

Supply Chain Management in Export and Import Logistics Operations at Freedom Shipping Agencies Tuticorin

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Abstract--Supply Chain Management (SCM) involves the coordination and management of the flow of goods, services, and information from the point of origin to the point of consumption. It integrates all activities related to procurement, production, storage, and distribution to ensure efficiency and customer satisfaction. With the rapid advancement of the Internet and digital technologies, traditional SCM has evolved into Electronic Supply Chain Management (e- SCM). This modern approach emphasizes the use of online platforms and information systems to integrate and synchronize supply chain activities among business partners. e-SCM enhances transparency, reduces operational costs, and provides organizations with a competitive edge in a globally connected market. The integration of Internet-based solutions has thus become an essential component of successful supply chain strategies in the digital era.

Keywords--Supply Chain Management (SCM), Electronic Supply Chain Management (e- SCM), Internet Technology, Logistics, Integration, Synchronization, Competitive Advantage, Digital Transformation, Information Systems, Global Operations.

I. INTRODUCTION

Supply Chain Management (SCM) coordinates all activities involved in moving goods and services from suppliers to customers. It integrates logistics, procurement, inventory, production, and distribution across interconnected organizations. Information flows both ways, products move forward, and money flows backward to maintain system balance. Emerging from the need for better coordination beyond traditional cost-focused operations, SCM enhances efficiency, reduces costs, and strengthens competitiveness through seamless integration of suppliers, manufacturers, and customers.

II. OBJECTIVES

- To identify the current supply chain management strategies in Freedom shipping agency, Tuticorin.
- To analyse the role of logistics operations in enhancing supply chain efficiency.

III. REVIEW OF LITERATURE

1. *Ruben Vrijhoef and Lauri Koskela (2000)* "The Four Roles of Supply Chain Management in Construction" identified four specific roles of SCM in construction, highlighting significant waste and inefficiencies. Their study found that most issues originate in earlier project stages and are intensified by outdated, short-term control methods.
2. *Dirk Pieter van Donk and Renzo Akkerman (2007)* "Opportunities and Realities of Supply Chain Integration: The Case of Food Manufacturers" examined barriers to supply chain integration in the food industry. They concluded that shared resources, product characteristics, and business complexities restrict integration, though such conditions also increase its necessity.
3. *M.K. Chien and L.H. Shih (2007)* "An Empirical Study of Green Supply Chain Management Practices in the Electrical and Electronic Industry" analyzed Taiwanese manufacturers' response to EU environmental directives. Their findings revealed that adopting green procurement and manufacturing improved both environmental and financial performance.

III. RESEARCH METHODOLOGY

Research Design and Approach

The present study follows a **descriptive and analytical research design** to explore **Supply Chain Management (SCM) practices**. Both **primary** and **secondary data** were utilized to obtain a comprehensive understanding of the topic. The descriptive nature of the study helps in analyzing and interpreting data systematically to identify patterns and relationships related to SCM effectiveness.

Sampling Design

The research is **exploratory and descriptive** in nature. The **Convenience Sampling method** was adopted to collect primary data from respondents due to accessibility and practicality.



This method allowed the researcher to gather relevant insights directly from individuals involved in SCM operations.

Sampling Size

A total of **97 respondents** were selected systematically for this study. The sample size was considered adequate to ensure reliable results and meaningful interpretation of Supply Chain Management practices within the organization.

Data Collection

a) primary Data

Primary data were obtained through a **structured, closed-ended interview schedule** designed to collect responses from employees of *Freedom Shipping Agency, Tuticorin*. The collected data were tabulated and analyzed descriptively to measure the respondents' levels of satisfaction and perceptions regarding SCM practices.

b) Secondary Data

Secondary data were gathered from **books, journals, periodicals, company reports, websites, and other publications** relevant to supply chain and logistics management. These sources helped provide theoretical and contextual support for the study.

