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Impact of implementation of advanced technology in logistics industries in Coimbatore District

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Abstract

This study looks at the effects of implementing cutting-edge technologies in Coimbatore district logistics operations. The study employs a descriptive research methodology to examine how well-suited technologies like artificial intelligence, big data analytics, and the Internet of Things are for improving operational efficiency. The report looks at adoption rates as of right now, finds problems, and suggests fixes to streamline logistics procedures. The study, which is restricted to the Coimbatore region, offers insights into how automation, artificial intelligence, and real-time tracking affect performance measures. Suggestions for the practical application of technology are meant to assist logistics companies in maintaining their competitiveness and promoting sustainable supply chain management.

Keywords: IoT, logistics, advanced technology, big data analytics, artificial intelligence

Introduction

Rapid technological breakthroughs, such as IoT, big data analytics, and AI systems, have radically changed the logistics business. These developments offer better consumer experiences, streamlined supply chain procedures, and increased operational efficiency. This study looks at how the Coimbatore district's logistics operations are affected by the use of new technology. It seeks to provide insights into technologically driven advancements by examining the adoption rates and efficacy of big data analytics, artificial intelligence, and IoT. The work is significant because it fills in gaps in the existing literature and provides stakeholders with useful insights.

Objective

- To perform research on the effects of advanced technology deployment in the Coimbatore district's logistics industries.
- To gauge how much the use of cutting-edge technology affects the industry's logistical operations' operational efficiency.
- To obtain suggestions from the responders on how to use cutting-edge technology to improve logistics operations in the logistics sector.

Research Methodology

1. **Sampling technique:** Simple random sampling method.
2. **Research design:** Descriptive Research.
3. **Area of the study:** Coimbatore.
4. **Data collection:** Primary and secondary data.
5. **Sample size:** 120.
6. **Statistical tools used for the study:** Simple Percentage analysis, Chi-Square and Correlation analysis.

Review of Literature

1. **Joanna Dyczkowska (2018)** [6], The use of modern technologies in logistics was described in this publication. The purpose of the study is a presentation of new technologies offered on the territories of Poland and Ukraine as well as their comparison.

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- A literature analysis and a comparative analysis method of the services offered by the largest logistics operator and national mailing services for e-commerce were used in the article. A historical outline and the current development of the e-commerce market in both countries were presented. The sustainable development of the market has resulted in tendencies connected with information technology, ecology and changes in supply chains. The results are smart supply network. Nevertheless, there occur differences within the same logistics operator that operates on the Polish and Ukrainian markets. Greater differences in the use of modern technologies can be observed with national mail operators.
2. **Niraj Chaudhari (2019)** ^[7], Logistics and supply chain management not only includes activities related to the physical movements of the goods/ items but also management of relationship with suppliers and customers. The main objective of the paper is to determine the automation technology used in logistics and supply chain management including new technology like automation with automatic identification of materials and items. The paper also discusses the impact of the automation technology and challenge to implementing automation technology on logistics and supply chain management. The author mainly focuses on the both primary and secondary data for collecting data relating to various advance technology like automation used in logistics and supply chain management. The author draws conclusion that technology play important role to increased supply chain competitiveness and performance by effectiveness of logistics system.
 3. **Alexandra Lagorio (2020)** ^[8], Many innovative technologies have been successfully adopted in logistics and supply chain management processes to increase efficiency, reduce costs or enhance communication. In recent years, considerable attention from both practitioners and academics has been focused on evaluating the impacts of innovative technologies adoption. To this end, this work presents a systematic literature review (SLR) that aims to increase the understanding of the trend toward new technologies in logistics and identify the main research trends and gaps. The principal research trends that emerged from the SLR involve the technologies, their evolution over time and their relationships with the research methodologies. The main literature gaps concern integration and communication, technology-adoption processes and differences between inbound and outbound logistics.
 4. **Mihaela Gabriela Belu (2021)** ^[9], The paper aims to identify new technologies (big data, blockchain, Internet of Things, 3D printing, 5G technology etc.) and their impact on the specific activities related to international sales contracts: International logistics and international payments. The study is based on theoretical and empirical research aimed at investigating the impact of new technologies on international trade flows and the development of international businesses. The findings confirm that these new technologies are rapidly developing and spreading and they have a positive effect on promoting international trade relations and on the environment. The results of our survey on the implementation of new technologies in the Romanian business environment show that employees are familiar with most of them, but the percentage of actual utilisation in companies is rather small.
 5. **Alexandra Lagorioa (2022)** ^[10], Many innovative technologies have been successfully adopted in logistics and supply chain management processes to increase efficiency, reduce costs or enhance communication. In recent years, considerable attention from both practitioners and academics has been focused on evaluating the impacts of innovative technologies adoption. To this end, this work presents a systematic literature review (SLR) that aims to increase the understanding of the trend toward new technologies in logistics and identify the main research trends and gaps. The principal research trends that emerged from the SLR involve the technologies, their evolution over time and their relationships with the research methodologies. The main literature gaps concern integration and communication, technology-adoption processes and differences between inbound and outbound logistics.
 6. **Simon Ayo Adekunle (2023)** ^[11], In this research, the existing literature on the major antecedents influencing and impeding the adoption of technology in managing logistics was examined. The main antecedents examined include the sorts of technological applications used, the degree of application integration, cost reduction and service level improvement, process management and monitoring, safety and security enhancements, and company features. There was also a discussion of the internal and external obstacles to technology adoption. To improve technology adoption in logistics management, the study recommends raising investment in technology, effectively integrating both new and old technologies, establishing industry-based standards, and boosting employee participation
 7. **Yongyi Shou (2023)** ^[12], Despite encouragement for green technology innovation (GTI) in logistics, conclusive evidence on its performance effect is lacking. Using panel data from 53 publicly listed Chinese logistics companies, this study finds an inverted U-shaped relationship between GTI and market value, moderated by stakeholder engagement and public attention. It provides managerial advice for the Chinese logistics industry.

