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Challenges Faced by Garment Exporters of Tirupur in the Digitalization of Icds and Cfs

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ABSTRACT

Tirupur, widely recognized as the "Knitwear Capital of India," plays a pivotal role in India's garment export industry, contributing significantly to the country's foreign trade revenue. The city's export sector heavily depends on efficient logistics and supply chain management, where Inland Container Depots (ICDs) and Container Freight Stations (CFSs) serve as critical nodes in facilitating international trade. The digitalization of these logistics hubs offers a transformative opportunity to enhance trade efficiency, streamline operations, reduce transaction costs, and improve real-time cargo tracking. By integrating advanced technologies such as automated documentation, digital customs clearance, and blockchain-based trade platforms, exporters can achieve greater transparency, security, and compliance with global trade regulations.

Despite these advantages, garment exporters in Tirupur encounter several barriers to adopting digital solutions. Key challenges include technological infrastructure limitations, such as inadequate access to high-speed internet and the lack of sophisticated IT systems; regulatory complexities, stemming from frequently changing compliance requirements and the need for integration with national and international trade platforms; financial constraints, as small and medium-sized enterprises (SMEs) struggle with the high initial costs of digital implementation and limited access to financial support; operational inefficiencies, arising from resistance to change, lack of skilled personnel, and dependence on manual processes; and cybersecurity risks, which pose threats to data integrity, privacy, and fraud prevention.

This study provides an in-depth analysis of these challenges and explores possible solutions to facilitate the seamless digital transformation of Tirupur's export ecosystem. It examines strategies such as strengthening digital infrastructure through public-private partnerships, offering financial incentives to exporters, simplifying regulatory procedures for easier compliance, enhancing workforce training in digital logistics, and implementing robust cybersecurity frameworks. By addressing these issues, the study aims to offer actionable insights for policymakers, industry stakeholders, and exporters, ultimately fostering a more efficient, competitive, and technology-driven export environment in Tirupur.

Keywords: Garment Exporters, Inland Container Depots (ICDs), Container Freight Stations (CFSs), Export Logistics, Technology Adoption, Digital Transformation.

1. INTRODUCTION

Tirupur plays a crucial role in India's textile and garment exports, handling significant volumes of international shipments through ICDs and CFSs. The region is renowned for its knitwear production, serving as a primary supplier to various international markets. With increasing globalization and technological advancements, the adoption of digital tools in export logistics has become essential to enhance efficiency, reduce manual paperwork, and streamline customs clearance processes (Mukherjee & Prasad, 2021).

Digitalization in ICDs and CFSs includes various technological innovations such as electronic documentation, real-time cargo tracking, automated customs clearance, and blockchain-based trade finance solutions. The transition to these digital systems is expected to minimize transit delays, reduce human intervention, and provide exporters with enhanced visibility over their shipments. Additionally, initiatives by the Indian government, such as the Digital India Program and electronic Bill of Lading (e-BL), aim to modernize trade operations (Government of India, 2022).

However, despite these benefits, garment exporters in Tirupur encounter numerous roadblocks in their digital transformation journey. The limited availability of digital infrastructure, regulatory compliance complexities, and financial constraints pose significant challenges to seamless adoption. Furthermore, resistance to change among traditional exporters, skill gaps in digital trade management, and concerns about cybersecurity continue to hinder progress (Chaudhuri & Singh, 2020).

This study aims to examine the specific barriers that prevent garment exporters from fully leveraging digitalization in ICDs and CFSs. By analyzing these challenges and identifying potential solutions, this research seeks to provide strategic recommendations that can facilitate a smoother transition towards digital trade operations in Tirupur's garment export sector.

2. STATEMENT OF THE PROBLEM

The digital transformation of ICDs and CFSs has been widely acknowledged as a necessity for improving logistics efficiency. However, garment exporters in Tirupur continue to experience significant difficulties in fully leveraging digital platforms due to inadequate infrastructure, lack of training, high implementation costs, and regulatory challenges (Patil & Sharma, 2019). This study aims to identify the specific obstacles that hinder the adoption of digital solutions in export logistics and propose viable strategies for overcoming these barriers.

