KASBIT BUSINESS JOURNAL

Journalhomepage:www.kbj.kasbit.edu.pk

Impact of SCOR Model on Firm's Supply Chain Performance - A Case Study Method

Malik Mamoon Munir[i*], Sana Arz Bhutto[ii], Muhammad Ahsan Javed[iii], Ume Rubaca[iv],

i) Bahria University Islamabad Pakistan
ii) Sindh Institute of Management and Technology, Karachi Pakistan
iii) Karachi University, Main University Road, Karachi, 75270, Pakistan
iv) Department of Management Sciences, Comsats University, Islamabad, Pakistan

ARTICLEINFO

Keywords:
Supply Chain Operations Reference (SCOR) model, Supply Chain Performance Metrics (SCPM), and Supply Chain Performance (SCP).

ABSTRACT

Customers' preferences increase daily in today's global market, where competition is high. Therefore, factors such as cost, quality, innovation and reliability are the key factors affecting the overall effectiveness of the enterprise. Developed on the foundation of existing literature, a theoretical basis was created, and preliminary data were collected from 30 participants at Atlas Battery Limited. After data collection, the hypotheses were tested using statistical tools. Data was collected using a survey of Atlas Battery Limited participants, and correlation analysis was used to analyze the relationship between the SCOR model and supply chain performance. Results show a statistically significant relationship between the SCOR model and supply chain performance. This study shows that the SCOR model is very important to any organisation to achieve market competitive advantage and increase the overall efficiency of the organisation. The results of this study can help supply chain specialists understand the impact of the SCOR model on supply chain performance. Along with quality, reliability, responsiveness and cost, they play a very important role in meeting customer needs, which should be the ultimate goal of any organization if they want to grow.

1. Introduction

The supply chain consists of all departments that meet the customer's needs. The typical supply chain network also includes manufacturers, suppliers, retailers, transport companies, distribution centres and customers (Munir, Javed, & Bhutto, 2022). In each relationship, for example, in a product, the production network includes all the necessary capabilities to receive and complete the customer's request (Dissanayake & Cross, 2018). These include improving new elements, incentives, processes, quality, distribution, financing, and benefits for the client. The customer is integral to the supply chain (Ptak & Schragenheim, 2016).

The purpose of any supply chain is to satisfy the client's needs and, of course, to provide benefits to the company (Putro, Purwaningsih, Sensuse, Suryono, & Kautsarina, 2022). The typical supply chain can include several stages, including timers, retailers, distributors/wholesalers, manufacturers, and raw/component material suppliers (Camerinelli, 2016).

Corresponding Author:
*Email: malikmamoonmunir@gmail.com (Malik Mamoon Munir)
Received 18, Dec 2022
Received in revised form 12, Mar 2023
Accepted 13, Mar 2023

The automotive industry has always been an important driver of the country's economic growth. The auto industry is called the user-end industry because it uses the results of all manufacturing industries and supports industries such as marketing, asset management, finance, steel, plastics, etc. (Ume Rubaca, Munir, & Munir, 2022). Manufacturing industries in developing countries face serious challenges from domestic and international competitors. In this competition, manufacturers face challenges in identifying their customers to improve their supply chains; using supply chain management practices raises challenges for automakers in achieving a competitive advantage (Chen, Preston, & Swink, 2015).

The automotive sector is a pioneer in mass production as a manufacturing strategy. Mass production depends to a large extent on the ability of the company to accurately assess the needs/requirements of the customer, helping companies to make decisions about processes and production (Putro et al., 2022). The best way to develop a production plan in a payment system is to use a forecasting method that accounts for future market changes, trends and seasonal influences (Sangari, Hosnavi, & Zahedi, 2015). However, an inflexible system uses old data to create a working table and uses existing formats to produce products for common resources (Saeed, Malhotra & Abdinnour, 2018).

In the past, research has been conducted on decentralized or decentralized solutions for internal information technology infrastructure. Camerinelli (2016) is very different from using the system, and the system's quality is associated with a decrease in the probability of end-user conversion into other products and services. Some enterprise resource planning (ERP) systems are measured as the basis for helping to achieve the business goals of most companies (Aqlan, 2016).

According to Baumann and Genoulaz (2014), it is the power to determine and measure supply chain efficiency, cost-effectiveness, product distribution, transport, reliability, flexibility and responsiveness. According to Vlachos (2014), the use of flexibility, performance and resources is thought to measure the performance of the supply chain. Heckmann, Comes, and Nickel (2015) measured the supply chain regarding reliability and cost coverage. According to Ntabe, LeBel, Munson, and Santa (2015), supply chain measurement is performed through responses to flexibility, variable costs, relationships, and supply chain performance. According to Baumann and Genoulaz (2014), it helps in measuring supply chain performance with flexibility and efficiency in the supply chain. Among the various SCP techniques, the Supply Chain operations reference (SCOR) is considered significant for bringing efficiency and responsiveness to the organizational processes (Ganji, Shaharoun, & Norehan, 2015).

The SCOR is a modelling approach developed by the Chain Council (SCC) that provides uniform guidelines for constantly developing companies (Govindan, Sarkis, & Seuring, 2014). Only a few companies accepted the SCOR model to improve supply chain performance in developing countries, particularly Pakistan. Competing with other companies worldwide will be difficult if other manufacturing companies do not work with new technologies and their implementation. Working on the SCOR model is crucial to compete with the market if organizations want a competitive advantage. The business has not yet been distributed, and published work is scarce on the SCOR model in Pakistan. Therefore, this research study is taken to observe the performance of the SCOR model examined in the leading battery manufacturing company to understand the reliability of SCP.

SCOR model's effectiveness improves reliability, flexibility, response speed, costs, and asset utilization (Ume Rubaca et al., 2022). Therefore, it is imperative to investigate the effectiveness of the SCOR model adoption on the SCP so that the automobile industry can optimally utilize its resources. Moreover, companies invest huge sums in adopting external strategies to bring efficiency and reliability to these processes. Such steps require a lot of research and pilot testing for an organization to adopt them

Corresponding Author:
*Email: malikmamoonmunir@gmail.com (Malik Mamoon Munir)
Received 18, Dec 2022
Received in revised form 12, Mar 2023
Accepted 13, Mar 2023

completely. Therefore, it is significant to find the key factors which may influence the SCP of a company in developing countries like
Pakistan.