Data analysis and interpretation

Table 1: Business profile of the respondents

S. No	Particulars	No. of the Respondents	Percent
Gender of the Respondents			
1	Male	72	60.0
2	Female	48	40.0
Educational Qualification of The Respondents			
1	UPTO HSC	26	21.7
2	UG	40	33.3
3	PG	33	27.5
4	Diploma & Others	21	17.5
No. of Years of Experience in The Logistics Industry			
	Less than 1 year	16	13.3
2	1-3 years	46	38.3
3	4-6 years	37	30.8
4	Above 6 years	21	17.5
Geographical Region			
1	Urban	31	25.8
2	Semi-urban	60	50.0
3	Rural	29	24.2
	Total	120	100.0

Table 2: Chi-Square

	Value	DF	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.491 ^a	9	.078
Likelihood Ratio	20.965	9	.013
Linear-by-Linear Association	.029	1	.864
N of Valid Cases	120		

Interpretation: From the above table 60.0% of the respondent are male, 33.3 of the respondent are undergraduate, 38.3% of the respondent are having

experience between 1-3 years, 50.0% of the respondent are belongs to semi-urban area.

Interpretation: As per the above table, it is inferred that the P value is 0.078; it is not significant to 5% (0.05) significant level. The minimum expected count is 2.55. Thus null hypothesis is accepted and it is found that there is no significant relationship between the role within the logistics organization and current level of IOT device integration in logistics operations.

Table 3: Correlations

		Gender of the respondents	Implementing of AI Technologies
	Pearson Correlation	1	-.181*
Gender of the respondents	Sig. (2-tailed)		.048
	Pearson Correlation	-.181*	1
Implementing of AI technologies	Sig. (2-tailed)	.048	

*. Correlation is significant at the 0.05 level (2-tailed).

Interpretation

The Above table indicates that out of 120 respondents, coefficient of correlation between the gender of the respondents and implementing of AI technologies is -0.181. It is below 1. So there is negative relationship between the gender of the respondents and implementing of AI technologies.

Findings of the study

- 60.0% of the respondents are male.
- 33.3% of the respondents have completed UG.
- 38.3% of the respondents have 1-3 years' experience in the logistics industry.
- 50.0% of the respondents said that semi-urban as the geographical region.
- 38.3% of the respondents said that warehouse manager as the role within the logistics organization.
- 40.8% of the respondents said that moderate integration as the current level of IOT device integration in logistics operations.
- 35.0% of the respondents said that RFID tags as the types of IOT devices are currently utilized in logistics processes.
- 45.0% of the respondents said that compatibility issues as the challenges have encountered
- During the integration of IOT devices into logistics operations.
- 40.0% of the respondents said that moderately effective as the effectiveness of IOT device integration in enhancing real-time tracking capabilities.
- 53.3% of the respondents said that significant improvement as the IOT device integration impacting customer satisfaction levels with logistics services.

Suggestions

- The company should assess the current level of IoT device integration and identify areas for improvement.
- It's essential for the company to diversify IoT device utilization to cover various aspects of logistics operations.
- Addressing challenges in IoT device integration requires dedicated resources for troubleshooting and ongoing support.
- Evaluating real-time tracking capabilities will provide insights into the effectiveness of IoT device integration.

Conclusion

The logistics sector in the Coimbatore District has seen a dramatic transformation as a result of the widespread use of cutting-edge technologies, such as AI, big data analytics, and IoT devices. These technologies have increased operating efficiency, decreased transportation costs, improved delivery time reliability, and improved demand forecasting accuracy. Predictive maintenance solutions powered by AI have reduced downtime, and decision support systems have become more responsive and agile. Maintaining and improving the effectiveness and competitiveness of logistics companies in the area requires giving priority to additional integration and investment in these technologies. Achieving the highest level of operational efficiency would require addressing issues like data integration and staff training. All things considered, cutting edge technology will have a significant impact on how logistics are conducted in the Coimbatore District going forward, providing industry stakeholders with important information they can use to seize new opportunities

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