3. RESEARCH METHODOLOGY

This study employs a mixed-methods research approach, incorporating both qualitative and quantitative analysis. Data collection methods include primary data and secondary data. The primary data is collected through Surveys and structured interviews with garment exporters, logistics providers, and customs officials in Tirupur. Secondary Data is gathered through Analysis of industry reports, trade documentation policies, and digital logistics trends from government and trade bodies. A comparative analysis is also used through Examination of digital adoption case studies from other garment export hubs to identify best practices applicable to Tirupur. The collected data is analyzed using statistical tools to assess the extent of digitalization challenges and suggest actionable recommendations (Kumar et al., 2020). The study is conducted among Garment Exporters who involve in usage of ICD's and CFS. The sample size is determined as 168, ensuring a comprehensive understanding the challenges faced by the exporters in usage of ICD's and CFS. A stratified random sampling technique is used to categorize

respondents based on their roles and expertise in Garment Industry which includes Manufacturers, Intermediaries and Managers.

4. RESULTS & DISCUSSION

The challenges faced by Garment Exporters of Tirupur in the Digitalisation of ICDs and CFS were analysed through Henry Garrett Ranking Method. The challenges includes 'Inadequate digital systems, unreliable internet connectivity, and lack of integration between platforms', 'Financial burden associated with digital transformation, software investment, and maintenance costs', 'Reluctance among exporters, logistics providers, and workers to shift from manual to digital processes', 'Complex digital documentation requirements, cybersecurity concerns, and lack of clarity in government regulations', 'Insufficient training programs and lack of expertise among exporters and logistics personnel', 'Risks of cyber threats, data breaches, and unauthorized access to critical export information', and 'Technical glitches, system failures, and downtime affecting the smooth functioning of ICDs and CFS'.

Number of Respondents who ranked the Factors

Table No : 1 Challenges faced by Garment Exporters of Tirupur in the Digitalisation of ICDs and CFS

Challenges/Rank	1	2	3	4	5	6	7
Inadequate digital systems, unreliable internet connectivity, and lack of integration between platforms	16	11	13	63	12	30	23
Financial burden associated with digital transformation, software investment, and maintenance costs	25	18	2	23	28	31	41
Reluctance among exporters, logistics providers, and workers to shift from manual to digital processes	3	26	7	71	1	37	23
Complex digital documentation requirements, cybersecurity concerns, and lack of clarity in government regulations	1	18	7	38	44	8	52
Insufficient training programs and lack of expertise among exporters and logistics personnel	12	13	5	53	2	79	4
Risks of cyber threats, data breaches, and unauthorized access to critical export information	20	41	11	7	64	21	4
Technical glitches, system failures, and downtime affecting the smooth functioning of ICDs and CFS	16	4	9	26	32	2	79

Source : Primary Source

Percent position = 100(Rij-0.5)/Nj
Rij = 1^{st}, 2^{nd}, 3^{rd}, 4^{th}, 5^{th}, 6^{th}, 7^{th} ranks
Nj = Total rank given by 168 respondents = 7

Table No : 2 Challenges faced by Garment Exporters of Tirupur in the Digitalisation of ICDs and CFS

Rank	100(Rij-0.5)	Percent position
1	100(1-0.5)/7	7
2	100(2-0.5)/7	21

3	100(3-0.5)/7	36
4	100(4-0.5)/7	50
5	100(5-0.5)/7	64
6	100(6-0.5)/7	79
7	100(7-0.5)/7	93

Source : Primary Source

From Henry Garret table, Garret value is found for the percent position

Table No : 3 Challenges faced by Garment Exporters of Tirupur in the Digitalisation of ICDs and CFS

Rank	Percent position value	Garret Value
1	7	79
2	21	66
3	36	57
4	50	50
5	64	43
6	79	34
7	93	21

Source : Primary Source

For each rank, garret value is multiplied by given value in the table

Table No : 4 Challenges faced by Garment Exporters of Tirupur in the Digitalisation of ICDs and CFS

Challenges/Rank	**1*79**	**2*66**	**3*57**	**4*50**	**5*43**	**6*34**	**7*21**
Inadequate digital systems, unreliable internet connectivity, and lack of integration between platforms	1264	726	741	3150	516	1020	483
Financial burden associated with digital transformation, software investment, and maintenance costs	1975	1188	114	1150	1204	1054	861
Reluctance among exporters, logistics providers, and workers to shift from manual to digital processes	237	1716	399	3550	43	1258	483
Complex digital documentation requirements, cybersecurity concerns, and lack of clarity in government regulations	79	1188	399	1900	1892	272	1092
Insufficient training programs and lack of expertise among exporters and logistics personnel	948	858	285	2650	86	2686	84
Risks of cyber threats, data breaches, and unauthorized access to critical export information	1580	2706	627	350	2752	714	84
Technical glitches, system failures, and downtime	1264	264	513	1300	1376	68	1659

affecting the smooth functioning of ICDs and CFS							

Source : Primary Source

All the calculated values are totalled row wise

Table No : 5 Challenges faced by Garment Exporters of Tirupur in the Digitalisation of ICDs and CFS

