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ANALYZING THE IMPACT OF LAST MILE DELIVERY SOLUTIONS FOR SUPPLIERS

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ABSTRACT:

This paper's primary goal is to offer an organized understanding of last-mile delivery, ultimately pointing out knowledge gaps and suggesting a framework for future research on the topic's sustainability. Five dimensions of the last mile are revealed by a thorough analysis of the literature: distribution, logistics, operations, transportation, and last mile delivery. These dimensions are all related to one another and have traits that are grouped. As an example, last-mile delivery, transportation, and operations are all operational, but last-mile distribution is tactical, and last-mile logistics is strategic. This research breaks down last mile delivery into manageable chunks in order to create a framework that illustrates its intricate features and how it is connected to other related components. The framework assists practitioners in determining which levels of last mile delivery (operational, tactical, or strategic) they may apply the concept of sustainability by examining last mile delivery holistically.

Keywords: Mile distribution, last-mile operations, sustainability terms

INTRODUCTION

The control of the movement of goods from supplier to carrier to production team to sales and ultimately to customer is known as supply chain management. The goal of supply chain management is to lower total costs by implementing efficient cross-echelon coordination and cooperation. To assist corporations in achieving this goal, a number of advanced analytical tools and optimization software solutions are available in the market and in scholarly publications. Nevertheless, this study suggests that since every department has its own Departmental Thought World (DTW) and unique perspective on reality, managers create biased data for tools and models, which makes them unusable.

Definition of Supply Chain Management

International markets are growing and changing how supply and demand are handled. Markets that span continents are the engines of global corporations. They are compelled to constantly searching for locations to locate production facilities where labour and raw materials are inexpensive in order to maintain low manufacturing costs. An agile procurement strategy crossing international borders is required to source raw materials and vendors who can provide them in the appropriate quantity, quality, and price. In the scenario described above, corporations are sourcing raw materials from multiple vendors worldwide to supply their factories, which are located in different continents.

Importance of supply chain management an organization

These days, supply chain strategies form the essential framework of business organizations. Effective Supply Chain Strategy implementation determines Product availability and Market coverage at key areas that are critical to Revenue Recognition. To put it simply, when a product is marketed and brought to market, it must be available for purchase at every sales counter across the nation and in every market where customers can accept delivery. Any issue with the product not being supplied at the appropriate time may cause demand and client interest to decline, which could have disastrous consequences. In order to support sales and marketing strategy, transportation network design and management are crucial.

The challenges encountered in one supply chain link affect the entire supply chain since supply chains operate as a system or network. Increased inefficiencies throughout the supply chain may result from this. To guarantee that the best decisions are made for the supply chain as a whole, more thought should be paid to how decisions and actions in one area of the chain affect the other areas. Given the chemical pigment industry's low level of competitiveness when compared to other global players, one could wonder if the supply chain management strategy is fully executed, with an emphasis on supply chain-wide solutions and efficiencies rather than those of individual parties in the supply chain

OBJECTIVES OF THE STUDY

- Use the last-mile delivery process to detect transportation system issues.
- To evaluate the performance of last-mile deliveries and resolve any transportation-related issues.
- To assess VVTi Pigments' last-mile delivery logistics process performance.
- To enhance vehicle routing's impact on logistics systems and the last mile delivery system's efficiency.
- To determine whether the concept has enhanced access delivery to the final destination and improved performance.

SCOPE AND SIGNIFICANCE OF THE STUDY

- The study titled "A supply chain and logistics function with chemical pigment" will help readers understand the client's presumption.
- Additionally, the research findings will support the proper implementation and strategy of the showcasing approaches.
- The investigation's research findings will benefit the automotive industry by outlining specific protocols to enhance transactions, the company, its reputation, and its competitive landscape.
- It also helps to recognize the factors influencing the deals and to comprehend the business instances of the product.

LIMITATIONS OF THE STUDY

- The study only looks at the logistics capacity of chemical pigment and leaves out some other vehicles.
- The majority of the clients are flighty while nothing because they are uninterested or lack time.
- The data may be inaccurate.
- The study does not manage the production supply chain or logistics function of chemical pigment used by individuals in another city.

REVIEW OF LITERATURE

Pagh (2017), In order for supply chain management to be successful, participants in various supply chains must share an equal share of risks and rewards, and this share must also last over an extended length of time. Members of the supply chain must cooperate with one another in order to accomplish a shared goal in a coordinated and timely manner. It is essential to preserving the industry's sustainability and progressiveness. Members of the supply chain should also collaborate with one another when developing the new product development plan.

Shukla (2022), supply chain management is becoming more conscious of the need for sustainable growth. These days, businesses are advancing and aiming for environmental sustainability. In recent times, literature has acknowledged the significance of specifically addressing sustainability challenges in supply chain and operations management. Nevertheless, when it comes to handling supply chain and operations management problems, the environmental and social aspects of sustainability are not systematically integrated. With the growing challenges posed by climate change and global warming, efforts to make supply chains more ecologically friendly have taken precedence.

