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A Study on Process Management in Supply Chain Industry at Universal Engineers Chennai Pvt Ltd

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ABSTRACT: This study provides an in-depth analysis of process management within the supply chain industry, emphasizing its pivotal role in enhancing operational efficiency, responsiveness, and sustainability. In today's highly competitive and dynamic global marketplace, organizations are under constant pressure to optimize their supply chain activities to deliver value to customers while maintaining cost-effectiveness and agility. This research investigates key process management methodologies such as Lean Management, Six Sigma, Total Quality Management (TQM), and process mapping, which are instrumental in identifying inefficiencies, eliminating waste, and streamlining workflows across procurement, production, logistics, and distribution.

A significant focus of the study is the integration of advanced technologies—namely Artificial Intelligence (AI), Internet of Things (IoT), blockchain, and automation—in modernizing and transforming traditional supply chain processes. These technologies contribute to real-time data sharing, improved decision-making, predictive analytics, enhanced traceability, and process automation, all of which collectively enhance supply chain visibility and efficiency. The study also explores the critical importance of risk management in ensuring supply chain resilience. It examines strategic approaches such as scenario planning, diversification of suppliers, and contingency frameworks designed to mitigate disruptions caused by geopolitical instability, natural disasters, pandemics, and market volatility.

KEYWORDS: Supply Chain Management, Process Management, Operational Efficiency, Lean Management, Six Sigma, Total Quality Management , Process Mapping, Procurement, Production, Logistics, Distribution, Artificial Intelligence, Internet of Things, Block chain, Automation, Predictive Analytics, Real-Time Data Sharing, Risk Management, Resilience, Scenario Planning, Supplier Diversification, Contingency Frameworks, Sustainability, Market Volatility, Geopolitical Instability.

I. INTRODUCTION

Supply Chain Management (SCM) refers to the management of the flow of goods and services, which involves the movement and storage of raw materials, inventory, and finished goods from point of origin to point of consumption. It includes various processes such as procurement, production, distribution, and logistics.

Process management in the supply chain industry is a critical aspect of ensuring that goodsare delivered efficiently, cost-effectively, and within the required timelines. It involves the systematic planning, monitoring, and control of business processes within the supply chain to improve performance, reduce costs, and enhance customer satisfaction.

Six Sigma Process Management in Sc Industry

1.Define (D)

Goal Setting: The first step is to define the problems or inefficiencies in the supply chain that need improvement. For example, delays in delivery, high defect rates in products, or excess inventory.

Customer Requirements: Six Sigma focuses on understanding customer needs and defining quality from their perspective. This includes meeting delivery timelines, maintaining product quality, and minimizing costs.

KPIs and Metrics: Define key performance indicators (KPIs) like delivery accuracy, lead time, and inventory turnover that can be used to measure the supply chain's performance.

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Measure (M)

Data Collection: Collect data across the supply chain to identify process variations and areas that need improvement. For example, tracking delivery times, order accuracy, and supplier performance.

Baseline Performance: Measure the current performance against the defined KPIs to establish abaseline.This helpsto determine where themostsignificant improvements can be made.

Identify Process Variables: Use tools like process mapping and flowcharts to understand the variables affecting supply chain performance, such as production delays or transportation issues.

Analyse(A)

Root Cause Analysis: In this phase, Six Sigma uses tools like Pareto analysis, cause- and-effect diagrams (fishbone diagrams), and statistical analysis to identify the root causes of defects and inefficiencies in the supply chain.

Process Variability: Analyse the data to identify sources of process variability, whether they are due to suppliers, transportation, production, or inventory management.

Bottlenecks: Identify bottlenecks or areas where the flow of goods or information is slowed down, leading to delays, stockouts, or increased costs.

Improve(I)

Solution Design: Based on the analysis, design solutions to improve processes. This might include implementing automation, changing suppliers, improving inventory management systems, or adjusting production schedules.