Tools for Analysis

To analyze and interpret the data, the following **statistical tools** were used:

1. Percentage Analysis

Used to compare proportions and understand the distribution of responses among different categories.

$$\text{Percentage of Respondents} = \frac{\text{Number of Respondents}}{\text{Total Respondents}} \times 100$$

2. Chi-Square Test (χ^2)

Used to determine the relationship between categorical variables and test the independence of factors.

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

Where O_i = Observed frequency and E_i = Expected frequency.

The test helps in accepting or rejecting the null hypothesis based on the calculated and table values.

3. ANOVA (Analysis of Variance)

ANOVA separates total variability into random and systematic components. It identifies whether differences in means among groups are statistically significant, thereby assessing the effect of independent variables on the dependent variable.

IV. DATA ANALYSIS AND INTERPRETATION

Used forecasting of demand for Production Planning

Used forecasting of demand for Production Planning	No of respondents	Percentage
Yes	77	79.4
No	20	20.6
Total	97	100.0

(Source: Primary data)



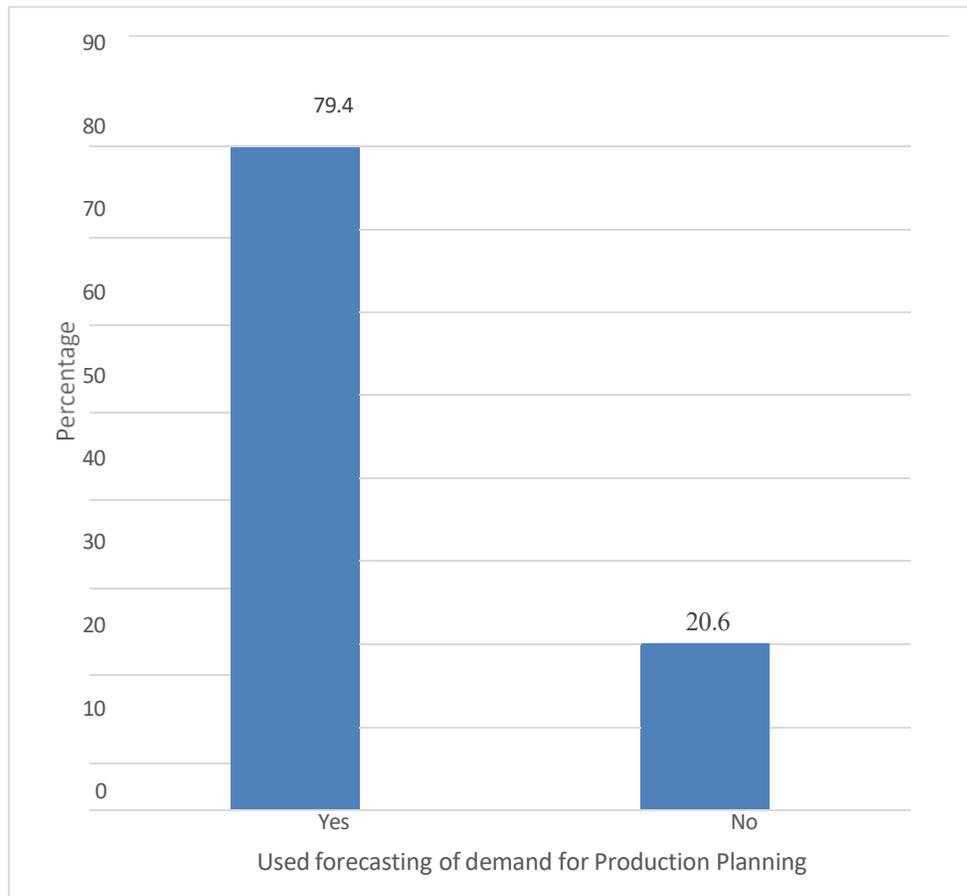
Interpretation

It could be seen from the above table that out of 97 respondents, 77 (79.4%) of the respondents have used forecasting of demand for production planning and

remaining 20 (20.6%) of the respondents are not used forecasting.

