiency in supply chain practices and systems formulation, has credit of introduction of Supply chain operation reference model (SCOR). This model is certainly focused on benchmarking and considered as a reference model having standardized terminology and processes [Meyr et al. 2002]. For development and enhanced performance along with bottom line augmentation of company ,a portfolio is crafted which is directly related with balance sheet of the company that means benchmarking in SCOR model is actually linked with operational measurement.

Figure-1: SCOR Model
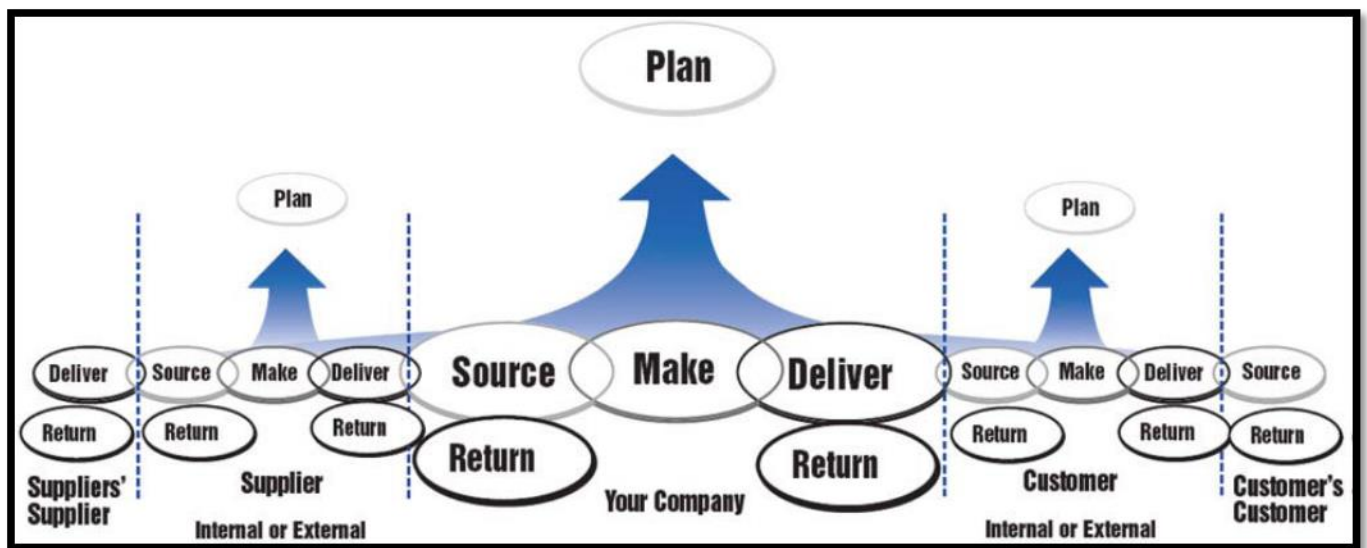
Source: SCC, 2009.

Supply chain operation reference model (SCOR) has five components or drivers as illustrated in aforementioned figure of SCOR model. These five drivers of SCOR model are: Plan, Source, Make, Deliver, and Return.

According to Hanfield and Nicholas [1999] the principal drivers of integration in ERP system transforming the supply chain and SCOR is described by Hanfield and Nicholas [1999] by explaining the chief drivers of integration as:

- The information revolution
- More and more demanding customer along with a demand driven market by increasing competition at a global level.
- The progress of innovative synergy and relationship among supply chain functions.

These researchers defined the basic essentials to develop a supply chain that is enabled with ERP, which includes information integration, inventory management and supply chain interactions.

Trust, technological cooperation, partnering, business collaboration and sharing of information are the basic factors that provide empowerment to the integration that is managed in a collaborative way as mentioned in above model [Akkermans et al., 1999]. Ballou et al.[2000] also defined collaboration through ERP is essential for every step in product life cycle.

Maximum effectiveness in supply chain can be approached through integration according to Cotrill [1997], it is same as the SCOR model described by SCC [2008]. It comprise of virtual integration with our dated approaches like company limitations etc. It can be handled directly by consumer and customers with the help of IT and electronic supports. His actual focus was on application of basic components like procurement manufacturing, planning and delivery drivers of SCOR model in the early stages of company and extended it to end of suppliers and customers in order to get the return driver of SCOR model. This model results in cost and time saving.

Lawrence & Morton [1997] also highlighted the importance of integration in supply chain for improved performance.

[Parnell, 1998] conducted study in which he found the drivers in integration of effective supply chain that included strong relationship and partnership between customer and suppliers. It helps in getting effective results like reduce days on hand, shorter delivery and lead-time and customer services excellence.

Senge [1990] described the objective of ERP enabled SCOR and SCM, that is fall in inefficiency. He described two main types refer to complexity that included dynamic type and detail type. Moreover explanation is given about the following types. First if there is separation found between cause and effect and it is hard to relate both of them in term of space and time. Second detail complexity includes various variables that need to be monitored and control at once.

[Bahri and Mzoughi], 2005 observed that ERP systems make information use comfortable and lead to better performance.

Research conducted by [Chesborough and Teece 1996, Downes and Mui 1998, Malone and Laubacher 1998, Porter 1998, Tayur et al. 1998, Hagel and Singer 1999] described that the demand literature on latest models on business for internet is growing in a rapid way. So as Fine [1998] stated, supply chain design in contrast with supply chain coordination is becoming a competitive advantage, as the globally organizational environment is changing. Organization with smart synchronization across supply chain coordination and design are gaining valuable edge over competitors. His theory-building work is being followed up by factual research confirming his findings [Mendelson and Pillai 1999].