Factor /Rank	1*82	2*70	3*63	4*58	5*52	6*48	7*42	Total
C1	1264	726	741	3150	516	1020	483	7900
C2	1975	1188	114	1150	1204	1054	861	7546
C3	237	1716	399	3550	43	1258	483	7686
C4	79	1188	399	1900	1892	272	1092	6822
C5	948	858	285	2650	86	2686	84	7597
C6	1580	2706	627	350	2752	714	84	8813
C7	1264	264	513	1300	1376	68	1659	6444

Source : Primary Source

The total score is divided my number of respondents to calculate average score, then the highest average score is ranked as Rank I and the least average score is ranked as Rank VII.

Table No : 6 Challenges faced by Garment Exporters of Tirupur in the Digitalisation of ICDs and CFS

Factors	Total	Average Score	Rank
C1	7900/168	47.02381	II
C2	7546/168	44.91667	V
C3	7686/168	45.75000	III
C4	6822/168	40.60714	VI
C5	7597/168	45.22024	IV
C6	8813/168	52.45833	I
C7	6444/168	38.35714	VII

Source : Primary Source

From the table, it can be inferred that the concern ‘C6 - Risks of cyber threats, data breaches, and unauthorized access to critical export information’ ranks I with an average Garrett score of 52.45833, the variable ‘C1 - Inadequate digital systems, unreliable internet connectivity, and lack of integration between platforms’ ranks II with an average Garrett Sccore of 47.02381, the vairbale ‘C3 - Reluctance among exporters, logistics providers, and workers to shift from manual to digital processes’ ranks III with an average score of 45.75000, the variable ‘C5 - Insufficient training programs and lack of expertise among exporters and logistics personnel’ ranks IV with an average score of 45.22024, the variable ‘C2 - Financial burden associated with digital transformation, software investment, and maintenance costs’ ranks V with an average score of 44.91667, the variable ‘C4 - Complex digital documentation requirements, cybersecurity concerns, and lack of clarity in government regulations’ ranks VI with an average score of 40.6074 and the variable ‘C7 - Technical glitches, system failures, and

downtime affecting the smooth functioning of ICDs and CFS' ranks VII with an average score of 38.35714.

5. CONCLUSION

The digitalization of Inland Container Depots (ICDs) and Container Freight Stations (CFSs) presents a significant opportunity for garment exporters in Tirupur to enhance trade efficiency, streamline logistics operations, and improve transparency in export procedures. However, the findings of this study highlight several critical challenges that hinder the seamless adoption of digital solutions in export logistics.

Based on the Henry Garrett Ranking Method, the most pressing challenge identified is cybersecurity risks (C6), including threats of data breaches, fraud, and unauthorized access to sensitive export information. This underscores the urgent need for robust cybersecurity frameworks to ensure data integrity and protect digital transactions. The second major challenge is inadequate digital infrastructure (C1), including unreliable internet connectivity and the lack of system integration, which directly affects exporters' ability to leverage digital trade platforms effectively.

Other notable obstacles include resistance to change (C3), as many exporters and logistics providers remain reluctant to shift from traditional manual processes to digital platforms. Additionally, insufficient training programs and skill gaps (C5) indicate a lack of preparedness among exporters and logistics personnel to adapt to digital technologies. Financial constraints (C2) related to the high cost of implementation and maintenance of digital systems further deter digital adoption, particularly for small and medium-sized enterprises (SMEs). Regulatory complexities (C4), such as cumbersome compliance requirements and evolving digital trade policies, create additional hurdles. Lastly, technical glitches and system failures (C7) contribute to operational inefficiencies, affecting the overall reliability of digital trade systems.

To address these challenges, policymakers, industry stakeholders, and exporters must adopt a multi-faceted approach that includes:

- Strengthening digital infrastructure through public-private partnerships.
- Implementing comprehensive cybersecurity measures to safeguard digital trade operations.
- Offering financial incentives and subsidies to support SMEs in digital adoption.
- Conducting training programs to enhance digital literacy among exporters and logistics professionals.
- Simplifying regulatory frameworks to facilitate seamless digital compliance.
- Investing in advanced IT support to minimize technical disruptions.

By overcoming these challenges, Tirupur's garment export sector can accelerate its transition to a technology-driven logistics ecosystem, enhancing competitiveness, operational efficiency, and global trade integration. The study's findings provide valuable insights for stakeholders aiming to foster a digitally empowered export environment that aligns with India's broader vision of digital transformation in trade logistics.

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