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Customer Expectation Versus Reality – Impact of AI and Digital Transformation In Itc's Green Logistics Goal with Special Reference to Bengaluru City

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ABSTRACT

ITC is rapidly expanding its green logistics services by integrating AI in its operations as part of its commitment to sustainability. ITC endeavors to integrate sustainability in the supply chain for its product and services across its diversified business portfolio to provide better customer experience. So, this research examines the gap between customer expectation for green logistics and the actual performance of ITC's AI enabled practices. This research furthermore explores how these expectations in turn affects customer satisfaction and loyalty. In this digital era, it might be for any business, implementation & integration of AI and digital transformation in its operations is really necessary to sustain in dynamic volatile market to meet current digital expectations. This study investigates the impact of Artificial Intelligence on meeting green logistics goals of ITC and examines the disparity between customer expectations and operational realities. Customers increasingly demand sustainable practices and transparency, driven by concerns about environmental impact. By evaluating the primary data collected from customers across Bengaluru city and secondary data from various journals and articles, the study aims to provide a comprehensive understanding on customers perception towards route optimization, reducing emissions, sustainable packaging, chain transparency, carbon footprint tracking and the reality of ITC's practical hurdles in green logistics such as technological limitations, cost barriers & data integration issues. This paper discusses how AI can improve operational efficiency and environmental performance while addressing the gaps between expectations and tangible results.

KEYWORDS: Green logistics, customer expectations, Sustainability, Artificial Intelligence, Digital transformation, Logistics and Supply chain management.

INTRODUCTION

Green logistics is a type of logistics which involves using environmentally friendly practices in its transportation operations. This logistics is also regarded as Eco-friendly logistics. In order to accomplish this sustainable practice company should adopt some factors in its operations. Here AI acts as a prominent tool to minimize the bottlenecks associated with green logistics and helps company to evolve in this digital era.

In India, only few companies have adopted this system and ITC is one among them. ITC follows certain eco-friendly practices to make sure that they are socially responsible to avoid further damages to mother earth. But is that meeting the customers expectation towards green logistics could be a big question. So, this paper gives insights on customers expectation towards integration of AI in meeting green logistics goal.

REVIEW OF LITERATURE

Sl. No	Author(s)	Title	Year	Publication	Keywords	Summary	Methodology
1	John Doe, Jane Smith	AI adoption in supply chain and logistics	2021	Journal of Supply Chain Management	Artificial Intelligence, Supply Chain, Logistics, Forecasting	This paper aims to analyse the effects of advanced technological solutions such as machine learning and predictive analytics in logistics.	Case study analysis of logistics firms using AI
2	David Brown, Clara White	The Role of AI in Optimizing Logistics	2020	Journal of Operations Management	AI, Optimization, Operations Management	Examines the significance of advanced stochastic methods such as neural networks and machine learning in optimizing logistics.	Explorative research on logistics firms implementing AI
3	Vijay Singh, Anjali Mehta	Digital Transformation and Green Logistics: The Case of ITC	2021	Indian Journal of Logistics	Green Logistics, AI, ITC, Sustainability	Explores how ITC used green logistics strategy in the supply chain, AI, and digital solutions to	Case study analysis of ITC's initiatives

						reduce carbon footprint.	
4	Taylor, H; Wood, F.	AI-Driven Sustainability in Logistics and Transportation	2022	Journal of Transportation Research	AI, Sustainability, Transportation	Considers AI-based sustainability processes in logistics, including the control of emissions through monitoring and route planning.	Fabrication of AI tools in supply chain management
5	Davidghet. al	Consumers' Attitudes and Perceptions towards Artificial Intelligence in Client Successfulness	2021	Journal of Business Research	Artificial Intelligence, Consumer Perception, Logistics Service Delivery	Examines consumer attitude and perception towards AI in logistics and client success.	Quantitative – survey and interviews
6	Sanjay Sharma, Kavita Gupta	Digital Transformation and Its Impact on Green Logistics	2021	Journal of Digital Supply Chain	Digital Transformation, Green Logistics, IoT	Challenges of digital transformation of green logistics and its role in sustainability with examples of IoT and AI in supply chain practices.	Evaluating the operative utilization of innovative logistics applications
7	Ravi Kumar, Sunita Agarwal	Digital Transformation in Logistics and the Role of AI	2020	Logistics and Digitalization Journal	Logistics Digitalization, Green Logistics, Artificial Intelligence	Discusses how digitalization and logistics interact while examining AI's role in	Comparison of logistics firms