More interestingly, a second business driven occurrence could be observed is ERP or enterprise resource planning is reaping across the whole business especially manufacturing sector simultaneously. ERP that initiated as MRP manufacturing resource planning and extended to MRP-II in 1970's and 1980's is now creating a benchmark for improving performance and setting standard in industry

These two school of thoughts make this ultimate development so interesting. Firstly defined, from a managerial decision making perspective, there are two trends that are related quite closely and yet seem to integrate in industry without being dependent. ERP is defined as a comprehensive transaction management system that enhance the ability to merge several kind of information processing abilities (that includes integration and sharing) and sets data into single database accordingly and with maximum perfection. While stating an example in order to clear the overall objective, years ago firms had detached systems and processes for purchasing, order management, human resources and accounting to record and analyze. ERP considers these into a single flawless system. Researchers have claimed information system displacement results in information delays and misstatement across the supply chain and its drivers [McAfee 1998]. As [Forrester 1961 and Lee et al. 1997] highlighted that the famous bullwhip effect phenomenon is caused by information delays and distortions.

SCOR model is a long term benchmarking tool for transformation of supply chain and a significant factor in flourishing more IT software for SCM support in rapid fashion.

Asgekar [1998] described SCOR as an ordinary base and very understanding across the drivers of supply chain.

SCOR model is defined as an advantage for better understanding of allocation of resources among supply chain drivers Allnoch [1997].

Inter-organizational sharing and integration of information for the purpose of interacting with suppliers in supply chain is enabled with the rapid development of newer technologies and formulations in it and increase in demand in Ecommerce tools like EDI, internet and intranet. Being an integrator SCM; ERP is playing a role of significant player [Love, 1996].

ERP and internet is managing the supply chain and has become acceptable as well as beneficial for the companies because it resolves the very critical situations in terms of forecasting and analyzing the demand trends, inventories stored in warehouse, types of products available, what need to be manufactured [Love, 1996].

ERP perform the task of operational fineness through reduction in lead time, built paper less environment cost saving method introduced, built interconnectivity between suppliers and company in sourcing and purchasing driver of supply chain.

Kehou and Boughton [2001] stressed on the role of ERP system in make driver of supply chain and focused on the current usage of ERP in manufacturing processes and define the industry practices in this regard. They also pointed out a web based model for cooperative supply chain manufacturing.

A model that is famous by a service-controlled agile logistics is proposed by Damen [2001], which influenced on IT and its usage of state of the art tools of IT for more and more possible perfection and effectiveness for logistics.

A combined distribution network system that is capable to improve organization's logistics and distribution systems proposed by Chiu [1995].

Anderson and Quinn [1986] conducted a study that showed the significance of logistics information systems by explaining the virtue of these types of systems inventory management and its positive impact on flow, transportation, customer care and warehousing can be managed properly as well. They also defined that logistics information systems helps to reduction and optimization of related costs.

ERP system has played a vital role in reducing the uncertainty and providing greater relationships among firms and suppliers, ERP system being a tool for cooperative relationship development has also enhanced the information sharing competency among firms, suppliers and other drivers. Another study conducted by Bakos and Brynjyoolfsoon (1993) indicates that ERP has emerged as a helpful phenomenon in improving the reduction in transaction costs and more collaboration in buyer- supplier correspondence.

Most of the studies till now focuses on comprise of strategies, people, organization, system and technology with less focus over integration as an enabler of SCM Gunasekaran [1999].

Sheather and Hanna [2000] also highlighted the effects of unreachability and insufficiency of realistic evidences on supply chain performance in terms of integration.

Clarke [1998] described the concept pertaining to the logistics driver of the supply chain and proposed the idea of virtual logistics which is actually treatment of physical and information aspects of logistics in an independent manner from each other. In such mechanism internet is controlling the resources in terms of checking and ownership instead of any physical control.

As evident from the literature review the incorporation of SCM through ERP is quite substantial for effective performance that's why now FMCGs are also focusing on modernizing the supply chain management with the help of ERP systems. The fundamental objective is to take out the supreme out of their business performance.

3.1 Aim of the Study

The aim of this study is to find out the contribution of ERP in the excellence of the following supply chain drivers .The basic purpose of this research study is to determine the role and contribution of ERP in the following performances enhancement of supply chain

- - To determine contribution of ERP in supply chain planning driver.
- - To determine contribution of ERP in supply chain sourcing driver.
- - To determine contribution of ERP in supply chain manufacturing driver
- - To determine contribution of ERP in supply chain delivery driver.
- - To determine contribution of ERP in supply chain return driver.