The main purpose of this research is to know the perspective of the SCOR model in the automotive industry. Therefore, the objectives of this study are:

- Investigate the relationship between asset utilization and SCP
- Investigate the impact of reliability on SCP
- Investigate the role of cost, agility and responsiveness regarding SCP

Whereas the research questions of this study are given below:
R1: What is the effectiveness of the SCOR Model in the organizational supply chain process?
R2: What are the key elements affecting supply chain performance?
R3: Does metrics of performance has any impact on Atlas Battery ltd.?

The SCOR model consists of five performance measures used in this study to measure supply chain performance (Munir et al., 2022). First is 'Source' which means "Visualization of the demand of the sourcing process (or reservation of vehicles) and purchase of products and companies" The second is 'Plan' which means "the modelling arrangements illustrate the exercises to create fixes for the supply chain network", the third is 'Refund' which means "the return process shows exercises related to the return of damaged products that have expired and are not suitable", fourth is 'Delivery' which means "the delivery process encourages the creation, support and satisfaction of customer requests", and fifth is 'Make' which means "It is the production process that determines the activities related to the conversion of raw materials to the final product". Figure 01 represents the pictorial representation of the SCOR model.

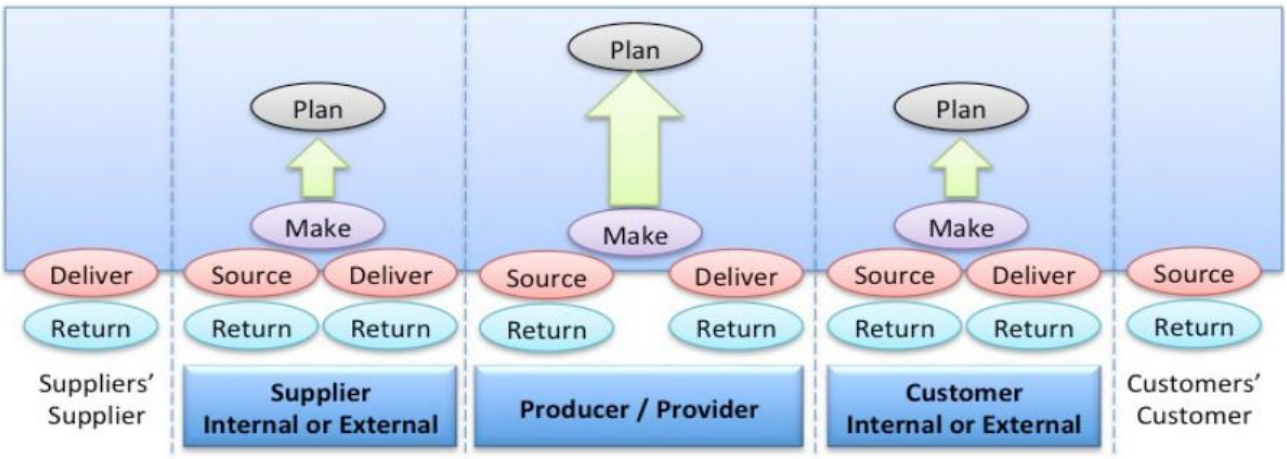

Figure 1: Supply Chain Council (SCC)

Corresponding Author:
*Email: malikmamoonmunir@gmail.com (Malik Mamoon Munir)
Received 18, Dec 2022
Received in revised form 12, Mar 2023
Accepted 13, Mar 2023

2.0 Supply Chain Management at Atlas Battery Limited

Atlas Batteries Limited (ABL) is a public limited company. They have a joint venture with GS Yuasa Japan, which is also reflected in the name of AGS (Atlas Genzo Shimadzu). With Japanese cooperation, ABL aims to implement best practices in engineering and management. Their administration is highly efficient, and people are trained in the supply chain department. There is a set of organizations where the company's strategy for the basic level and MBO (Management by Objectives) is implemented, and a
Japanese philosophy is used in the organization.

3.0 Supply Chain Management and its Relationship with Variables

In this study, the literature reviewed and presented the relationship between the SCOR model and the performance of the supply chain. The aim was to identify viable aspects that will consider their efforts to effectively address the supply chain approved by the SCOR model (Zhu, Song, Cegielski, & Lee, 2017). The literature is designed to identify performance indicators that improve the efficiency of the supply chain using the SCOR model, which includes a generalization of the SCOR model and drivers, that is, planning, source, production, presentation and presentation of ideas (Zhu, Song, Hazen, Lee, & Cegielski, 2018). The assessment aims to develop a structure that helps identify factors that influence decision-making (Vlachos, 2014). In the supply chain, all activities, from the delivery of goods to the customer, are important in creating a company and the long-term business of any company (Chardine-Baumann & Botta-Genoulaz, 2014). Internet companies are following developments in these areas with other trends resulting from globalization (Vlachos, 2014). As the market expands and becomes increasingly global, the number of potential battery suppliers is increasing, so it is important to use a tool to evaluate operations in the company (Tramarico, Salomon, & Marins, 2017). As a result, the report was approved to express a conceptual agenda that affected SCM's productivity and supply chain, facilitating the SCOR model (Saeed et el., 2018), a SCOR aspect and offering a brief description of the basics. It is the structure of the SCOR's development and experience approved from a procedural point of view. The research concludes that fasting is strong in technical aspects, such as modelling methods and processes, but weak in social aspects. Mary Moth, program director at McCormick and Company, once focused on comparing the SCOR brand. They completed the standard two hours because the data were only available in the internal reports, and the study provided the right training. A comparative report that links other companies and the indicators they use increases the value of SCOR. Elgazzar, Tipi, and Hubbard (2016) link the following functions with operational SCM: management of the whole channel record, adequacy of the supply chain budget, long-term collaborative adjustment projects, data exchange and network management, common ideas and good business philosophy, business relationships and risk sharing the reward as shown in Figure