RESEARCH METHODOLOGY

The precise steps or methods used to find, pick, process, and evaluate data on a subject are known as research methodology. The methodology part of a research article gives the reader the opportunity to assess the general validity and reliability of the study.

a. Study area: The study area is Tuticorin.

b. The study's design: The framework of a researcher's chosen study methods and techniques is known as research design. In this work, descriptive research is used. The goal of descriptive research is to precisely and methodically characterize a population, circumstance, or phenomena. It can respond to inquiries about what, where, when, and how, but not why.

c. Source of the data

Any place we can locate statistics, figures, or other pertinent information to back up the research is a data source. There are two sources of data that can be obtained: internal and external. "Primary data" refers to information obtained from internal sources, whereas "secondary data" refers to information obtained from external sources.

Primary Data Source:

These are new data that have just been gathered. The interview schedule questionnaire was the main method of data collecting employed in this study.

Secondary Data Source:

Information gathered specifically for the study but already existing elsewhere is referred to as secondary data. The primary sources of secondary data for the project are the organization's yearly reports, the internet, journals, and magazines.

d. Method of research:

An overall strategy and procedure for conducting the study might be thought of as a research approach. A deductive methodology is used in this investigation.

e. Tool for research

One tool for gathering, calculating, and analysing data about research interests is a research instrument.

f. The technique of sampling

The name of the particular procedure used to choose the sample's entities, or some other means of identification, is a sampling technique. Non-Probability Sampling method is used in this investigation. The method of convenience sampling is employed. Survey participants who are "convenient" for the researcher are used in convenience sampling.

g. Unit of example company personnel serve as the sampling unit.

h. The amount of the sample

The survey just included the opinions of the company's workers. A total of 120 respondents' samples were collected for the study.

i. Methods and tools for analysis

The following statistical techniques are frequently employed for data analysis:

1. Percentage analysis
2. Analysis of Chi Square test
3. Analysis of correlation
4. Anova

DATA ANALYSIS AND INTERPRETATION

Correlation

The relationship between two or more variables is the focus of correlation analysis. It provides no information regarding a cause-and-effect relationship. Correlation can be categorized or described in various ways. Pearson's coefficient of correlation is the common term used to describe Karl Pearson's approach. The letter "r" stands for it.

$$\text{Karl Pearson's coefficient formula is } r = \frac{\sum XY}{\sqrt{(\sum X^2)(\sum Y^2)}}$$

The coefficient of correlation, as determined by the formula above, will always have a value between +1 and -1. A complete positive correlation exists between the variables when $r = 1$. There is perfect negative correlation between the variables when $r = -1$. There is no link between the variables when $r = 0$.

Relationship between Year of the experience and Opinion about Quality of Service

Hypothesis testing

Null hypothesis (H₀):

There is no significant relationship between year of the experience and opinion about quality of service.

Alternative hypothesis (H₁):

There is some significant relationship between year of the experience and opinion about quality of service.

Correlations			
		Experience in years	Opinion about Quality of Service
Experience in years	Pearson Correlation	1	.874**
	Sig. (2-tailed)		.000
	N	120	120
Opinion about Quality of Service	Pearson Correlation	.874**	1
	Sig. (2-tailed)	.000	
	N	120	120

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

Interpretation:

According to the preceding data, there is a 0.874 coefficient of association between the year of experience and the opinion of the quality of the service. It is less than one. Thus, there is a favourable correlation between the year of experience and the perception of service quality.

CHI-SQUARE ANALYSIS

In statistics, chi-square analysis is used to evaluate the goodness of fit between the observed data distribution and the theoretical distribution that is assumed. As such, it is a metric for analysing the difference between actual and predicted frequencies. Regarding the population being sampled, no assumptions are made by it. The amount known as χ^2 (chi-square) is used to express how much theory and observation differ. The observed and anticipated frequencies entirely coincide if χ^2 is zero. The difference between observed and predicted frequencies would be larger the higher the value of χ^2 . The following formula can be used to calculate Chi-Square (χ^2).

where E_i is the expected frequency and O_i is the observed frequency.

The calculated value of χ^2 is compared with the table of χ^2 for given degrees of freedom at specified level of significance. If the calculated value of χ^2 is greater than the table value then the difference between theory and observation is considered to be significant. On the other hand, if the calculated value of χ^2 less than the table value then the difference between theory and observation is not considered to be significant. The degrees of freedom are $(n - 1)$ where 'n' is number of observed frequencies.

Relationship between Income per month of the Respondents and Firm supply chain time taken in.

Hypothesis testing

Null hypothesis (H_0):

There is no significant relationship between income per month of the respondents and firm supply chain time taken in.

Alternative hypothesis (H_1):

There is some significant relationship between income per month of the respondents and firm supply chain time taken in.