3.2 Conceptual Framework
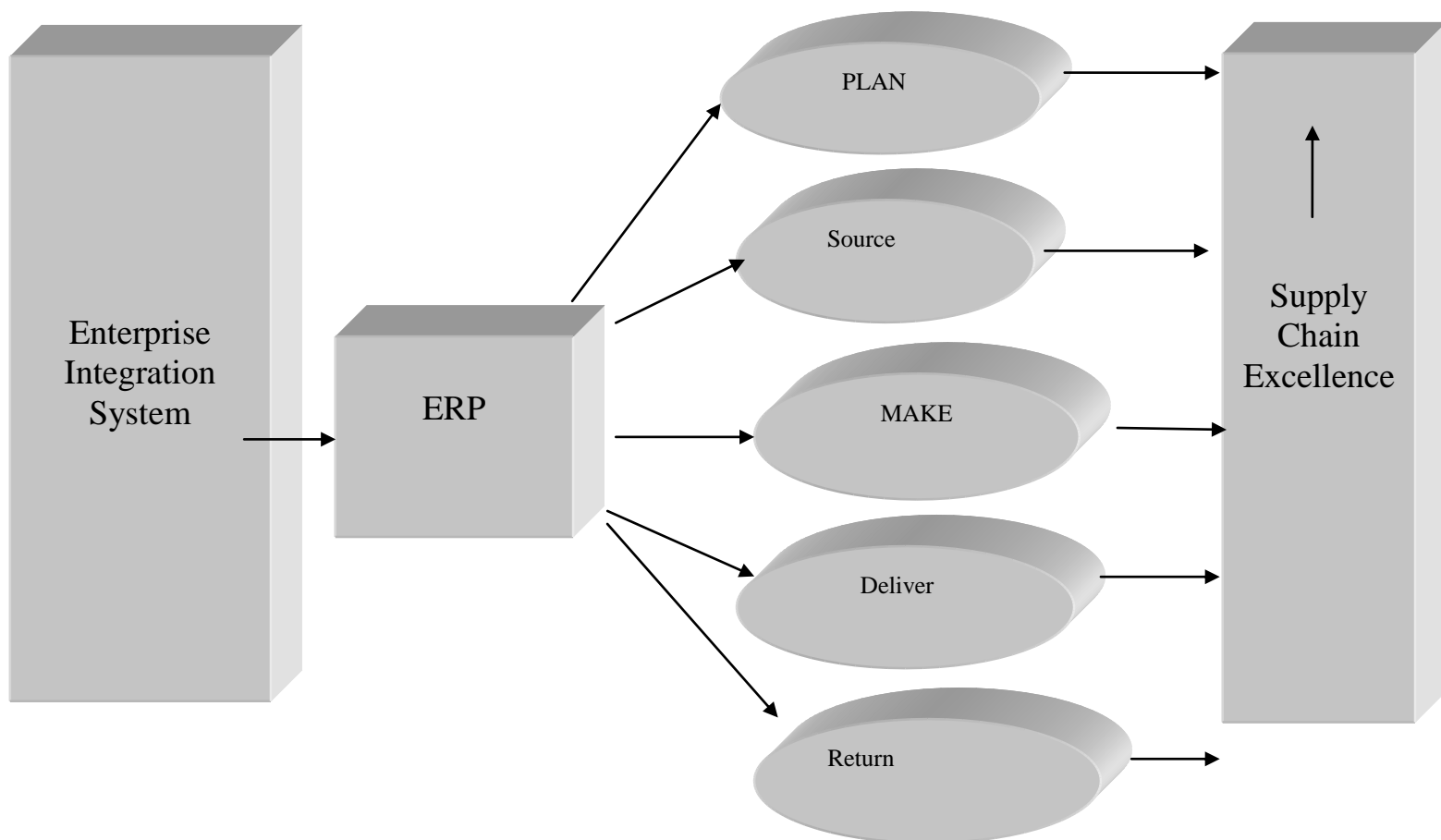
3.3 Hypothesis

H1: ERP is an effective enabler of supply chain planning excellence.

H2: ERP is an effective enabler of supply chain sourcing planning excellence.

H3: ERP is an effective enabler of supply chain manufacturing planning excellence.

H4: ERP is an effective enabler of supply chain delivery planning excellence.

H5: ERP is an effective enabler of supply chain return excellence.

CHAPTER 4: DATA ANALYSIS AND PRESENTATION

As mentioned earlier this research study is conducted to explore and analyze the impact of ERP systems on the efficiency of supply chain drivers like plan, source, make, deliver and return. For this exploratory study leading automobile company Exide Pakistan Ltd was selected for investigation and measures the impact of ERP on supply chain drivers. For this investigative study five hypotheses were created on the basis of five supply chain drives which are plan, source, make, deliver and return and was statistically tested with ERP as an essential part of the organization's business processes and integrated functions. Find out the impact and significance level of ERP programs in improvement of supply chain performance was also determined thorough hypotheses which were mentioned above. Drivers of the supply chain i.e plan, make, source, deliver, return have been discussed deeply through statistical analysis.

4.1 Testing of Hypotheses

As discussed above, five hypothesis were derived for determining the contribution of ERP on Supply chain driver with respect of their performance improvement. ERP used as a variable consist of two main regions which are distinguished as a main pillars of ERP in organizations like ERP is a core in part of their business practices and ERP initiatives for integration of functions. These termed are used as a name of BP and IF respectively. The major areas of ERP which are mentioned above were separately analysis and tested against supply chain drivers variables like plan source, make, deliver and return to find out the existence of relationship and level of significance among them. For determining statistical relationship of hypothesis SPSS is used.

H1: ERP is an effective enabler of supply chain planning excellence

4.2 Data Reliability

Reliability tells about the internal consistency of the data that means reliability analysis shows the frequency level of internal construct data. Data should be internally close related with each one. This level of significance can be found through Cronbach's Alpha. Cronbach's alpha is used to measure the internal consistency or reliability of the data which was extracted from the questionnaire. The data which were collected from questionnaire and further undergoes through reliability testing and Cronbach's alpha is used for testing the reliability of the instrument.

The acceptable value of cronbach's alpha is 0.7 percent. Values equal to 0.7 or greater are considered as highly acceptable or reliable. The value extracted from the questionnaire comes out to be 0.73 which is considered highly acceptable. This figure indicates that the internal consistency among the data is quite good.

Reliability Statistics

Cronbach's Alpha	N of Items
.73	3

Table: 1 Reliability statistics

Statistical Model Application

The following hypothesis is established among supply chain planning as a dependent variable and businesses processes (BP) and integrated functions (IF) as independent variables. The model is developed between supply chain planning and business processes along with integrated functions to scrutinize and investigate the possible impact and relation that can exist between each of the three variables. In H1 supply chain planning is dependent and counting on the different business processes carried out by the firm along with the integrated functions being processed and performed by the various departments like manufacturing, logistics and customer relationship management.