The majority 77 (79.4%) of the respondents have used forecasting of demand for production planning.

Used forecasting of demand for Production Planning





Period of Forecasting

Period of Forecasting	No of respondents	Percentage
Short term	48	49.5
Medium term	29	29.9
Long Term	18	18.6
Very long term	2	2.1
Total	97	100.0

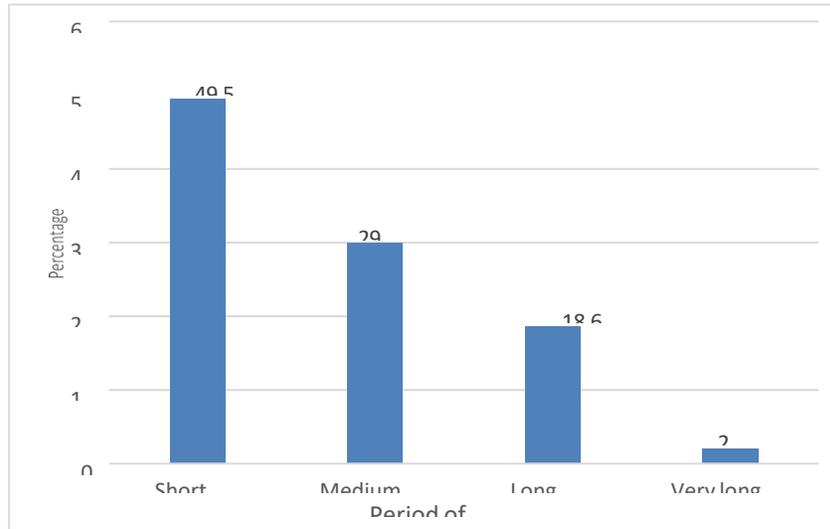
(Source: Primary data)

Interpretation

It is evident from the above table that out of 97 respondents, 48 (49.5%) of the respondents have consider short term period for forecasting, 29 (29.9%) of the respondents have consider medium term period, 18 (18.6%)

of the respondents have consider long term period and remaining 2 (2.1%) of the respondents have consider very long term period for forecasting. The majority 48 (49.5%) of the respondents have consider short term period for forecasting.

Period of Forecasting



Demand Forecasting method affects efficiency of forecasting

Demand Forecasting method affects efficiency of forecasting	No of respondents	Percentage
Yes	67	69.1
No	30	30.9
Total	97	100.0

