A STUDY ON THE GLITCHES OF GARMENT INDUSTRIES IN REVERSE LOGISTICS WITH SPECIAL REFERENCE TO TIRUPUR DISTRICT- An Empirical Study

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Abstract:

The apparel sector is an essential part of global supply chains, but it faces several difficulties, especially in the area of reverse logistics. With an emphasis on Tirupur District, this empirical study explores the complexities of reverse logistics within the apparel industry. In addition to shedding insight into the causes and consequences of these problems, the research attempts to detect, evaluate, and alleviate the issues that frequently arise in the garment industries' reverse logistics operations. This study employed analytical and descriptive research designs as its technique. The 118 respondents who make up the sample size are drawn from the Tirupur districts' apparel businesses. The analytical tools employed are ANOVA, factor analysis, and simple percentage analysis. The study's conclusions point to a wide range of issues with Tirupur's garment industry's reverse logistics procedures, such as ineffective product return management, insufficient recycling and disposal methods, a lack of visibility and transparency in reverse supply chains, and less-than-ideal resource use. The study makes several recommendations to improve the sustainability and efficiency of reverse logistics in Tirupur's textile sector in response to these findings.

Keywords: Reverse logistics, Tirupur district, Garment industries, Supply chains.

Introduction:

The apparel sector is a vital component of international trade, acting as a medium for both economic growth and fashion trends. Reverse logistics, which includes the procedures for processing returned, damaged, or excess products, is essential to this complex ecology. Effective reverse logistics systems are essential for sustainability, profitability, and customer happiness in the apparel manufacturing industry[1]. Located in the southern Indian state of Tamil Nadu, Tirupur is recognized as one of the world's primary centers for the production of clothing. The area, which is well-known for its skill in the textile industry, makes a substantial contribution to India's textile exports because of its strong network of producers, suppliers, and exporters. Nevertheless, for all its praise, Tirupur is not without its problems, especially when it comes to reverse logistics. The present study aims to investigate the inefficiencies present in Tirupur's reverse logistics procedures of the apparel industry[2]. Through an exploration of the complexities involved in reverse logistics, this study aims to pinpoint the obstacles, inadequacies, and root reasons that obstruct the smooth movement of returned clothing and excess inventory in the district. This study's significance stems from its ability to highlight critical areas for development, which will promote increased operational effectiveness and sustainability in Tirupur's apparel sector. Stakeholders can get essential insights to enhance resource usage, minimize losses, and streamline reverse logistics

operations by thoroughly analyzing the difficulties encountered and potential solutions. This paper will explore the theoretical underpinnings of reverse logistics, contextualize the importance of the garment industry in Tirupur, outline the research methodology used, present findings from empirical data, and conclude with recommendations meant to strengthen the reverse logistics ecosystem within Tirupur's garment industry and fix the identified flaws.

Objectives:

- To identify the different practices adopted by the garment industry in terms of reverse logistics.
- To examine the drivers and barriers of reverse logistics in garments industries.

Research methodology:

- **Research design:** Descriptive Research and Analytical Research designs
- **Area of the study:** Tirupur district.
- **Sampling technique:** Simple random sampling.
- **Data collection:** Primary and secondary data
- **Sample size:** 118
- **Tools used for analysis:** Simple Percentage analysis, Factor analysis, and ANOVA

Review of literature:

1. **Reverse logistics and waste in the Brazilian textile and clothing production chain, Solimar Garcia, Irenilza Nääs, et al. (2019).** This article's goal is to assess the state of recycling programs and reverse logistics used in Brazil's textile and apparel sector. The findings confirm that there is no way to resolve the problem in the absence of public records, government initiatives to execute reverse logistics and recycling, and promotion of the activity's advantages.
2. **Critical Barriers to Implementing Reverse Logistics in the Manufacturing Industry: A Case Study of a Developing Country, Muhammad Waqas, Qian-li Dong, et al. (2018).** This study seeks to determine and validate the obstacles to reverse logistics adoption through a two-stage approach. The study's top five obstacles are, in general, the following: a lack of initial funding; a shortage of RL-skilled professionals; company policies that discourage RL; a lack of new technology and information systems; and a lack of community pressure. Manufacturing businesses can create a prioritized list of tasks to improve the reverse logistics system's deployment by learning about the obstacles to reverse logistics.