Mathematically model is illustrated as below:

$$\text{Supply Chain Planning} = \alpha + \beta_1\, BP + \beta_2\, IF$$

By applying the application of SPSS on the model following results are achieved.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.734[a]	.538	.504	.45638

a. Predictors: (Constant), IF, BP

Table: 2 Model Summaries

The above mentioned table illustrates the value of R square to be .538 or 53.8%, this signifies that supply chain planning is 53.8% described via independent variables business processes and integrated functions and is also reckoned significant. Also the value of adjusted R square is .50 which is a progenitor of R square and more precisely defines the value of R square also shows that the model established and symbolized between the dependent and independent variables is valid and significant.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.585	.532		2.979	.006
	BP	.064	.112	.076	.577	.569
	IF	.581	.107	.720	5.455	.000

a. Dependent Variable: PLAN

Table: 3 Coefficients

The model established by determining the coefficient of variable through statistical analysis is as follows.

Supply Chain Planning = 1.585   + .064 BP + .581 IF

On the basis of results derived and generated by performing statistical analysis following facts can be concluded regarding H1.

From the above mentioned model, there exists a significant impact on the firms supply chain planning performance. The model illustrates and signifies that by increasing and elevating the value of the independent variable business processes (BP) the dependent variable will experience an increase of 0.064 (6.4%) which is itself comparatively significant. This increase also indicates that the firms' business processes relating and concerning ERP's role and its usage in supply chain planning are positively connected and interlinked with the firms' plan driver.

The model also illustrates and signifies that by increasing and elevating the value of the independent variable integrated functions (IF) the dependent variable supply chain planning will experience an increase of .581 (58.1%) which is itself significant. This increase also narrates

that the firms' integrated functions regarding ERP's effectiveness also enhances the role and potential of supply chain planning driver throughout supply chain.

Apart from these facts regarding dependent and independent variable the model also highlights the t statistics values as convincing and hence signifies that the model assures a strong relationship between both the dependent and independent variables. This theory in turn suggests that the succession rate of supply chain planning performance is fairly reliant and dependent on ERP systems.

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.551	2	3.276	15.728	.000^b
	Residual	5.624	27	.208		
	Total	12.175	29			

a. Dependent Variable: PLAN

Table: 4 ANOVA

Overall analysis done so far proves that there exists a strong correlation among variables and the value of adjusted R-square also comes out to be in an acceptable range. The values indicated by ANOVA analysis also depicts that the entire model is significant and narrates a positive vibe among the variables. After undergoing all the statistical analysis on H1 it can be said that the role of ERP in enhancing and improving the performance of not only the supply chain plan driver but also complements the entire supply chain network. We can conclude that ERP has a positive and direct impact on the supply chain planning performance thus our hypotheses under consideration H1 will not be rejected.

H2: ERP is an effective enabler of supply chain sourcing performance excellence.

Data Reliability

The acceptable value of cronbach's alpha is 0.7 percent. Values equal to 0.7 or greater are considered as highly acceptable or reliable. The value extracted from the questionnaire comes out to be 0.78 which is considered highly acceptable. This figure indicates that the internal consistency among the data is quite good.

Reliability Statistics

Cronbach's Alpha	N of Items
.78	3

Statistical Model application

The following hypothesis is established among supply chain sourcing as a dependent variable and businesses processes (BP) and integrated functions (IF) as independent variables. The model is developed between supply chain sourcing and business processes along with integrated functions to scrutinize and investigate the possible impact and relation that can exist between each of the three variables. In H2 supply chain sourcing is dependent and counting on the different business processes carried out by the firm along with the integrated functions being processed and performed by the various departments like manufacturing, logistics and customer relationship management.

Mathematically model is illustrated as below:

$$\text{Supply Chain Sourcing} = \alpha + \beta_1 \, BP + \beta_2 \, IF$$

By applying the application of SPSS on the model following results are achieved.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.746[a]	.556	.523	.37089

a. Predictors: (Constant), IF, BP

The above mentioned table illustrates the value of R square to be .556 or 55.6%, this signifies that supply chain sourcing is 55.6% described via independent variables business processes and integrated functions and is also reckoned significant. Also the value of adjusted R square is .523 which is a progenitor of R square and more precisely defines the value of R square also shows that the model established and symbolized between the dependent and independent variables is valid and significant.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.964	.432		4.543	.000
	BP	.095	.091	.136	1.048	.304
	IF	.479	.087	.716	5.534	.000

a. Dependent Variable: SOURCE

The model established by determining the coefficient of variable through statistical analysis is as follows.

Supply Chain Sourcing = 1.964   + .095 BP + .479 IF

On the basis of results derived and generated by performing statistical analysis following facts can be concluded regarding H2.

From the above mentioned model, there exists a significant impact on the firms supply chain sourcing performance. The model illustrates and signifies that by increasing and elevating the

value of the independent variable business processes (BP) the dependent variable will experience an increase of 0.095 (9.5%) which is itself comparatively significant. This increase also indicates that the firms' business processes relating and concerning ERP's role and its usage in supply chain sourcing are positively connected and interlinked with the firms' source driver.

The model also illustrates and signifies that by increasing and elevating the value of the independent variable integrated functions (IF) the dependent variable supply chain sourcing will experience an increase of .479 (47.9%) which is itself significant. This increase also narrates that the firms' integrated functions regarding ERP's effectiveness also enhances the role and potential of supply chain sourcing driver throughout supply chain

Apart from these facts regarding dependent and independent variable the model also highlights the t statistics values as convincing and hence signifies that the model assures a strong relationship between both the dependent and independent variables. This theory in turn suggests that the succession rate of supply chain sourcing performance is fairly reliant and dependent on ERP systems.

ANOVA[a]

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	4.653	2	2.326	16.912	.000[b]
Residual	3.714	27	.138		
Total	8.367	29			

a. Dependent Variable: SOURCE

b. Predictors: (Constant), IF, BP

Overall analysis done so far proves that there exists a strong correlation among variables and the value of adjusted R-square also comes out to be in an acceptable range. The values indicated by ANOVA analysis also depicts that the entire model is significant and narrates a positive vibe among the variables. After undergoing all the statistical analysis on H2 it can be said that the role of ERP in enhancing and improving the performance of not only the supply chain source driver but also complements the entire supply chain network. We can conclude that ERP has a positive

and direct impact on the supply chain sourcing performance thus our hypotheses under consideration H2 will not be rejected.

