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A Study On Supply Chain Management In Water Distribution With Reference To Coimbatore City

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ABSTRACT

This research analyzes the effectiveness and problems of supply chain management (SCM) in the water supply industry in the case of Coimbatore city. Owing to fast industrialization and population expansion, Coimbatore is experiencing growing pressure on its water supply system. The study seeks to explore the present SCM operations in water purchase, storage, movement, and delivery, as well as the role played by technology, policy, and customer feedback. Based on primary data gathered through standardized questionnaires and supplemented by secondary data from reports and journals, the research determines major inefficiencies and prescribes measures to enhance the operational performance, customer satisfaction, and sustainability.

INTRODUCTION

Coimbatore, or Manchester of South India, has witnessed a spurt in industrial and population growth. This has led to a spurt in water demand, which has put pressure on supply systems. Sources of water supply in the city are primarily from Pillur and Siruvani reservoirs. Inefficiencies in supply due to leakage, irregular supply, unauthorized tapping, and aged infrastructure hinder proper supply.

A low-cost water supply chain is not only critical for economic development but also for public health and environmental sustainability. In this research paper, there is an effort to understand the SCM process in the water distribution sector in Coimbatore and the role of technology, policy, and public-private partnerships in improving the system.

STATEMENT OF THE PROBLEM

Despite being a basic necessity, water distribution in Coimbatore is plagued with inefficiencies:

- Leakage due to old pipelines (30% water loss).
- Unauthorized connections and inefficient metering systems (15% water loss).
- Industrial water demand clashes with residential needs.
- Budgetary constraints restrict the adoption of smart technologies.

The city requires a future-ready SCM approach that ensures equitable water distribution, reduces losses, and integrates technology for sustainability.

OBJECTIVES OF THE STUDY

- To study the SCM practices in Coimbatore's water distribution sector.
- To analyze inefficiencies in procurement, storage, transportation, and distribution.
- To evaluate the role of technology and policy in water supply management.
- To assess consumer satisfaction and preferences regarding water delivery.
- To suggest improvements for a sustainable water SCM model.

SCOPE OF THE STUDY

This study focuses on consumers using canned water services provided by Gowra Solutions in Coimbatore and Tiruppur. The scope includes evaluating delivery patterns, pricing, order placement methods, and consumer satisfaction. It also looks into broader infrastructure and policy issues related to water SCM in the region.

SIGNIFICANCE OF THE STUDY

The findings of the study provide valuable insights into how SCM can be improved to reduce wastage, enhance consumer satisfaction, and make water supply systems more resilient. The research benefits local policymakers, water supply companies, and technology providers working toward sustainable water distribution.

RESEARCH METHODOLOGY

Sources of Data

Primary Data: Structured questionnaires collected from 104 consumers.

Secondary Data**:** Journals, articles, and websites.

Sample Design

Sampling Method: Simple random sampling.

Sample Size: 104 respondents from Coimbatore and Tiruppur.

Tools Used for Analysis

- Simple Percentage Analysis
- Ranking Analysis
- Chi-Square Test

LIMITATIONS OF THE STUDY

- Data based on respondent opinions, subject to bias.
- Limited to Coimbatore and Tiruppur areas.
- Time-constrained and reliant on structured questionnaires.

REVIEW OF LITERATURE

- Kotler (2015): Advocates for customer-focused SCM.
- Pankaj Kumar (2016): Emphasizes the role of IoT and AI in reducing losses.
- Khaniwale (2015): Recommends integrating SCM with water resource management.
- Warakul (2016): Shows how real-time data and predictive maintenance enhance SCM.

These studies collectively support the need for advanced SCM solutions in water distribution, especially in urban settings.

DATA ANALYSIS

SIMPLE PERCENTAGE

GENDER OF THE RESPONDENTS

S.No	Gender	No. of Respondents	Percentage (%)
1	Male	78	75%
2	Female	26	25%
Total		**104**	**100%**

INTERPRETATION:

The above Table 4.1 shows that, out of 104 respondents taken for the study, 75% of the respondents are male, and 25% of the respondents are female.

The majority (75%) of the respondents are male

RANKING ANALYSIS

PURCHASE DECISION FACTORS OF THE RESPONDENTS

CATEGORY	1(5)	2(4)	3(3)	4(2)	5(1)	TOTAL	RANK
Price	28 140	12 48	34 102	20 40	11 55	**105** **385**	**I**
Quality	3 15	28 113	36 108	30 60	8 8	**105** **304**	**II**
Brand Reputation	4 20	11 44	49 147	33 66	8 8	**105** **285**	**III**
Packaging	5 25	9 36	30 90	48 96	13 13	**105** **260**	**IV**
Delivery speed	6 30	10 40	27 81	38 76	24 24	**105** **251**	**V**

INTERPRETATION:

From the Rank Analysis, It is found that the highest rank score Price and the lowest rank score is Delivery speed.

Majority of the respondents consider Price

CHI-SQUARE ANALYSIS

RELATIONSHIP BETWEEN INCOME AND DELIVERY OF WATER SUPPLY

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
delivery of water supply * monthly income of the respondant	104	100.0%	0	0.0%	104	100.0%

delivery of water supply * monthly income of the respondant Crosstabulation

			monthly income of the respondant				
			Less than Rs 10000	Rs 10001 - 30000	Rs 30001 - 50000	Rs 50001 - 70000	Total
delivery of water supply	Same Day	Count	31	1	0	0	32
		Expected Count	9.5	9.2	5.5	7.7	32.0
	1-2 Days	Count	0	29	8	0	37
		Expected Count	11.0	10.7	6.4	8.9	37.0
	3-5 Days	Count	0	0	10	6	16
		Expected Count	4.8	4.6	2.8	3.8	16.0
	More than 5 Days	Count	0	0	0	19	19
		Expected Count	5.7	5.5	3.3	4.6	19.0
Total		Count	31	30	18	25	104
		Expected Count	31.0	30.0	18.0	25.0	104.0

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	210.160[a]	9	<.001
Likelihood Ratio	215.353	9	<.001
Linear-by-Linear Association	93.288	1	<.001
N of Valid Cases	104		

a. 6 cells (37.5%) have expected count less than 5. The minimum expected count is 2.77.

INTERPRETATION:

There is a statistically significant association between the two variables (p-value = 0.001) between the variables, suggesting that the observed relationship is unlikely to occur by chance. It is noted that 37.5% of the cells have expected counts less than 5, which may affect the test's accuracy. The association is not due to chance (p-value < 0.05), Thus H_0 is rejected.

There is an association between Monthly income and Delivery of water supply

FINDINGS

- Price is the most critical factor.
- Most respondents are students and make weekly purchases.Majority prefer ordering by phone.
- A considerable number value sustainability.

SUGGESTIONS

- Upgrade old infrastructure.
- Invest in smart meters and leak detection tools.
- Foster public-private partnerships.
- Educate consumers on water conservation.
- Develop mobile platforms for grievance redressal.

CONCLUSION

Efficient SCM for water supply is not merely a logistics necessity but also a social responsibility. Coimbatore can develop the water supply infrastructure by upgrading the existing infrastructure, using smart technology, and stakeholder involvement at all levels. Gowra Solutions is a great example of the type of initiative that private organizations can take. Coimbatore can be a model city in water management sustainability if it takes proactive steps.