Lean Principles: Six Sigma often integrates Lean principles, which focus on eliminating waste, reducing inventory levels, and optimizing the use of resources.

Pilot Testing: Implement pilot programs to test the proposed solutions on a smaller scale to validate their effectiveness before full-scale implementation.

Control(C)

Standardization: Once improvements have been made, standardize the newprocesses to ensure consistency across the supply chain. This can include setting new operational standards, SOPs (Standard Operating Procedures), and documentation.

Continuous Monitoring: Use control charts, dashboards, and other monitoring tools to continuously track performance against KPIs to ensure that improvements are maintained.

Employee Training: Provide ongoing training for employees to ensure they understand the new processes and are committed to maintaining high standards of performance.

Sustain(S)

Continuous Improvement: Six Sigma encourages a culture of continuous improvement, meaning businesses should regularly revisit their processes and make further improvements based on new data, market trends, or technological advancements.

Feedback Loops: Establish regular feedback loops with suppliers, customers, and internal stakeholders to monitor the effectiveness of the changes and identify new areas for improvement.

II. OBJECTIVES OF THE STUDY

- To study the process management in supply chain industry practices implemented in Universal Engineering at Chennai.
- Assess the coordination between departments (procurement, production, inventory, dispatch) to ensure seamless information flow and decision-making.
- Focus on how process improvements can result in faster turnaround times and consistent product quality.

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- Examine how digital tools like ERP systems, automation, or data analytics are used and suggest improvements for better efficiency and transparency.
- Identify areas where improved process management can help reduce waste, minimize delays, and lower procurement and inventory costs.

III. SCOPE OF THE STUDY

The company faces challenges in procurement, inventory, and logistics. A study is needed to pinpoint exact inefficiencies and streamline the process.
Increasing raw material, storage, and transportation costs demand an in-depth study to find cost-saving opportunities.
Delays in supply chain operations affect customer commitments. The study aims to improve delivery timelines and service levels.
Currently, decisions are often made based on assumptions. The study will provide factual insights for strategic planning and operations.
With growing industry competition and evolving technologies, the company needs to modernize its supply chain for better performance and market relevance.

IV. REVIEW OF LITRATURE

Alka,R(2014)
States that recruitment and selection is the important function of HRM. Proper recruitment and selection provide a strong basic structure/ foundation to an organization. Its basic objective is to attract and appoint a person with proper and adequate skills and qualification at the appropriate/ best fitted job. Modern era is techno savvy. Online recruitment and selection process help the organization to attract and manage the competent workforce. The main objective of this article is to understand the meaning and process of online recruitment and selection process. Many online recruitment agencies are also emerging as a popular and reliable source of recruitment. Some of them are discussed in the article.
Special focus is give non the online recruitment and selection process adopted by IBPS. Use of information technology in recruitment and selection process provides benefits to both the recruiter and the job seekers in many ways.

Bagul, DB (2014)
States that research little attempt is made to see its satisfactory level. The recruitment activity is analyzed internally, that means from the view of the departmental heads, which are, involved in theprocess itselfandexternally that means from the candidate's perspective. From the study of Recruitment and Selection at Rathi, and by analyzing the processconclusionisdrawn.Thecandidatesaresatisfiedwiththepolicyof Ratio,butthereis little scope to improve the satisfactory level of Recruitment and Selection process from the internal point of view that means among the departmental head. Recruitment activity is oneof the prime activities of any growing organization; therefore, it is very necessary for any organization tocheck whether thisprocess is going on smoothly or requires some change.As performance of the whole group is ultimately depends on the efficiency of the employees of the group. Therefore, to make sure the recruited candidate is a right candidate is the prime responsibility of the HR people.