H3: ERP is an effective enabler of supply chain manufacturing performance excellence.

Data Reliability

The acceptable value of cronbach's alpha is 0.7 percent. Values equal to 0.7 or greater are considered as highly acceptable or reliable. The value extracted from the questionnaire comes out to be 0.80 which is considered highly acceptable. This figure indicates that the internal consistency among the data is quite good.

Reliability Statistics

Cronbach's Alpha	N of Items
.80	3

Statistical Model application

The following hypothesis is established among supply chain manufacturing as a dependent variable and businesses processes (BP) and integrated functions (IF) as independent variables. The model is developed between supply chain performance and business processes along with integrated functions to scrutinize and investigate the possible impact and relation that can exist between each of the three variables. In H3 supply chain manufacturing is dependent and counting on the different business processes carried out by the firm along with the integrated functions being processed and performed by the various departments like manufacturing, logistics and customer relationship management.

Mathematically model is illustrated as below:

$$\text{Supply Chain Make} = \alpha + \beta_1 \, BP + \beta_2 \, IF$$

By applying the application of SPSS on the model following results are achieved.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.813[a]	.661	.636	.32212

a. Predictors: (Constant), IF, BP

The above mentioned table illustrates the value of R square to be .661 or 66.1%, this signifies that supply chain manufacturing is 66.1% described via independent variables business processes and integrated functions and is also reckoned significant. Also the value of adjusted R square is .636 which is a progenitor of R square and more precisely defines the value of R square also shows that the model established and symbolized between the dependent and independent variables is valid and significant.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.502	.375		4.002	.000
	BP	.307	.079	.440	3.892	.001
	IF	.419	.075	.629	5.568	.000

a. Dependent Variable: MAKE

The model established by determining the coefficient of variable through statistical analysis is as follows.

$$\text{Supply Chain Make} = 1.502 + .307 \text{ BP} + .419 \text{ IF}$$

On the basis of results derived and generated by performing statistical analysis following facts can be concluded regarding H3.

From the above mentioned model, there exists a significant impact on the firms supply chain manufacturing performance. The model illustrates and signifies that by increasing and elevating the value of the independent variable business processes (BP) the dependent variable will experience an increase of 0.307 (30.7%) which is itself comparatively significant. This increase also indicates that the firms' business processes relating and concerning ERP's role and its usage in supply chain manufacturing are positively connected and interlinked with the firms' make driver.

The model also illustrates and signifies that by increasing and elevating the value of the independent variable integrated functions (IF) the dependent variable supply chain manufacturing will experience an increase of .419 (41.9%) which is itself significant. This increase also narrates that the firms' integrated functions regarding ERP's effectiveness also enhances the role and potential of supply chain make driver throughout supply chain.

Apart from these facts regarding dependent and independent variable the model also highlights the t statistics values as convincing and hence signifies that the model assures a strong relationship between both the dependent and independent variables. This theory in turn suggests that the succession rate of supply chain make performance is fairly reliant and dependent on ERP systems.

ANOVA[a]

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	5.473	2	2.737	26.372	.000[b]
Residual	2.802	27	.104		
Total	8.275	29			

a. Dependent Variable: MAKE

b. Predictors: (Constant), IF, BP

Overall analysis done so far proves that there exists a strong correlation among variables and the value of adjusted R-square also comes out to be in an acceptable range. The values indicated by ANOVA analysis also depicts that the entire model is significant and narrates a positive vibe among the variables. After undergoing all the statistical analysis on H3 it can be said that the role

of ERP in enhancing and improving the performance of not only the supply chain make driver but also complements the entire supply chain network. We can conclude that ERP has a positive and direct impact on the supply chain manufacturing performance thus our hypotheses under consideration H3 will not be rejected.

H4: ERP is an effective enabler of supply chain delivery performance excellence.

Data Reliability

The acceptable value of cronbach's alpha is 0.7 percent. Values equal to 0.7 or greater are considered as highly acceptable or reliable. The value extracted from the questionnaire comes out to be 0.71 which is considered as acceptable. This figure indicates that the internal consistency among the data is quite good.

Reliability Statistics

Cronbach's Alpha	N of Items
.71	3

Statistical Model application

The following hypothesis is established among supply chain delivery as a dependent variable and businesses processes (BP) and integrated functions (IF) as independent variables. The model is developed between supply chain delivery and business processes along with integrated functions to scrutinize and investigate the possible impact and relation that can exist between each of the three variables. In H4 supply chain deliver is dependent and counting on the different business processes carried out by the firm along with the integrated functions being processed and performed by the various departments like manufacturing, logistics and customer relationship management.

Mathematically model is illustrated as below:

$$\text{Supply Chain Delivery} = \alpha + \beta_1\,BP + \beta_2\,IF$$

By applying the application of SPSS on the model following results are achieved.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.779[a]	.607	.577	.31692

a. Predictors: (Constant), IF, BP

The above mentioned table illustrates the value of R square to be .607 or 60.7%, this signifies that supply chain delivery is 60.7% described via independent variables business processes and integrated functions and is also reckoned significant. Also the value of adjusted R square is .577 which is a progenitor of R square and more precisely defines the value of R square also shows that the model established and symbolized between the dependent and independent variables is valid and significant.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.895	.369		5.130	.000
	BP	.212	.078	.333	2.735	.011
	IF	.402	.074	.662	5.433	.000

a. Dependent Variable: DEL

 The model established by determining the coefficient of variable through statistical analysis is as follows

Supply Chain Delivery = 1.895   + .212 BP + .402 IF

On the basis of results derived and generated by performing statistical analysis following facts can be concluded regarding H4.