Corresponding Author:
*Email: malikmamoonmunir@gmail.com (Malik Mamoon Munir)
Received 18, Dec 2022
Received in revised form 12, Mar 2023
Accepted 13, Mar 2023

	Level		Examples	Comments
	#	Description		
Within scope of SCOR	1 	Process Types (Scope)	Plan, Source, Make, Deliver, Return and Enable	Level-1 defines scope and content of a supply chain. At level-1 the basis-of-competition performance targets for a supply chain are set.
	2 	Process Categories (Configuration)	Make-to-Stock, Make-to-Order, Engineer-to-Order Defective Products, MRO Products, Excess Products	Level-2 defines the operations strategy. At level-2 the process capabilities for a supply chain are set. (Make-to-Stock, Make-to-Order)
	3 	Process Elements (Steps)	• Schedule Deliveries • Receive Product • Verify Product • Transfer Product • Authorize Payment	Level-3 defines the configuration of individual processes. At level-3 the ability to execute is set. At level-3 the focus is on the right: • Processes • Inputs and Outputs • Process performance • Practices • Technology capabilities • Skills of staff
Not in scope	4 	Activities (Implementation)	Industry-, company-, location- and/or technology specific steps	Level-4 describes the activities performed within the supply chain. Companies implement industry-, company-, and/or location-specific processes and practices to achieve required performance

Figure 2: Supply Chain in SCOR model levels

Sangari, Hosnavi, and Zahedi (2015) declared that PRTM announced the following opportunities for SCM.

- Orders overdue reduction 70-90%
- Overhead costs reduction of 10-30%
- Manufacturing lead time reduction of 30-90%
- Order processing time reduction of 40-75%
- Delivery improvement of 10-25%
- Inventory reduction of 50-80%

Poirier and Quinn describe SCM, which shows that more than half of the five education levels have only levelled 1 and 2, have internal levels and cannot reach levels 3, 4 and 5 (Sangari, Hosnavi, & Zahedi, 2015) as shown in Figure 03.

Corresponding Author:
*Email: malikmamoonmunir@gmail.com (Malik Mamoon Munir)
Received 18, Dec 2022
Received in revised form 12, Mar 2023
Accepted 13, Mar 2023

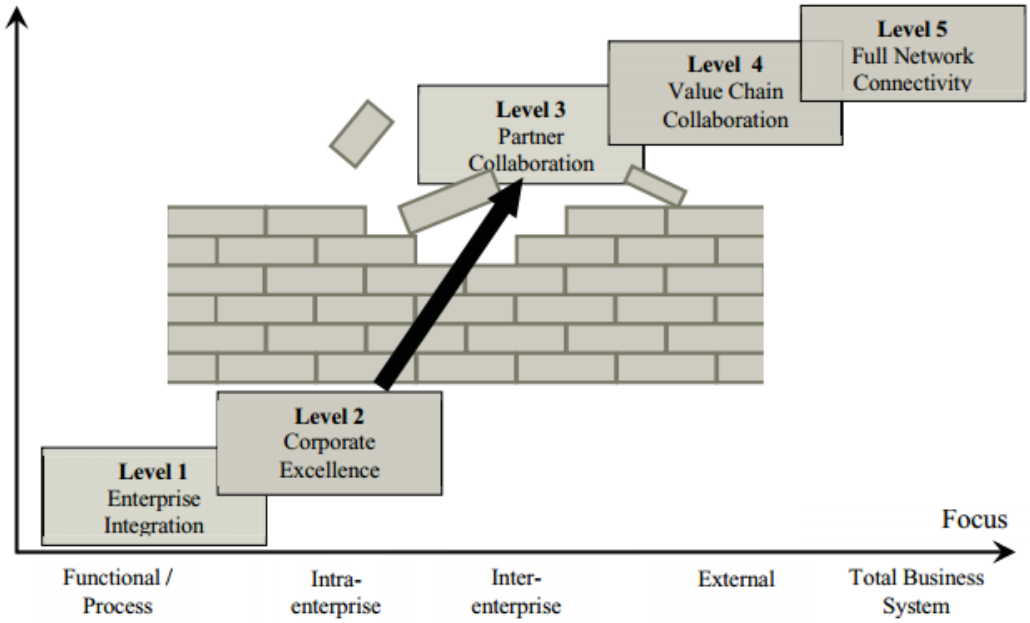

Figure 3: Poirier & Quinn

Ptak and Schragenheim (2016) said that a joint team would be required to implement and apply the SCOR model. Some researchers suggest that the SCOR model is a strategic way to increase the overall efficiency of an organization's supply chain (Ptak & Schragenheim, 2016). Dissanayake and Cross (2018) point out that the SCOR model is a strategic tool for solving complex supply chain management problems. However, recent studies clearly show that the team must have a project manager who must achieve the full process of integrating the supply chain process. Other scientists are also developing a reference model for supply chain operations. The supply chain council creates a private and separate stakeholder group to assess the integration of SCOR, Lean and Six Sigma. Proposal management requires the necessary institutional changes in the implementation and position of the company. The first is progressive information and communication technologies that companies can redesign their supply chains (Ntabe, LeBel, Munson, & Eulalia, 2015). The structure needed to synchronize and coordinate supply chain activities; Competitors, innovations, sales, operations, procurement methods, inventory management, management system and corporate functions can be divided into categories. Technologies and functions of various supply chain teams inside and outside the organization (Saeed, Malhotra & Abdinnour, 2018).