Data analysis and interpretation:

Table No.: 1 (Simple Percentage Analysis)

Table showing the age of the respondents			
1.	Male	103	87.3
2.	Female	15	12.7
Table showing the years of experience.			
1.	Below 1 year	23	19.5
2.	1 year to 5 years	50	42.4
3.	6 years to 10 years	32	27.1

4.	Above 10 years	13	11
Table showing the strategies in managing RL.			
1.	Remanufacturing or Refurbishing	32	27.1
2.	Recycling of textile waste	45	38.1
3.	Donation to charities	21	17.8
4.	Resale of returned goods	20	16.9
Table showing the challenges of managing returned goods.			
1.	Inventory management system	11	9.3
2.	Automation	29	24.6
3.	Collaboration with partners	23	19.5
4.	Transportation	55	46.6
TOTAL		**118**	**100**

The above table indicates that the majority of the respondents, 87.3% are male, 42.4% of the respondents have 1 year to 5 years of experience, 38.1% of the respondents follow recycling of textile waste strategies in managing reverse logistics, 46.6% of the respondents face transportation problem.

Table No: 2 (Factor Analysis)

ROTATED COMPONENT MATRIX:

THE TABLE SHOWS THE ROTATED COMPONENT MATRIX.

Rotated Component Matrix					
	Component				
	1	**2**	**3**	**4**	**Group Name**
Lack of sufficient in-house facilities (Storage equipment and vehicles)- P18	.807				**INFRASTRUCTURE BARRIER** (18.241)
No practice in place for recycling- P17	.807				
Lack of a system to monitor returns- P19	.803				
Don't have green design implementation for end-of-life- P16	.717				
Lack of coordination with 3PL providers- P20	.704				
Lack of public awareness of environmental protection- P15	.628				
Lack of initial capital- P7		.852			**FINANCIAL BARRIER** (35.038)
Lack of funds for training- P8		.822			
Lack of waste management practices- P6		.710			

Lack of funds for storage and handling- P9		.679			
Lack of shared understanding of best practices- P5		.562			
Lack of government-supportive economic- P12			.852		**POLICY BARRIER** (50.057)
RL is not considered a critical aspect of competitive performance- P13			.739		
Lack of enforceable laws and directives on take-back of end-of-life products- P11			.720		
Customers not informed of take-back- P14			.673		
Lack of funds for return monitoring systems- P10		.519	.567		
Lack of trained personnel- P2				.867	**MANAGEMENT BARRIER** (64.056)
Understanding the significance of RL- P1				.850	
Management commitment- P3				.836	
Lack of experts at the management level- P4				.584	
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.					
a. Rotation converged in 6 iterations.					

- The variables P18, P17, P19, P16, P20, and P15 constitute factor I and it accounts for 18.241 percent of the total variance.
- The variables P7, P8, P6, P9, and P5 constitute factor II and it accounts for 35.038 percent of the total variance.
- The variables P12, P13, P11, P14, and P10 constitute factor III and it accounts for 50.057 percent of the total variance.
- The variables P2, P1, P3, and P4 constitute factor IV and it accounts for 64.056 percent of the total variance.

Table No: 3 (ANOVA)

TABLE SHOWING ANOVA TEST RESULT OF THE INTERNAL AND EXTERNAL BARRIERS AND YEARS OF EXPERIENCE.

ANOVA						
	Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**	**Result**

Infrastructure barrier	Between Groups	8.453	3	2.818	3.340	.022	**S**
	Within Groups	96.175	114	.844			
	Total	104.628	117				
Financial barrier	Between Groups	14.610	3	4.870	6.998	.000	**S**
	Within Groups	79.335	114	.696			
	Total	93.944	117				
Policy barrier	Between Groups	10.208	3	3.403	4.905	.003	**S**
	Within Groups	79.085	114	.694			
	Total	89.294	117				
Management barrier	Between Groups	8.027	3	2.676	2.568	.058	**NS**
	Within Groups	118.786	114	1.042			
	Total	126.814	117				

(NS - NOT SIGNIFICANT, S - SIGNIFICANT)

HYPOTHESIS:

Ho – There is No significant difference between the internal and external barriers and years of experience.

H1 – There is a significant difference between the internal and external barriers and years of experience.

INTERPRETATION:

ANOVA was conducted to test the above hypothesis. The test results show that the calculated significant value is lesser than 0.05 which is considered to reject the null hypothesis. Hench, there is a significant difference between the internal and external barriers and years of experience.