From the above mentioned model, there exists a significant impact on the firms supply chain deliver performance. The model illustrates and signifies that by increasing and elevating the value of the independent variable business processes (BP) the dependent variable will experience an increase of 0.212 (21.2%) which is itself comparatively significant. This increase also indicates that the firms' business processes relating and concerning ERP's role and its usage in supply chain deliver are positively connected and interlinked with the firms' deliver driver.

The model also illustrates and signifies that by increasing and elevating the value of the independent variable integrated functions (IF) the dependent variable supply chain deliver will experience an increase of .402 (40,2%) which is itself significant. This increase also narrates that the firms' integrated functions regarding ERP's effectiveness also enhances the role and potential of supply chain deliver driver throughout supply chain.

Apart from these facts regarding dependent and independent variable the model also highlights the t statistics values as convincing and hence signifies that the model assures a strong relationship between both the dependent and independent variables. This theory in turn suggests that the succession rate of supply chain delivery performance is fairly reliant and dependent on ERP systems.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.180	2	2.090	20.809	.000[b]
	Residual	2.712	27	.100		
	Total	6.892	29			

a. Dependent Variable: DEL

b. Predictors: (Constant), IF, BP

Overall analysis done so far proves that there exists a strong correlation among variables and the value of adjusted R-square also comes out to be in an acceptable range. The values indicated by ANOVA analysis also depicts that the entire model is significant and narrates a positive vibe among the variables. After undergoing all the statistical analysis on H4 it can be said that the role

of ERP in enhancing and improving the performance of not only the supply chain deliver driver but also complements the entire supply chain network. We can conclude that ERP has a positive and direct impact on the supply chain deliver performance thus our hypotheses under consideration H4 will not be rejected.

H5: ERP is an effective enabler of supply chain return performance excellence.

Data Reliability

The acceptable value of cronbach's alpha is 0.7 percent. Values equal to 0.7 or greater are considered as highly acceptable or reliable. The value extracted from the questionnaire comes out to be 0.75 which is considered highly acceptable. This figure indicates that the internal consistency among the data is quite good.

Reliability Statistics

Cronbach's Alpha	N of Items
.75	3

Statistical Model application

The following hypothesis is established among supply chain return as a dependent variable and businesses processes (BP) and integrated functions (IF) as independent variables. The model is developed between supply chain return and business processes along with integrated functions to scrutinize and investigate the possible impact and relation that can exist between each of the three variables. In H5 supply chain return is dependent and counting on the different business processes carried out by the firm along with the integrated functions being processed and performed by the various departments like manufacturing, logistics and customer relationship management.

Mathematically model is illustrated as below:

$$\text{Supply Chain Return} = \alpha + \beta_1 \, BP + \beta_2 \, IF$$

By applying the application of SPSS on the model following results are achieved.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.752[a]	.566	.534	.43863

a. Predictors: (Constant), IF, BP

The above mentioned table illustrates the value of R square to be .566 or 56.6%, this signifies that supply chain return is 56.6% described via independent variables business processes and integrated functions and is also reckoned significant. Also the value of adjusted R square is .534 which is a progenitor of R square and more precisely defines the value of R square also shows that the model established and symbolized between the dependent and independent variables is valid and significant.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.538	.511		3.008	.006
	BP	.074	.107	.088	.691	.496
	IF	.589	.102	.736	5.751	.000

a. Dependent Variable: RETURN

The model established by determining the coefficient of variable through statistical analysis is as follows

$$\text{Supply Chain Return} = 1.538 + .074BP + .589 \ IF$$

On the basis of results derived and generated by performing statistical analysis following facts can be concluded regarding H5.

From the above mentioned model, there exists a significant impact on the firms supply chain return performance. The model illustrates and signifies that by increasing and elevating the value of the independent variable business processes (BP) the dependent variable will experience an increase of 0.074 (7.4%) which is itself comparatively significant. This increase also indicates

that the firms' business processes relating and concerning ERP's role and its usage in supply chain return are positively connected and interlinked with the firms' return driver.

The model also illustrates and signifies that by increasing and elevating the value of the independent variable integrated functions (IF) the dependent variable supply chain return will experience an increase of .589 (58.9%) which is itself significant. This increase also narrates that the firms' integrated functions regarding ERP's effectiveness also enhances the role and potential of supply chain return driver throughout supply chain.

Apart from these facts regarding dependent and independent variable the model also highlights the t statistics values as convincing and hence signifies that the model assures a strong relationship between both the dependent and independent variables. This theory in turn suggests that the succession rate of supply chain return performance is fairly reliant and dependent on ERP systems.

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	6.772	2	3.386	17.599	.000^b
Residual	5.195	27	.192		
Total	11.967	29			

a. Dependent Variable: RETURN

b. Predictors: (Constant), IF, BP

Overall analysis done so far proves that there exists a strong correlation among variables and the value of adjusted R-square also comes out to be in an acceptable range. The values indicated by ANOVA analysis also depicts that the entire model is significant and narrates a positive vibe among the variables. After undergoing all the statistical analysis on H5 it can be said that the role of ERP in enhancing and improving the performance of not only the supply chain return driver but also complements the entire supply chain network. We can conclude that ERP has a positive and direct impact on the supply chain return performance thus our hypotheses under consideration H5 will not be rejected.

CHAPTER 5: RESULTS AND DISCUSSION

Over the past few years ERP has emerged as an effective tool for companies to gain competitive edge in their operations and programs. The research findings and literature review also demonstrates that ERP is an essential and influential tool for firms and businesses to   upgrade their operations and sustain the insanely dramatic and unpredictable competitive world. After undergoing several literary findings it is evident that ERP has a tremendous and huge impact and role in shaping the supply chain network effectively. Integration of supply chain management with ERP system has become a crucial part in streamlining processes and operations to more progressively and efficiently ponder and cater to the needs of customers in all dimensions of business world.