Zhu, Song, Cegielski, and Lee (2017) introduced a six-dimensional system for protecting the supply chain, shareholders, assistance, communication and information technology, productivity, business practices, sales forecasting and understanding of market demand. Start quality products or services with suppliers in the supply chain questions may increase if providers do not provide the required amount on time or buyers choose a resource below the lowest price (Liu, Huang, Mokasdar, Zhou, & Hou, 2014). The choice of suppliers for large companies has been studied, but not for medium and small companies. As a result, several studies have been conducted to determine the important factors for the automotive industry and the factors that must be considered when deciding which supplier will outsource products or some part of them. Another article used a multi-criteria decision-making approach to evaluate and select suppliers. In

Corresponding Author:
*Email: malikmamoonmunir@gmail.com (Malik Mamoon Munir)
Received 18, Dec 2022
Received in revised form 12, Mar 2023
Accepted 13, Mar 2023

light of lower costs, this study showed that the traditional approach based on man is not strong enough to manage modern supply (Liu et al., 2014).

Hugos (2018) discussed the transition of the automotive sector in the light of the widespread production of Henry Ford, i.e. based on delivery on a march basis, by which the client requested a real auto assembly solution. The move should cut several billion dollars in stock of finished products in the mall. In any case, traction deliveries were subject to a long period of OTD. Therefore, reducing OTD implementation time is important. For example, Renault raised the demand by focusing on transportation within 01 day. However, the OTD goal was extended to 21 days, and OTD overcomes those still normal for 40 days due to non-compliance with the program (Elgazzar, Tipi, & Hubbard, 2016). One of the important results of Heckmann, Comes, and Nickel (2015) is that the proposed lean SCM is important to achieve the demand targets for shorter transport logic.

To write systematic processes, application management, production planning, procurement and organization of procurement, distribution conversion, change adjustment and management: an increase in the seven core networks for inventory management surveys conducted to write tests and meetings in qualifying categories. Elgazzar et al. (2016) continued discussing how these classifications were classified by the reference model of supply chain operations (SCOR). This suggests that the choice of methods for cartographic processes and transportation options changes the tendency to switch from the SCOR selection areas to change parameters, suggesting that the internal SCOR tends to adapt to the areas selected by the Board internally and externally throughout the network of stores. In addition, the purchase is achieved by installing an internal SCOR option, supplier arrangements and backup options (Saeed et al., 2018).

By observing the implementation of supply chains, it was found that most SC applications, for example, contain more costs than expected. Only a few SC exercises make this element more selectable. Adding exercises deserves attention, but seeing all the waste surrounding them is difficult. Ntabe, LeBel, Munson, and Santa (2015), in general, stated that only 5 pence per exercise do not contain significant recognition of 35 exercises for a predetermined penny, and Bennis does not include any exercise incentives at 60. In addition, vehicles can be evacuated in a way. As a rule, eliminating these 60s for every unrecognized penny, including exercises, opens the door to reducing performance and cost. In addition, when exercises that were not predicted are private or excluded, the next goal is to reduce high costs, including exercises. Integration of cross-functions is a process of interconnection and interaction between departments (Abolghasemi, Khodakarami, & Tehranifard, 2015).

Therefore, In this study, we have used efficiency and efficiency to measure supply chain management. Productivity means a minimum loss of contributions and meets customers' needs according to their expectations. According to Heckmann, Comes, and Nickel (2015), the purpose of the supply chain is to lower costs and provide consumers with a valuable product, as SCM is an individual development in the performance and efficiency of the organization. On the other hand, it reduces the organization's value as a whole (Tramarico, Salomon, & Marins, 2017).

4.0 Research Hypotheses

In the previous conceptual framework, a hypothesis was developed to measure the performance of the supply chain through the survey. The SCOR model includes five performance measures, asset utilization, cost, agility, responsiveness, and reliability. These are independent variables. A hypothesis has been developed to show that the dependent variable on these variables varies and positively affects SCP (supply chain performance).

Corresponding Author:
*Email: malikmamoonmunir@gmail.com (Malik Mamoon Munir)
Received 18, Dec 2022
Received in revised form 12, Mar 2023
Accepted 13, Mar 2023

H1: Asset utilization has a positive impact on SCP
H0: Asset utilization does not have a positive impact on SCP
H2: Reliability has a positive impact on SCP
H0: Reliability does not have a positive impact on SCP
H3: Cost has a positive impact on SCP
H0: Cost does not have a positive impact on SCP
H4: Agility has a positive impact on SCP
H0: Agility does not have a positive impact on SCP
H5: Responsiveness has a positive impact on SCP
H0: Responsiveness does not have a positive impact on SCP

Figure 04 represents the conceptual framework of the present study.