TABLE SHOWING ANOVA TEST RESULT OF THE INTERNAL AND EXTERNAL BARRIERS AND AGE OF THE RESPONDENTS.

HYPOTHESIS:

Ho – There is No significant difference between the internal and external barriers and age of the respondents.

H1 – There is a significant difference between the internal and external barriers and the age of the respondents.

ANOVA							
		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**	**Result**
Infrastructure barrier	Between Groups	7.930	3	2.643	3.116	.029	**S**
	Within Groups	96.698	114	.848			
	Total	104.628	117				
Financial barrier	Between Groups	10.438	3	3.479	4.750	.004	**S**
	Within Groups	83.507	114	.733			
	Total	93.944	117				
Policy barrier	Between Groups	7.230	3	2.410	3.348	.022	**S**
	Within Groups	82.064	114	.720			

	Total	89.294	117				
Management barrier	Between Groups	10.094	3	3.365	3.286	.023	**S**
	Within Groups	116.720	114	1.024			
	Total	126.814	117				

(NS - NOT SIGNIFICANT, S - SIGNIFICANT)

INTERPRETATION:

ANOVA was conducted to test the above hypothesis. The test results show that the calculated significant value is less than 0.05, which rejects the null hypothesis. Hench, there is a significant difference between the internal and external barriers and the age of the respondents.

Findings of Simple percentage analysis:

- The majority of the respondents 87.3% are male, 42.4% of the respondents have 1 year to 5 years of experience, 38.1% of the respondents follow recycling of textile waste strategies in managing reverse logistics, and 46.6% of the respondents face transportation problems.

Findings of ANOVA:

- The test results show that the calculated significant value is less than 0.05, which rejects the null hypothesis. Hench, there is a significant difference between the internal and external barriers and years of experience.
- The test results show that the calculated significant value is less than 0.05, which rejects the null hypothesis. Hench, there is a significant difference between the internal and external barriers and the age of the respondents.

Suggestions:

- Make sure that all departments involved in reverse logistics, including production, distribution, customer support, and quality control, have clear and efficient communication routes.
- Use techniques like vendor-managed inventory (VMI) and just-in-time (JIT) inventory to cut down on excess inventory and lessen the chance of stockouts or overstocking.
- Offer thorough training courses to workers engaged in reverse logistics operations, such as logistics staff, customer support agents, and warehouse workers.
- Work together with reliable reverse logistics partners, including reverse logistics specialists or third-party logistics providers (3PLs), to manage intricate logistics chores and expedite the returns process.
- Reverse logistics key performance indicators (KPIs) including return rates, processing times, and customer satisfaction levels should be continuously monitored and corrected as necessary.

Conclusion:

The study's conclusion clarifies the major issues with reverse logistics that the apparel sector must deal with, emphasizing the difficulties in handling product returns, refurbishments, and recycling procedures. The results highlight the various problems caused by ineffective reverse logistics procedures, such as higher operating expenses, environmental issues, and unsatisfied customers. A comprehensive strategy including technical advancement, governmental actions, and cooperation between supply chain players is required to resolve these issues. In an increasingly competitive economy, the apparel industry can boost sustainability and profitability while also cultivating more customer trust and loyalty by acknowledging the significance of reverse logistics and putting efficient solutions in place to avoid hiccups. As a result, industry participants must take a proactive approach to addressing these issues and use reverse logistics as the cornerstone of ethical and durable business practices in the apparel industry.

Reference:

- **Solimar Garcia, Irenilza Nääs, et al (2019)** conducted a study on Reverse Logistics and Waste in the Textile and Clothing Production Chain in Brazil. https://link.springer.com/chapter/10.1007/978-3-030-30000-5_23
- **Muhammad Waqas, Qian-li Dong, et al (2018)** conducted the study on Critical Barriers to Implementation of Reverse Logistics in the Manufacturing Industry: A Case Study of a Developing Country.
- **Anna Nilson Törnqvist (2020)** conducted a study on Circular Economy Practice Applied to Reverse Logistics: A Multiple Case Study from Fashion Retailers Perspective. https://www.diva-portal.org/smash/record.jsf?pid=diva2:1458297
- **Solimar Garcia, Irenilza Nääs, et al (2019)** conducted a study on Reverse Logistics and Waste in the Textile and Clothing Production Chain in Brazil. https://link.springer.com/chapter/10.1007/978-3-030-30000-5_23