The research findings highlighted several points for the firms to consider and ponder upon in order to better enhance and improve their supply chain network. The integration of departments with one another needs to be the prime objective for the firms to establish and build a smart supply chain network. The research facts also showed that ERP plays an important role in defining the roles of all the drivers [participating in the supply chain. ERP not only enhances the supply chain as a whole but it also signifies its importance and influence of departments independently.

All the hypotheses established and developed comprising of planning, sourcing, making or manufacturing, delivery and return driver are statistically tested and the results also showed that ERP is an excellent enabler of enhancing supply chain management.

All the hypotheses demonstrated that the ERP integration with all the drivers of the supply chain positively enhances and elevates the performance of supply chain network. Statistical analysis also depicted the values of correlation, R square and ANOVA to be highly significant and reliable. A firms business processes needs to be integrated with all the drivers of supply chain to fully incorporate the essence of ERP system. The statistical analysis also signifies that in order to improve the business performance the smart usage of IT tools and techniques is vital.

CHAPTER 6: CONCLUSION

In today's competitive world supply chain management is the ultimate operational strategy and principle for the firms to create a competitive advantage. There is no exception in the fact that companies and businesses today are finding and looking for ways to enhance their adaptability and customer responsiveness and above all competitiveness by improving and upgrading their operational approaches and techniques by adopting and implementing the blessings and perks of supply chain management and information technology. The present world is connected electronically and is quite dynamic in nature as well. Therefore in order to cope up and better benefit the business from the usage of information technology ERP system turns out to be a modern approach for gaining competitive advantage.

The study is conducted on EXIDE Pakistan and with all the limitations the research findings suggested and concluded that ERP does improves and enhances the performance of supply chain drivers separately and supply chain performance as a whole.

Also all the hypotheses were statistically proved and studied in detail narrating the relationship of supply chain and its transformational role in enhancing the performance of all the drivers consisting planning, sourcing, manufacturing, delivery and return in terms of ERP which is with no doubt transforming and shaping the world of supply chain.

Having said that, this paper clarifies that manufacturing firms like Exide Pakistan can better improve and enhance their operations and supply chain network by attributing their focus more towards the technological advancements or software's like ERP system to elevate and upgrade their business processes and integrated functional departments.

6.1. Recommendations

✓ Organization should focus on ERP system implementation and should have a clear visualization concerning ERP practices in company with management commitment should be well defined for more concentration on organization's performance improvement particularly in supply chain.

✓ For the success and betterment of organizations usage of ERP systems enhance the performance level of business practices and overall supply chain performance improvement.

✓ Organizations must focus on ERP systems for better response against the market demand and market requirement and also for built interconnectivity with consumers.

✓ Through ERP system Organizations can increase our forecast accuracy and throughout supply chain performance.

✓ Through ERP System Companies can control manufacturing cost and also they can increase the manufacturing process efficiency through reduction in plant wastages and effective capacity utilization.

✓ Better usage of ERP systems can bring supply chain transformation and cost efficiency in organizations.

References

Mabert, V. A., Soni, A., & Venkataramanan, M. A. (2003). Enterprise resource planning: Managing the implementation process. European Journal of Operational Research, 146(2), 302–314. http://dx.doi.org/10.1016/S0377-2217(02)00551-9

Hsu, C. C., Tan, K. C., Kannan, V. R., & Keong Leong, G. (2009). Supply chain management practices as a mediator of the relationship between operations capability and firm performance. International Journal of Production Research, 47(3), 835–855. http://dx.doi.org/10.1080/00207540701452142

Koh, S. C. L., Saad, S., & Arunachalam, S. (2006). Competing in the 21st century supply chain through supply chain management and enterprise resource planning integration. International Journal of Physical Distribution & Logistics Management, 36(6), 455–465. http://dx.doi.org/10.1108/09600030610677401

Meyr, H., Rohde, J., Stadtler, H., 2002. Basics for modelling. In: Stadtler, H., Kilger, C. (Eds.), Supply Chain Management and Advanced Planning, second ed. Springer, Berlin, pp. 45–70.

Mc Laren, T.S., Head, M. M., and Yuan, Y. , 2004.Supply chain management information system capabilities . An Exploratory Study of electronics manufacturers. Journal of information systems and e Business management, 4 (3), pp 2-3

Olhager, J., & Selldin, E. (2003). Enterprise resource planning survey of Swedish manufacturing firms. European Journal of Operational Research, 146(2), 365–373. http://dx.doi.org/10.1016/S0377-2217(02)00555-6

Chen, H. J., & Lin, T. C. (2009). Exploring source of the variety in organizational innovation adoption issues-An empirical study of managers' label on knowledge management project issues in Taiwan. Expert Systems with Applications, 36(2), 1380–1390. http://dx.doi.org/10.1016/j.eswa.2007.11.016

Ellram, L. M. (1993). Supply-Chain Management: The Industrial Organisation Perspective. International Journal of Physical Distribution & Logistics Management, 21(1), 13–22. http://dx.doi.org/10.1108/09600039110137082

Fine, C. H. (1998). Clockspeed: Winning industry control in the age of temporary advantage. Basic Books.