Income per month * Firm supply chain time taken in Crosstabulation						
Count		Firm supply chain time taken in				Total
		One day	One day to week	Week to one month	One month to one year	
Income per month	Below Rs. 5,000	10	17	1	0	28
	Rs. 5,000 – Rs 10,000	0	0	48	0	48
	Rs. 10,000 – Rs. 15,000	0	0	28	0	28
	Above Rs. 15,000	0	0	8	8	16
Total		10	17	85	8	120

Chi-Square Tests			
	Value	Df	Asymp. Sig (2-sided)
Pearson Chi-Square	1.687E2 ^a	9	.000
Likelihood Ratio	151.692	9	.000
Linear-by-Linear Association	67.903	1	.000
N of Valid Cases	120		

a. 11 cells (68.8%) have expected count less than 5. The minimum expected count is 1.07.

Interpretation

The aforementioned table suggests that the P value is 0.001 and the Pearson Chi-Square value is 1.687, indicating that the data is not significant at the 5% (0.05) significance level. 0.9.3 is the bare minimum predicted count. As a result, the null hypothesis is accepted, and it is discovered that there is no meaningful correlation between respondents' monthly salary and the amount of time they spend in the company supply chain.

ONE WAY- ANOVA

One technique that distinguishes between variation attributable to one set of causes and variation attributable to another set of causes is the analysis of variance. The two components that comprise the overall variation are as follows:

- Variation among the sample subgroups
- Differences among the sample subgroups

ANOVA is the abbreviation for the analysis of variance method. An ANOVA table is a table that displays the variance's cause, sum of squares, degrees of freedom, mean square (variance), and the calculation for the F-ratio.

F-statistic is equal to the sample variance. Variability among the samples

Hypothesis testing

Null Hypothesis (H₀):

There is no significant relationship between age of the respondent's and Think about the logistics operation of the company

Alternative Hypothesis (H₁):

There is a significant relationship between age of the respondent's and Think about the logistics operation of the company

ANOVA							
Age		Sum of Squares	Df	Mean Square	F	Sig.	
Between Groups	(Combined)	91.194	3	30.398	171.955	.000	
	Linear Term	Unweighted	61.026	1	61.026	345.211	.000
		Weighted	82.560	1	82.560	467.026	.000
		Deviation	8.633	2	4.317	24.419	.000
Within Groups		20.506	116	.177			
Total		111.700	119				

Interpretation

The age of the respondents is clearly displayed in the table, and their thoughts regarding the logistics of the company's relationship with my superiors have a figure on 345.211 values, with significance at the.366 level. In comparison, the values of the sum of squares within groups between groups are 20.506 and 91.194, respectively. Accepting the alternative hypothesis, the significant value is less than 0.05 and the significant percentage is above 95%. Consequently, the null hypothesis—that there is a substantial correlation between the respondent's age and consider the company's logistical operations.

Result

Based on the study above, we may conclude that H1 is accepted because the determined F-value is a positive 345.211 value. Given that the P value of 0.000 is less than < 0.05 , it may be concluded that there is a strong correlation between respondent designation and advance scheduling and planning. At the 4% level, the results are considerable.

FINDINGS

44.2% of respondents are between the ages of 41 and 50, while 81.7% of respondents are men.

Employees make up 40% of the respondent's position.

The respondent's income is Rs. 5,000 and Rs. 10,000, or 40.0%.

39.2% of those surveyed had less than five years of experience.

Seventy-eight percent of the respondents reported a firm supply chain time of one week to one month. 37.5% of respondents said that the quality of the services was average.

57.5% of the respondents operate the company's logistics effectively.

SUGGESTIONS

- No quantitative metrics of firm performance were used in this study. It would be intriguing to explore if quantitative metrics, like profitability, might provide similar outcomes.
- To achieve a competitive edge, apply customer-focused multidimensional customer service (responsiveness and flexibility), logistics quality (reliability, timeliness, and timely delivery), and demand management interface capabilities.

To obtain a strategic edge, enable before-during-and-after sales service interface capabilities.

- To reduce costs across the supply chain without sacrificing service standards, enable interface capabilities for logistics and supply management.

CONCLUSION

This study's goal is to look into supply chain management procedures in the pigment production sector. The study's main finding indicates that the industry employs a number of effective supply chain management techniques. In the logistics sector, a variety of creative projects and programs

are being implemented to handle supply chain activities in an efficient and fruitful way. There are a few problems, one of which is with qualification, relationship, and supplier selection.

The main areas of concern are quality and environmental issues related to the supply chain. To address these concerns, the industry is working to incorporate green supply chain strategies.

The study's main drawback was that the majority of respondents were extremely devoted to the business and were unwilling to respond. It is necessary to expand the number of responders. Generalized findings are produced by the application of qualitative approaches. This work could be done for another manufacturing firm that handles logistics.

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