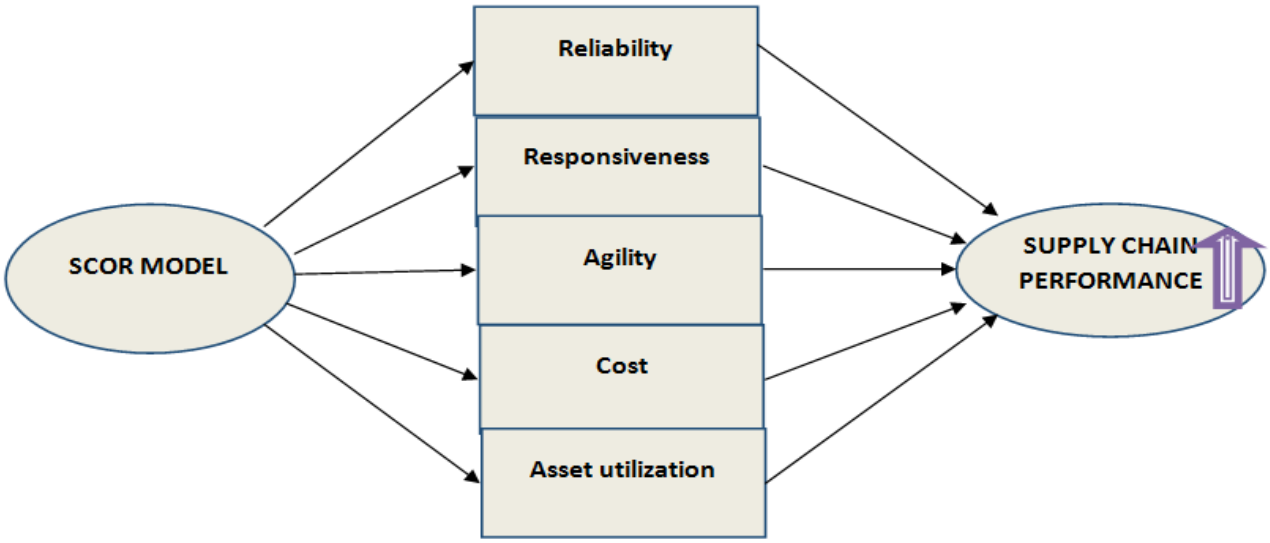

Figure 04 Conceptual Framework

5.0 Research Design

Since the study is conducted in Atlas Battery Ltd, it is descriptive, and the quantitative research method was selected. The questionnaire is designed to collect research data regarding the area of investigation (Munir et al., 2022). The study is cross-sectional because the data was collected from individuals simultaneously. Cross-sectional data collection techniques help to observe the variables without influencing them. Several variables were designed regarding the research objectives and hypothesis, and only a few appropriate variables were selected for research. To deal with endogeneity concerns is through instrumental variables (IV) techniques. The most common IV estimator is Two Stage Least Squares (TSLS). IV estimation is intuitively appealing, and relatively simple to implement.

The questionnaire is developed based on the selected variables. The employees working in the industry supply

Corresponding Author:
*Email: malikmamoonmunir@gmail.com (Malik Mamoon Munir)
Received 18, Dec 2022
Received in revised form 12, Mar 2023
Accepted 13, Mar 2023

chain participated in the present research. The employees were approached by the researcher of this study through the mail in order to be a part of the survey. The questionnaire was sent only to the participants who replied to the mail and were ready to be a part of the survey. The non-probability sampling method collects the data from the target sample. The sample size is 384 people.

The questionnaire is divided into two parts mainly. Part A relates to the participant's demographic data, whereas part B relates to the variables measured by the 1-5 Likert scale. The study's target audience - Atlas Battery Ltd. management includes senior managers, department heads, and assistant assistants. The questionnaire was developed on a Likert scale of 5 points (Ume Rubaca et al., 2022). Raw data is used to perform this search. The questionnaire received from the participants is to be filed through the mail. The researcher ensured that their details should not be shared with a third party or mentioned in this research study. The researcher initially introduces the scope of this study to all participants in order to conduct more relevant outcomes from them. Moreover, they all have the right to leave the survey if they feel uncomfortable with it or contact the researcher through the mail if they have any doubts.

The Social Sciences Statistical Package (SPSS) integrates data and analyses various research statistics. The researcher put the researched data into the SPSS; different tests were taken to test the relationship between variables as per the hypothesis. The researched data was analyzed in chapter 4; hypothesis testing was analyzed as the hypothesis summary at the end of this chapter.

6.0 Results

The following sections will present the results of the present study for hypothesis testing.

6.1 Respondents Profile

Statistics

		Q2	Q3	Q4	Q5
N	Valid	384	384	384	384
	Missing	0	0	0	0

The statistics show that all 384 participants participated in the survey, and no data is missing from the researched data**.**

Table 1.1 Q2 Table

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	170	44.3	44.3	44.3
	Male	214	55.7	55.7	100.0
	Total	384	100.0	100.0	

It has been observed that 170 females and 214 males participated in the survey, with a percentage of 44 and 55, respectively. In this way, a total of 384 participants participated in the survey.

Corresponding Author:
*Email: malikmamoonmunir@gmail.com (Malik Mamoon Munir)
Received 18, Dec 2022
Received in revised form 12, Mar 2023
Accepted 13, Mar 2023

Table 1.2 Q3 Table

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Manufacturing	191	49.7	49.7	49.7
	Service provider	130	33.9	33.9	83.6
	Other	63	16.4	16.4	100.0
	Total	384	100.0	100.0	

The above table shows that 191 participants worked in the manufacturing department, 130 were the service provider, and 63 were working in other departments.

Table 1.3 Q4 Table

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Lower	92	24.0	24.0	24.0
	Middle	117	30.5	30.5	54.4
	Upper	175	45.6	45.6	100.0
	Total	384	100.0	100.0	

The designation of the 92 participants is lower, 117 is middle, and 175 is the upper level. The percentage of the designation is 24, 30.5, and 45.6.

Table 1.4 Q5 Table

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 3 years	26	6.8	6.8	6.8
	3-8 years	185	48.2	48.2	54.9
	More than 8 years	173	45.1	45.1	100.0
	Total	384	100.0	100.0	

The age of the 26 participants is less than 3 years, 185 are 3-8 years old, and 173 are more than 8 years old. The percentage of the age is 6.8, 48.2, and 45.1.

Corresponding Author:
*Email: malikmamoonmunir@gmail.com (Malik Mamoon Munir)
Received 18, Dec 2022
Received in revised form 12, Mar 2023
Accepted 13, Mar 2023

Table 1.0 Multi-Regression Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.965[a]	.931	.927	.28016

a. Predictors: (Constant), Q24, Q19, Q20, Q22, Q17, Q15, Q21, Q23, Q16, Q13, Q11, Q18, Q10, Q9, Q8, Q12, Q7, Q14

The standard error of the dependent and independent variables is 0.28, and the R-square is 0.93.

Table 2.1 ANOVA Test

ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	383.598	18	21.311	271.507	.000[b]
	Residual	28.649	365	.078		
	Total	412.247	383			

a. Dependent Variable: Q6
b. Predictors: (Constant), Q24, Q19, Q20, Q22, Q17, Q15, Q21, Q23, Q16, Q13, Q11, Q18, Q10, Q9, Q8, Q12, Q7, Q14

The ANOVA test identified that the mean square of the dependent and the independent variable is 21.31, and the significance is 0.