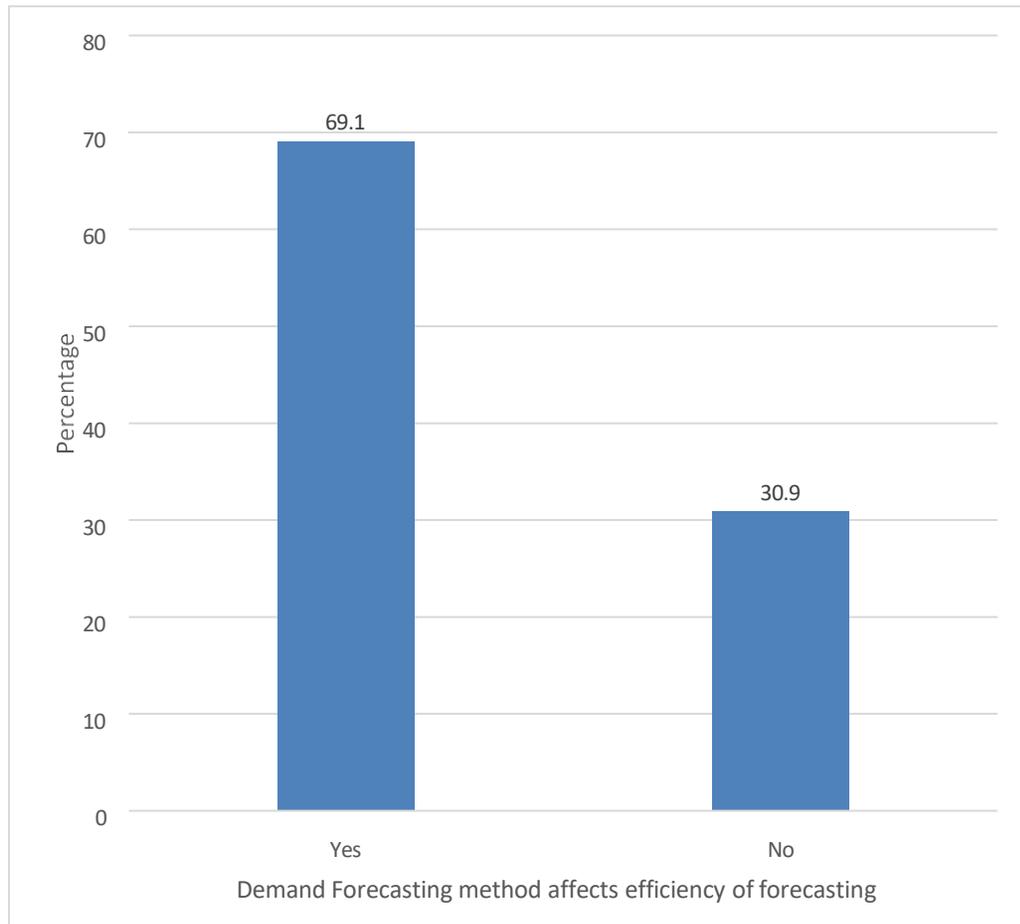
(Source: Primary data)

Interpretation

The above table shows that out of 97 respondents, 67 (69.1%) of the respondents are said demand forecasting method affects efficiency of forecasting and remaining 30

(30.9%) of the respondents are said demand forecasting method not affect efficiency of forecasting. The most 67 (69.1%) of the respondents are said demand forecasting method affects efficiency of forecasting.

Demand Forecasting method affects efficiency of forecasting



V. FINDINGS

1. Use of Demand Forecasting:

A majority of respondents (79.4%) reported using demand forecasting for production planning, showing its importance in aligning production with market demand.

2. Forecasting Period Preference:

Nearly half of the respondents (49.5%) preferred short-term forecasting, indicating a focus on immediate production and sales requirements rather than long-term planning.

3. Effectiveness of Forecasting Methods:

About 69.1% agreed that the forecasting method directly affects forecasting efficiency, highlighting the need for accurate and scientific forecasting models.

4. Impact on Organizational Performance

More than half (55.7%) stated that demand forecasting has improved procurement procedures, helping organizations plan material purchases efficiently.



5. *Material Resource Planning (MRP):*

A large portion (66%) of respondents confirmed using Material Resource Planning (MRP) in purchasing decisions, reflecting its significance in managing resources effectively.

VI. SUGGESTIONS

1. *Enhance Forecasting Accuracy:*

Adopt advanced data analytics and AI-based forecasting tools to improve prediction accuracy and reduce variability in production planning.

2. *Encourage Long-Term Forecasting:*

Shift focus from short-term to medium and long-term forecasting to enable better capacity planning and strategic sourcing.

3. *Strengthen Material Resource Planning:*

Integrate MRP with enterprise resource planning (ERP) systems

4. *Improve Inventory Management:*

Implement real-time inventory tracking and automatic reorder systems to minimize overstocking or stockouts.

VII. CONCLUSION

The study reveals that demand forecasting and material resource planning play crucial roles in enhancing supply chain efficiency. Most organizations rely on short-term forecasting for production planning, while inventory control remains the main reason for implementing MRP. However, persistent delays in logistics processes highlight the need for better coordination and digital integration.

Overall, the findings suggest that adopting data-driven forecasting methods, expanding the scope of material planning, and strengthening logistics operations can significantly improve productivity, reduce costs, and enhance the overall effectiveness of supply chain management.

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