Koh, S. C. L., Saad, S., & Arunachalam, S. (2006). Competing in the 21st century supply chain through supply chain management and enterprise resource planning integration. International Journal of Physical Distribution & Logistics Management, 36(6), 455–465. http://dx.doi.org/10.1108/09600030610677401

Akkermans, H. A., Bogerd, P., Yücesan, E., & Van Wassenhove, L. N. (2003). The impact of ERP on supply chain management: Exploratory findings from a European Delphi study. European Journal of Operational Research, 146(2), 284–301. http://dx.doi.org/10.1016/S0377-2217(02)00550-7

Kelle, P., & Akbulut, A. (2005). The role of ERP tools in supply chain information sharing, cooperation, and cost optimization. International Journal of Production Economics, 93, 41–52. http://dx.doi.org/10.1016/j.ijpe.2004.06.004

Sabherwal, R., & Chan, Y. E. (2001). Alignment Between Business and IS Strategies: A Study of Prospectors, Analyzers, and Defenders. [Journal Article]. Information Systems Research, 12(1), 11-33.

Byrd, T., & Turner, D. (2001). An exploratory analysis of the value of the skills of IT personnel: Their relationship to IS infrastructure and competitive advantage. Decision Sciences, 32(1), 21-54.

Derocher, R. P., & Kilpatrick, J. (2000). Six supply chain lessons for the new millennium. Supply Chain Management Review, 3(4), 3441.

Griffith, D. A., & Myers, M. B. (2005). The performance outcomes of strategic fit of relational norm inter-organizational governance strategies. Journal of International Business Studies, 36(3), 254269.

Myers, M., & Cheung, M. (2008). Sharing global supply chain knowledge. Sloan Management Review, 49, 67-73.

Thatte, A. A. (2007). Competitive advantage of a firm through supply chain responsiveness and SCM practices. Dissertation, University of Toledo, Toledo, Ohio.

Bilek, G. M. (2010). The Value of Information Sharing in a Build-to-Order Supply Chain. The Business Review, Cambridge, 15(1).

Hsu, C.-C., Kannan, V. R., Tan, K.-C., & Leong, G. K. (2008). Information sharing, buyer-supplier relationships, and firm performance. International Journal of Physical Distribution & Logistics Management, 38(4), 296-310.

Allen, T. (2011). Improve Your Business. Strategic Finance, May, 54-59.

Wadhwa, S., Saxena, A., & Chan, F. T. S. (2008). Framework for flexibility in dynamic supply chain management. [Article]. International Journal of Production Research, 46(6), 1373-1404. doi: 10.1080/00207540600570432

Patnayakuni, F., Rai, A., & Seth, N. (2006). Relational antecedents of information flow integration for supply chain coordination. Journal of Management Information Systems, 23(1), 13-49.

Meyr, H., Rohde, J., Stadtler, H., 2002. Basics for modelling. In: Stadtler, H., Kilger, C. (Eds.), Supply Chain Management and Advanced Planning, second ed. Springer, Berlin, pp. 45–70.

Hanfield, R. amd Nicholas, Jr. E., 1999. Introduction to supply chain management. New Jersey: Prentice Hall.

Akkermans, H., Bogerd, P. and Vos, B., 1999. Virtuous and vicious cycles on the road towards international supply chain management. International journal of operations & production management,19 (6), pp. 565-581.

Ballou, R.H., Gilbert, S.M. and Mukherjee, A.,2000. New managerial challenges from supply chain opportunities. Industrial Marketing Management,29(1), pp. 7-18.

Cottrill, K., 1997.The supply chain of the future. Journal of distribution, 96 (11), pp. 52-54.

Lawrence, A., 1997. Customer power forces supply chain integration. Journal of works management, 4(1), pp. 43-47.

Morton, R., 1997.Learning from the past to shape the future. Transportation and distribution, 38(1), pp. 84-85.
Parnell, C., 1998. Supply chain management in the soft goods industry. Apparel industry magazine, 59(6), pp. 60-61.

Senge, P.M., 1990. The Fifth Discipline: The Art and Practice of the Learning Organization. London: Century Business.

Neely, A.D. (1991) "Prod uc tion Mana ge ment: A Two-dim ens ional Func tion?" In ter na tional Jour nal of Op er a tions and Pro duc tion Man age ment, 11(7), pp.49-54.

Mc Laren, T.S., Head, M. M., and Yuan, Y. , 2004.Supply chain management information system capabilities . An Exploratory Study of electronics manufacturers. Journal of information systems and e Business management, 4 (3), pp 2-3

Annexure

This survey is conducted for the academic purpose only. All your personal information will be kept confidential and will not be misuse by anyone.

Name: _____
Gender: 1. Male ☐   2. Female ☐
Organization:
SITE: 1. Karachi ☐ 2. HUB Baluchistan
Designation: 1. Senior Manager ☐   2. Manager ☐   3. Assistant Manager ☐
Department 1. Marketing ☐ 2. Finance ☐   3. R&D ☐   4. Supply Chain ☐   5. Other ☐

Participants were asked to circle the best response to each statement on a 1-5 Scale mentioned as below

Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
5	**4**	**3**	**2**	**1**

S.No	Questions	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
		5	**4**	**3**	**2**	**1**
1	For organization's business practices, integration of supply chain management through ERP plays a vital role					

2	Integrated supply chain management across functions presently emphasized initiative in your organization.					
3	Implementation of vendor managed inventory system makes easier by using ERP					
4	In forecasting and production scheduling, ERP systems are fundamental parts.					
5	For Real time information sharing with suppliers ERP based systems are playing a significant role					
6	Spreading supply chain beyond first level suppliers ERP proved itself very useful					
7	ERP systems makes manufacturing flexibility more easy and comfortable					
8	Enhancement of plants capacity utilization becomes easier with the help of ERP systems					
9	Overall manufacturing cost of the company gets decreased due to ERP systems					
10	Concept of Speed to market has reduced by using ERP systems					
11	For performance monitoring of third party logistics ERP systems are essential					

12	Overall logistics cost of the company becomes lessen due to ERP systems					
13	Customer's feedback related to Company products is based on ERP systems					
14	In modern trade for enhancing company business and real time customer feedback, E-commerce and electronic data interchange links are helpful					
15	Backtracking and traceability of any complaints received from customer becomes possible with the use of ERP systems					