Corresponding Author:
*Email: malikmamoonmunir@gmail.com (Malik Mamoon Munir)
Received 18, Dec 2022
Received in revised form 12, Mar 2023
Accepted 13, Mar 2023

Table 2.2 T-Test

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	T	Sig.
1	(Constant)	-.546	.331		-1.652	.099
	Q7	-.018	.018	-.018	-1.008	.314
	Q8	-.008	.018	-.007	-.412	.681
	Q9	.123	.025	.082	5.024	.000
	Q10	.029	.015	.030	1.905	.058
	Q11	-.011	.014	-.012	-.757	.450
	Q12	-.025	.017	-.027	-1.526	.128
	Q13	.034	.015	.035	2.262	.024
	Q14	.002	.029	.001	.075	.940
	Q15	.960	.016	.944	59.839	.000
	Q16	-.013	.013	-.017	-1.054	.292
	Q17	.054	.022	.036	2.417	.016
	Q18	.005	.025	.003	.189	.850
	Q19	.012	.020	.010	.617	.537
	Q20	-.029	.017	-.026	-1.721	.086
	Q21	.024	.013	.029	1.855	.064
	Q22	.018	.017	.018	1.025	.306
	Q23	-.027	.020	-.023	-1.399	.163
	Q24	-.015	.014	-.018	-1.095	.274

a. Dependent Variable: Q6

Corresponding Author:
*Email: malikmamoonmunir@gmail.com (Malik Mamoon Munir)
Received 18, Dec 2022
Received in revised form 12, Mar 2023
Accepted 13, Mar 2023

The above multi-regression test has been taken to test the relationship between dependent and independent variables. It has been signified that the significance of the reliability variable is 0.31, 0.68, 0.00, and 0.58, respectively. Hence, there is a little relationship present between reliability and SCP variables. The significance of the responsiveness is 0.45, 0.12, 0.02, 0.94, and 0.00. Hence, there is somewhat of a relationship between responsiveness and SCP variables. The significance value for the agility variable is 0.29, 0.01, and 0.85. It has been observed that there is a strong relationship present between agility and SCP variables.

The significance for the cost variable is 0.53, 0.08, 0.06, and 0.3. However, there is somewhat of a relationship between cost and SCP variables. The significance value of the asset utilization variable is 0.16 and 0.27. Hence, there is no relationship present between asset unitization and SCP variables.

6.3 Hypothesis Testing

Table 3.0 Hypothesis 1 - Pearson Correlation Test

Correlations

		Q6	Q23	Q24
Q6	Pearson Correlation	1	-.090	.091
	Sig. (2-tailed)		.079	.076
	N	384	384	384
Q23	Pearson Correlation	-.090	1	-.161**
	Sig. (2-tailed)	.079		.002
	N	384	384	384
Q24	Pearson Correlation	.091	-.161**	1
	Sig. (2-tailed)	.076	.002	
	N	384	384	384

**. Correlation is significant at the 0.01 level (2-tailed).

Pearson Correlation is taken to observe the relationship between asset utilization and SCP. The significance value for the variable is 0.79 and 0.76, meaning there is no relationship between these variables.

Table 4.0 Hypothesis 2 - Pearson Correlation Test

Correlations

		Q6	Q7	Q8	Q9	Q10
Q6	Pearson Correlation	1	.203**	-.092	.125*	.091
	Sig. (2-tailed)		.000	.072	.014	.074
	N	384	384	384	384	384
Q7	Pearson Correlation	.203**	1	-.217**	.144**	-.070
	Sig. (2-tailed)	.000		.000	.005	.169
	N	384	384	384	384	384
Q8	Pearson Correlation	-.092	-.217**	1	.244**	.250**
	Sig. (2-tailed)	.072	.000		.000	.000
	N	384	384	384	384	384
Q9	Pearson Correlation	.125*	.144**	.244**	1	.183**
	Sig. (2-tailed)	.014	.005	.000		.000
	N	384	384	384	384	384
Q10	Pearson Correlation	.091	-.070	.250**	.183**	1
	Sig. (2-tailed)	.074	.169	.000	.000	
	N	384	384	384	384	384

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Corresponding Author:
*Email: malikmamoonmunir@gmail.com (Malik Mamoon Munir)
Received 18, Dec 2022
Received in revised form 12, Mar 2023
Accepted 13, Mar 2023

The reliability variables' significance values are 0.00, 0.7, 0.01, and 0.07. It has been observed that there is very little relationship between these two variables.

Table 5.0 Hypothesis 3 - Pearson Correlation Test

Correlations

		Q6	Q19	Q20	Q21	Q22
Q6	Pearson Correlation	1	-.064	-.127*	.041	-.049
	Sig. (2-tailed)		.210	.013	.429	.338
	N	384	384	384	384	384
Q19	Pearson Correlation	-.064	1	.049	-.084	-.021
	Sig. (2-tailed)	.210		.339	.099	.683
	N	384	384	384	384	384
Q20	Pearson Correlation	-.127*	.049	1	-.129*	-.042
	Sig. (2-tailed)	.013	.339		.012	.411
	N	384	384	384	384	384
Q21	Pearson Correlation	.041	-.084	-.129*	1	.105*
	Sig. (2-tailed)	.429	.099	.012		.040
	N	384	384	384	384	384
Q22	Pearson Correlation	-.049	-.021	-.042	.105*	1
	Sig. (2-tailed)	.338	.683	.411	.040	
	N	384	384	384	384	384

*. Correlation is significant at the 0.05 level (2-tailed).

The significance value for the cost variable is 0.21, 0.01, 0.42, and 0.33 in the Pearson Correlation. It has been observed that there is a little relationship present between cost and SCP variable.

