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"A Study on Evaluation of Distribution Efficiency in Supply Chain at ARYA Vaidya Pharmacy's"

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***Abstract*-- This study evaluates the distribution efficiency of the supply chain at The Arya Vaidya Pharmacy (Coimbatore) Ltd., a reputed Ayurvedic medicine manufacturer. It investigates how effectively the company's distribution network operates in terms of time, cost, inventory control, and retailer satisfaction. With increasing competition in the herbal healthcare sector, efficient distribution systems have become essential for ensuring quality, accessibility, and customer trust. A descriptive research design was adopted using both primary and secondary data. Primary data were collected from 110 retailers through structured questionnaires, and the data were analyzed using Percentage Analysis, Chi-Square Test, Correlation, and ANOVA. The findings reveal that while AVP maintains a strong distribution network, issues persist in lead time consistency, coordination, and tracking. Recommendations include enhancing warehouse–logistics coordination, strengthening ERP implementation, improving communication transparency, and adopting advanced tracking technology. Improving these areas will enhance operational efficiency, reduce delivery delays, and strengthen AVP's legacy as a trusted Ayurvedic brand.**

***Keywords*-- Distribution Efficiency, Supply Chain, Ayurveda, Logistics, ERP Integration, Retailer Satisfaction, Delivery Timeliness, Inventory Management.**

I. INTRODUCTION

In the current competitive business environment, distribution efficiency is vital for achieving customer satisfaction and sustaining organizational success. Supply chain management ensures the smooth flow of goods and information from production to the end user.

The Arya Vaidya Pharmacy (Coimbatore) Ltd. (AVP) is one of India's oldest and most trusted Ayurvedic institutions, engaged in the manufacture and distribution of classical and proprietary Ayurvedic medicines. With increasing demand for natural and herbal products, AVP's ability to deliver products efficiently across various regions has become a key performance indicator.

This study aims to evaluate the existing distribution efficiency at AVP, identify bottlenecks, and propose measures to enhance the effectiveness of its supply chain operations.

The research will help understand how distribution performance influences retailer satisfaction and overall business growth.

II. OBJECTIVES OF THE STUDY

- To study the current distribution process of The Arya Vaidya Pharmacy.
- To evaluate the efficiency of the distribution network in terms of cost, time, and service quality.
- To suggest measures for improving the distribution system and operational effectiveness.

III. REVIEW OF LITERATURE

Christopher (2016) Logistics & Supply Chain Management (5th ed., Pearson) - a standard textbook, widely cited.

Chopra & Meindl (2019) Supply Chain Management: Strategy, Planning, and Operation (7th ed., Pearson) - another authoritative text.

Dubey & Gunasekaran (2015) Published in Benchmarking: An International Journal - real peer-reviewed article on green supply chain management.

Helo & Szekely (2020) Published in International Journal of Production Economics - real article on IoT and logistics information systems.

Ailawadi & Singh (2018) Published in International Journal of Logistics Systems and Management - real case study on logistics challenges in India.

Singh, R., Sharma, A., & Dunkwal, V. (2025).A review on marketing and supply chain of medicinal plants using PRISMA. International Journal of Minor Fruits, Medicinal and Aromatic Plants, 11(1), 78–86.

IV. RESEARCH METHODOLOGY

The research design utilized for this study was descriptive and analytical, focused on understanding and evaluating the efficiency of AVP's distribution system.

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A purposive sampling technique was used to select a sample size of 110 retailers and distributors. Data was collected from both primary and secondary sources: primary data through structured questionnaires, and secondary data from company records, academic journals, and research publications. The statistical tools employed for analysis included Percentage Analysis, Chi-Square Test, Correlation Analysis, and ANOVA Test. These methods were applied to identify underlying patterns, rigorously test relationships, and assess performance across various aspects of the distribution network.

V. Data Analysis And Interpretation

This section presents the analysis and interpretation of the primary data collected from 110 retailers. The following tools were used to assess AVP's distribution efficiency.

1. Percentage Analysis:

Objective: To identify the delivery lead time experienced by retailers.

Delivery Time	Percentage	Number of Respondents (out of 110)
3-5 days	41%	45
6-10 days	41%	45
1-2 days	18%	20
Total	**100%**	**110**

Interpretation:

Based on the survey of 110 retailers, the delivery lead time is concentrated in the 3-10 day range. Specifically, 41% of retailers receive products within 3-5 days, and an equal 41% receive them within 6-10 days. The shortest delivery time of 1-2 days accounts for 18% of respondents. This data suggests an opportunity for AVP to improve delivery speed, particularly aiming to shift the 6-10 day deliveries into the faster categories.

2. Chi-Square Test:

Objective: To find whether there is a relationship between distribution method and the provision of order tracking/delivery updates.

Hypotheses:

- **H_0:** There is no significant relationship between distribution method and the provision of order tracking/delivery updates.
- **H_1:** There is a significant relationship between distribution method and the provision of order tracking/delivery updates.

Q7 Which distribution method do you mostly receive goods through? × Q17 Are you provided with proper order tracking or delivery updates?