Rathore, N.S(2014)
Statesthathumanresourcemanagementisthemanagementofemployee'sskill, knowledge abilities, talent, aptitude, creativity, ability etc. different terms are used for denoting Human Resource Management. They are labor management, labor administration, labor management relationship, employee employer relationship, industrial relationship, human capital management, human assent management etc. In simple sense, human resource management means employing people, developing their resources, utilizing, maintaining and compensating their services in tune with the job and organizational requirements Human Resource Management is also a strategic and comprehensive approach to managing people and the workplace culture and environment.

V. RESEARCH METHODOLOGY

The research methodology adopted for this study on process management in supply chain industries at Universal Engineering Chennai Private Limited is a combination of qualitative and quantitative approaches, aligning with a descriptive research design. Primary data was collected through structured questionnaires and interviews with key personnel involved in procurement, logistics, inventory management, and production planning. A sample size of 110 employees was selected using purposive sampling to ensure that only those directly involved in supply chain processes were surveyed. Secondary data was obtained from company reports, operational manuals, and industry journals to support and validate the findings. Data analysis was carried out

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using statistical tools such as SPSS and MS Excel to identify patterns, bottlenecks, and opportunities for process optimization. This methodological framework enables a comprehensive evaluation of the effectiveness, efficiency, and integration of supply chain practices within the organization.

Meaning of Research

Research is a systematic and objective process of collecting, analyzing, and interpreting information to increase understanding of a particular phenomenon. In the context of this study, research refers to the careful investigation and analysis of process management practices within the supply chain operations of Universal Engineering Chennai Private Limited. It involves exploring existing procedures, identifying inefficiencies, and evaluating strategies for improving coordination, cost-effectiveness, and overall performance. By applying research methods, the study aims to generate insights that can help the organization streamline its supply chain processes, enhance productivity, and gain a competitive advantage in the manufacturing sector. Research thus serves as a valuable tool for informed decision-making and continuous improvement in industrial operations.

Types of Research Design

Descriptive Research Design
Exploratory Research Design
Qualitative Research Design
Quantitative Research Design

Description of statistical tools used:

Correlation Analysis

Supplier performance metrics reviewed (Quality, Delivery Time, Cost)

Response	Noofresponse	percentage
Monthly	40	38%
Quarterly	36	34%
Annually	24	22%
Never	6	6%
Total	106	100%

Interpretation

From the above supplier performance table,38% of respondents have reviewed monthly,34%ofrespondentsareinQuarterly,22%ofrespondentsare inAnnually,6% of respondents are reviewed in never.

Main Criteria for Suppliers Election

Response	Noofresponse	percentage
Price	23	21%
Quality	34	32%
Delivery reliability	29	27%
Alloftheabove	21	20%
Total	107	100%

Interpretation

Formtheabovetablemain criteriaforsupplierselection,therespondentsare21%of price,32% of quality,27% of delivery reliability,20% are all of the above are mentioned in supplier selection.

Correlation Analysis:

The correlation analysis is a statistical tool used to measure the degree to which two variables are linearly related to

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each other. The correlation is between two variables numerically describes which is larger and smaller than average value of one variables are related to larger or smaller than values of the other variables. It is measuring the strength and direction of the linear relationship between two variables.

Hypothesis:
H0-(Null Hypothesis) There is no Significant Relationship of Rating the supplier performance metrics reviewed (quality, delivery time, cost).
H1- (Alternative Hypothesis) there significant relationship of rating the supplierperformancemetricsreviewed (quality, delivery time, cost).

Particulars	YES	NO	TOTAL
Monthly	20	20	40
Quarterly	18	18	36
Annually	12	12	24
Never	3	3	6
Total	53	53	106

Correlation Coefficient (r): 1.00 (perfect positive correlation)
Sample Size (n): 4
t-statistic (t): 94,906,265.62
p-value (p): ~0.00000000000000011 (practically 0)
Degrees of Freedom (df): 2

Interpretation:
There is a nearly perfect positive correlation between the two groups, indicating that the values in Group 1 and Group 2 are almost identical across all categories. This is evident since the data in both groups are the same, leading to a correlation coefficient extremely close to 1. 1.

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