Correlations

		Q6	Q16	Q17	Q18
Q6	Pearson Correlation	1	-.189**	.047	-.168**
	Sig. (2-tailed)		.000	.355	.001
	N	384	384	384	384
Q16	Pearson Correlation	-.189**	1	.107*	.092
	Sig. (2-tailed)	.000		.037	.073
	N	384	384	384	384
Q17	Pearson Correlation	.047	.107*	1	-.094
	Sig. (2-tailed)	.355	.037		.066
	N	384	384	384	384
Q18	Pearson Correlation	-.168**	.092	-.094	1
	Sig. (2-tailed)	.001	.073	.066	
	N	384	384	384	384

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Corresponding Author:
*Email: malikmamoonmunir@gmail.com (Malik Mamoon Munir)
Received 18, Dec 2022
Received in revised form 12, Mar 2023
Accepted 13, Mar 2023

The significance values for agility are 0.00, 0.35, and 0.00. Hence, there is a strong relationship present between agility and SCP variables**.**

Correlations

		Q6	Q11	Q12	Q13	Q14	Q15
Q6	Pearson Correlation	1	-.089	-.110*	.121*	.173**	.958**
	Sig. (2-tailed)		.080	.032	.018	.001	.000
	N	384	384	384	384	384	384
Q11	Pearson Correlation	-.089	1	-.092	.087	.330**	-.084
	Sig. (2-tailed)	.080		.072	.088	.000	.100
	N	384	384	384	384	384	384
Q12	Pearson Correlation	-.110*	-.092	1	-.266**	-.097	-.077
	Sig. (2-tailed)	.032	.072		.000	.057	.133
	N	384	384	384	384	384	384
Q13	Pearson Correlation	.121*	.087	-.266**	1	.136**	.096
	Sig. (2-tailed)	.018	.088	.000		.008	.060
	N	384	384	384	384	384	384
Q14	Pearson Correlation	.173**	.330**	-.097	.136**	1	.192**
	Sig. (2-tailed)	.001	.000	.057	.008		.000
	N	384	384	384	384	384	384
Q15	Pearson Correlation	.958**	-.084	-.077	.096	.192**	1
	Sig. (2-tailed)	.000	.100	.133	.060	.000	
	N	384	384	384	384	384	384

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The significance value for the responsiveness is 0.08, 0.03, 0.01, 0.00, and 0.00. Hence, there is a strong relationship present between responsiveness and SCP variables**.**

Table 8 Summary of Hypotheses Testing

Hypothesis	Result
H1: Asset utilization does not have a positive impact on SCP	Null hypotheses accepted
H2: Reliability has a positive impact on SCP	Statement hypothesis accepted
H3: Cost has a positive impact on SCP	Statement hypothesis accepted
H4: Agility has a positive impact on SCP	Statement hypothesis accepted
H5: Responsiveness has a positive impact on SCP	Statement hypothesis accepted

7.0 Discussion & Conclusion

The automotive sector is the escalating Pakistani market. With increasing competition in the market, there is a need to improve the supply chain operations in the enterprise to achieve a competitive advantage. To this end, the SCOR model has been studied and applied in a Pakistani battery company working to its full potential in Pakistan. The scope of this research is the concept and application of the SCOR model in the performance of Pakistan's Automotive – Lead Acid Battery sector. For this purpose, Atlas Battery Ltd. has been selected as one of the leading battery manufacturers in Pakistan for four months. This is essential for manufacturing companies to design a proper supply chain in the global environment for customer products.

Corresponding Author:
*Email: malikmamoonmunir@gmail.com (Malik Mamoon Munir)
Received 18, Dec 2022
Received in revised form 12, Mar 2023
Accepted 13, Mar 2023

The firm has the competence and experience in managing material flows. Therefore, the researcher of this study particularly selected the

SCOR model for implementation in the battery manufacturing company.
ATLAS Supply Chain Management, the reference model of supply chain operations (SCOR), was reviewed in more detail in this study. Atlas Batteries Co., Ltd is a manufacturing company that offers a wide range of planning, supply, processing, delivery and return services and a supply chain that includes the SCOR operating model. To achieve a competitive advantage over other companies, you must adopt modern methods to improve work within the organization and achieve the company's profitability. Atlas Battery Limited was selected in this study, which used the Statistical Package for Social Sciences (SPSS) program to analyze various data and statistics. This is because independent variables and performance variable performance of the supply chain (reliability, reaction speed and flexibility, cost and asset utilization) are used to model the performance of SCOR standards.

Correlation and regression tests were used to determine the relationship and impact of the SCOR model's performance measures on the supply chain's performance. When the correlation is studied, it shows a weak negative relationship with reliability while showing a weak positive relationship with the reaction, dexterity, cost and use of the assets. The regression has been studied for additional impact tests. The degree of freedom is calculated as follows:

D.O.F = Sample size - Number of elements = 30 - 6 = 24

Now, this value of 24 is checked in the table of critical values, and the value of t is shown at 5%
of the value of 2.064. Therefore, an empty room 2,064 and - 2,064 rejects the lower and upper limits of any graph of the distribution of values that falls in the outer region. Nevertheless, all the values in the gradient table connected in Section 4 are within the region. Therefore, any empty
room takes performance from the supply chain for SCOR performance measurements, which has no positive effect.
Brandenburg et al. (2014) found that huge investments were made to create an ERP system as the company seeks to integrate the supply chain into organizations and business markets. The ERP system is believed to be an immediate data exchange and integration engine. Financial and other resources in the enterprise resource planning system's work procedures require careful analysis of many functions in practice and phases. Currently, threats to ERP implementation have increased as they combine technology and financial resources (Saeed, Malhotra & Abdinnour, 2018). Organizations are presently facing conflicts for various reasons. The world has become a global village, and customer expectations are a long-term element for changing ERP management.

8.0 Recommendations

The company has overcome the deficiencies mentioned above by making appropriate operational decisions and improving operational measures by improving the following:

1. Improving procurement strategies - delivering raw materials
2. By reducing the inventory date of WIP raw materials and finished products
3. By improving the inventory turnover ratio
4. By setting up an auxiliary unit to produce sub-contract items within the company premises
6. By tracking the location of the delivery vehicle
7. By adjusting the price level with one customer to take care of the fluctuation of the battery price due to variations in the price of the main raw material

Corresponding Author:
*Email: malikmamoonmunir@gmail.com (Malik Mamoon Munir)
Received 18, Dec 2022
Received in revised form 12, Mar 2023
Accepted 13, Mar 2023

These all are possible by implementing the SCOR model into the supply chain process. Therefore, manufacturing companies need to be aware of the benefits of this model and its implementation into the supply chain process to increase its efficiency.