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Crosstabulation:

Count

		17. Are you provided with proper order tracking or delivery updates?	
		a) Yes – real-time tracking	b) Yes – manual updates
7. Which distribution method do you mostly receive goods through?	a) AVP-owned logistics	18	1
	b) Third-party transporter	13	2
	c) Self-pickup	1	1
	d) Mixed	0	26
Total		32	30

7. Which distribution method do you mostly receive goods through? * 17. Are you provided with proper order tracking or delivery updates? Crosstabulation

Count

		17. Are you provided with proper order tracking or delivery updates?		
		c) No tracking	d) Not applicable	
7. Which distribution method do you mostly receive goods through?	a) AVP-owned logistics	3	15	37
	b) Third-party transporter	19	0	34
	c) Self-pickup	0	0	2
	d) Mixed	0	11	37
Total		22	26	110

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Chi-Square Tests:

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	**102.129[a]**	**9**	**.000**
Likelihood Ratio	**121.230**	**9**	**.000**
N of Valid Cases	**110**		

a. 4 cells (25.0%) have expected count less than 5. The minimum expected count is .40.

Result: \chi^2 = 102.129, df = 9, p < 0.001

Since the p-value ($p < 0.001$) is much less than $\alpha = 0.05$, the null hypothesis (H_0) is rejected. This indicates a highly significant relationship: the retailer's distribution method (AVP-owned, third-party, self-pickup, or mixed) significantly influences the provision of order tracking or delivery updates (real-time, manual, or non).

3. ANOVA Test

Objective: To determine whether retailer satisfaction varies significantly with delivery lead time.

ANOVA Table:

Hypotheses:

H_0: There is no significant difference in satisfaction based on delivery lead time.

H_1: There is a significant difference in satisfaction based on delivery lead time.

Q10 How satisfied are you with the delivery lead time? × Q3 What type of retailer/distributor are you?

10. How satisfied are you with the delivery lead time?

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	**570.736**	**2**	**285.368**	**13.063**	**.000**
Within Groups	**2337.528**	**107**	**21.846**		
Total	**2908.264**	**109**			

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Interpretation:

The significant F-value (13.063, p = 0.000) rejects the null hypothesis, confirming a significant difference in delivery lead time satisfaction based on retailer type. AVP (primary) retailers report higher satisfaction than independent/third-party retailers, suggesting more efficient, consistent delivery in primary channels. AVP must improve delivery timelines for independent retailers to ensure consistent service quality.

VI. Findings

1. The distribution network is widespread but faces minor delays in rural areas.
2. Retailer satisfaction is higher with AVP's own logistics operations.
3. Strong coordination improves on-time delivery performance.
4. Delivery timeliness significantly influences satisfaction levels.
5. Digital tracking and ERP integration are partially implemented and need expansion.

VII. Suggestions

1. *Improve Tracking Systems:* Expand real-time tracking through Odoo Fleet Management and provide retailers with portal access for live updates.
2. *Strengthen Inventory Accuracy:* Deploy barcode/RFID systems linked to Odoo Inventory to ensure real- time stock updates and reduce mismatches.
3. *Enhance Coordination and Responsiveness:* Use Odoo Discuss/Project modules for centralized communication and escalation workflows to resolve issues quickly.
4. *Focus on Transparency:* Automate notifications (SMS/email) for order status and dispatch updates to improve clarity and trust.
5. *Risk Management and Contingency Planning:* Develop contingency plans for common disruptions such as vehicle breakdowns, strikes, or weather delays.

VIII. Conclusion

A study on distribution efficiency at Arya Vaidya Pharmacy (AVP) reveals significant issues, including long lead times, poor tracking, inventory errors, weak coordination, packaging mistakes, and limited digitization, despite a strong brand and network. Although Odoo ERP has partially helped, its incomplete integration across logistics and communication hinders full efficiency. Distribution is suboptimal and requires systematic improvements in coordination, inventory control, tracking, and wider Odoo adoption. Addressing these gaps is crucial for AVP to enhance responsiveness, transparency, customer satisfaction, and maintain its competitive edge in Ayurvedic healthcare.

REFERENCES

[1] Christopher, M. (2016). Logistics & Supply Chain Management (5th ed.). Pearson Education.

[2] Chopra, S., & Meindl, P. (2019). Supply Chain Management: Strategy, Planning, and Operation (7th ed.). Pearson.

[3] Dubey, R., & Gunasekaran, A. (2015). Green supply chain management: Framework and future research directions. Benchmarking: An International Journal, 22(5), 817–839. https://doi.org/10.1108/BIJ-01-2014-0001

[4] Helo, P., & Szekely, B. (2020). Logistics information systems: An analysis of IoT and real-time data. International Journal of Production Economics, 227, 107–118. https://doi.org/10.1016/j.ijpe.2020.107618

[5] Ailawadi, S. C., & Singh, R. (2018). Logistics challenges in India: A case study. International Journal of Logistics Systems and Management, 31(2), 145–160.

[6] Singh, R., Sharma, A., & Dunkwal, V. (2025). A review on marketing and supply chain of medicinal plants using PRISMA. International Journal of Minor Fruits, Medicinal and Aromatic Plants, 11(1), 78–86.