9.0 Limitations of the Research

The limitation of this research study is that it only identified the SCOR Model efficiency by the only mean of the manufacturing company. Another limitation is that it only observed the effective use of the SCOR model. In contrast, other models that are also helpful in the supply chain process were not focused on. Only one company is selected in this study. Therefore, there is more need in future to observe the wider area regarding SCOR model efficiency to improve the supply chain.

10.0 Future Research

It has been observed that the company can adjust RFID technology to track products during production to find the true status of work in the finished product process and during transportation to the warehouse. In addition, this technology also helps to track the containers that are fed into the vessel through the global positioning system. Therefore, future research work is needed in this area.

References

Abolghasemi, M., Khodakarami, V., & Tehranifard, H. (2015). A new approach for supply chain risk management: Mapping SCOR into Bayesian network. Journal of industrial engineering and management, 8(1), 280-302.

Aqlan, F. (2016). A software application for rapid risk assessment in integrated supply chains. Expert Systems with Applications, 43, 109-116

Brandenburg, M., Govindan, K., Sarkis, J., & Seuring, S. (2014). Quantitative models for sustainable supply chain management: Developments and directions. European journal of operational research, 233(2), 299-312.

Camerinelli, E. (2016). Measuring the value of the supply chain: linking financial performance and supply chain decisions. Routledge.

Chardine-Baumann, E., & Botta-Genoulaz, V. (2014). A framework for sustainable performance assessment of supply chain management practices. Computers & Industrial Engineering, 76, 138-147.

Chen, D. Q., Preston, D. S., & Swink, M. (2015). How the use of big data analytics affects value creation in supply chain management. Journal of Management Information Systems, 32(4), 4-39.

Dissanayake, C. K., & Cross, J. A. (2018). Systematic mechanism for identifying the relative impact of supply chain performance areas on the overall supply chain performance using SCOR model and SEM. International Journal of Production Economics, 201, 102-115.

Elgazzar, S. H., Tipi, N. S., & Hubbard, N. J. (2016). The impact of supply chain strategy on the financial performance: a case study of a manufacturing company.

Corresponding Author:
*Email: malikmamoonmunir@gmail.com (Malik Mamoon Munir)
Received 18, Dec 2022
Received in revised form 12, Mar 2023
Accepted 13, Mar 2023

Ganji Jamehshooran, B., Shaharoun, M., & Norehan Haron, H. (2015). Assessing supply chain performance through applying the SCOR model. International Journal of Supply Chain Management, 4(1).

Heckmann, I., Comes, T., & Nickel, S. (2015). A critical review on supply chain risk–Definition, measure and modeling. Omega, 52, 119-132.

Hugos, M. H. (2018). Essentials of supply chain management. John Wiley & Sons.

Liu, P., Huang, S. H., Mokasdar, A., Zhou, H., & Hou, L. (2014). The impact of additive manufacturing in the aircraft spare parts supply chain: supply chain operation reference (scor) model-based analysis. Production Planning & Control, 25(13-14), 1169-1181.

Munir, M. M., Javed, M. A., & Bhutto, S. A. (2022). Young Adults' Switching Behaviour in the Cellular Service Industry of Pakistan. Global Journal for Management and Administrative Sciences, 3(1), 1-16. https://gjmasuok.com/index.php/gjmas/article/view/84/89.

Ntabe, E. N., LeBel, L., Munson, A. D., & Santa-Eulalia, L. A. (2015). A systematic literature review of the supply chain operations reference (SCOR) model application with special attention to environmental issues. International Journal of Production Economics, 169, 310-332.

Ptak, C. A., & Schragenheim, E. (2016). ERP: tools, techniques, and applications for integrating the supply chain. Crc Press.

Putro, P. A. W., Purwaningsih, E. K., Sensuse, D. I., Suryono, R. R., & Kautsarina (2022). Model and implementation of rice supply chain management: A literature review. Procedia Computer Science, 197, 453-460.

Saeed, K. A., Malhotra, M. K., & Abdinnour, S. (2018). How supply chain architecture and product architecture impact firm performance: An empirical examination. Journal of Purchasing and Supply Management.

Sangari, M. S., Hosnavi, R., & Zahedi, M. R. (2015). The impact of knowledge management processes on supply chain performance: An empirical study. The International Journal of Logistics Management, 26(3), 603-626.

Tramarico, C. L., Salomon, V. A. P., & Marins, F. A. S. (2017). Multi-criteria assessment of the benefits of a supply chain management training considering green issues. Journal of Cleaner Production, 142, 249-256.

Ume Rubaca, Munir, M. M., & Munir, B. (2022). Covid-19 Related Experiences, Online Leisure Crafting, and Academic Performance: Role of Uncertainty Avoidance. Reviews of Management Sciences, 4(1), 16-29. https://doi.org/10.53909/admin.v4i1.117.

Vlachos, I. P. (2014). A hierarchical model of the impact of RFID practices on retail supply chain performance. Expert Systems with Applications, 41(1), 5-15.

Zhu, S., Song, J., Cegielski, C. G., & Lee, K. (2017). The Impact of Supply Chain Analytics on Operational Supply Chain Transparency: An Information Processing View.

Corresponding Author:
*Email: malikmamoonmunir@gmail.com (Malik Mamoon Munir)
Received 18, Dec 2022
Received in revised form 12, Mar 2023
Accepted 13, Mar 2023

Zhu, S., Song, J., Hazen, B. T., Lee, K., & Cegielski, C. (2018). How supply chain analytics enables operational supply chain transparency: An organizational information processing theory perspective. International Journal of Physical Distribution & Logistics Ma

Corresponding Author:
*Email: malikmamoonmunir@gmail.com (Malik Mamoon Munir)
Received 18, Dec 2022
Received in revised form 12, Mar 2023
Accepted 13, Mar 2023