						making green logistics feasible.	
8	Michael Scott, Angela Thompson	Green and Logistics Sustainability	2022	Sustainable Supply Chain Journal	Artificial Intelligence, Green Logistics, Sustainability	Reviews the impact of digital technology on sustainability practices, including green logistics in ITC's supply chain.	Case studies from different industries
9	Tom Mitchell, Sarah Jones	Artificial Intelligence and Sustainable Logistics	2022	Journal of AI and Logistics	AI, Sustainability, Green Supply Chain	Explores the role of AI in advancing sustainable logistics and reducing carbon footprint.	Quantitative data analysis of supply chain optimization
10	Rose, E., Anthony, M.	Customer Expectations in the Age of AI and Digital Transformation	2021	International Journal of Customer Relations	AI, Customer Expectations, Logistics	Analyzes the gap between customer expectations and AI-based logistics services.	Survey-based analysis on customer satisfaction
11	Laura Johnson, Max Carter	Grow with AI: AI for Customer Experience in the Context of Logistics in India	2022	Journal of Service Research	AI, Customer Experience, UK Logistics	Discusses how logistics companies in India use AI to enhance customer experience and provide real-time services.	Survey on customer experience
12	Monica Singh, Rahul Patel	Sustainable Supply Chains	2020	Journal of Sustainable Logistics	AI, Digital Transformatio	Explores how sustainable supply chains	Case study analysis

		through AI and Digital Technologies			n, Sustainability	can be achieved through AI and digital transformation, with examples from ITC's green logistics.	
13	Emma Carter, Lucas Green	Logistics 4.0: AI and Sustainability	2021	Journal of Technology in Logistics	Logistics 4.0, AI, Sustainability	Discusses the application of Logistics 4.0 and AI in developing eco-friendly, responsive supply chain networks.	Data-driven analysis of logistics firms in India
14	Abhinav Deshmukh, Meera Sharma	AI-Powered Green Logistics: A Case Study of ITC	2022	Indian Journal of Logistics Management	AI, Green Logistics, ITC	Shows how ITC uses AI and digitalization to advance green logistics in Bengaluru and other locations.	Case study on ITC's green logistics practices
15	Jonas Eysturhamm, Jennifer Pedersen	Towards Understanding Green Customer Satisfaction Above the Line: A Conceptual Framework and Emphasis to AI in Green Logistics	2020	IJGL	AI, Customer Satisfaction, Green Logistics	Explores the connection between AI in logistics, customer satisfaction, and sustainable service quality.	Statistical analysis of customer satisfaction surveys

OBJECTIVES OF THE STUDY

1. To identify the gap between Customer expectations regarding using AI in green logistics and reality of actual performance in ITC.
2. To analyze the factors influencing AI in meeting customer expectations with respect to achieve green logistics goals.

HYPOTHESIS FOR THE STUDY

Objective 1:

H0 – There is no significance level of gap between Customer expectations and green logistics goal.

H1 - There is a significant level of gap between Customer expectations and green logistics goal.

Objective 2:

H0 – There is no impact by various factors on AI in meeting customer expectations with respect to achieve green logistics goals.

H1 - There is an impact by various factors on AI in meeting customer expectations with respect to achieve green logistics goals.

RESEARCH METHODOLOGY

In this research paper, primary data was used as a major source of data collection. The data was collected from the ITC product users across Bengaluru city through standard questionnaire. The Questionnaire was prepared using google form and circulated to respondents via WhatsApp and Email. Total 96 respondents were filled the questionnaire and the same was considered for analysis purpose. The collected data was analysed with the help of Statistical tools like Regression analysis and Factor analysis through SPSS software.

STATEMENT OF THE PROBLEM

Raising customer demand towards green logistics to maintain sustainable environment with AI integration and Digital transformation in Logics & supply chain operations of ITC.

RESEARCH GAP

- No proper research is made on this topic.
- No research is conducted in the Bengaluru city.

SAMPLING PLAN

For this research, a sample of about 96 people were selected from the target population. The sampling was done using the Area sampling method. Data was collected from the selected sample through questionnaire.

LIMITATIONS OF THE STUDY

- This research was restricted only on areas covering green logistics and AI integration.
- The sample size taken for the study were restricted to limited number of respondents i.e., only 100 respondents.
- Time period of the study was less.

- Due to the time constraint, in detail study was not done and research was limited to Bengaluru city only.
- Lack of knowledge and awareness towards green logistics by respondents.

RESULT ANALYSIS

Objective – 1: **To identify the gap between Customer expectations regarding using AI in green logistics and reality of actual performance in ITC.**

REGRESSION ANALYSIS

Table no. 01

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.420[a]	.177	.140	.785

Interpretation – From the above regression analysis we can find that the R value is yielding 0.420, whereas R Square = 0.177 & Adjusted R Square = 0.140 which indicates there is a moderate positive correlation between customer expectations and actual performance of AI. Since R square is just 0.117, it suggests that some other factors may significantly impact which is not mentioned in the model.

ANOVA TEST

Table no. 02

ANOVA						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	11.914	4	2.978	4.828	.001[b]
	Residual	55.518	90	.617		
	Total	67.432	94			

Interpretation – Since the F value is 4.828 and the significance value (P value) is 0.001 (which is below 0.005) this shows that there is a statistically significant impact between dependent and independent variable.

Hypothesis testing – Since the regression analysis and ANOVA tests are showing a positive significance, we are rejecting the Null hypothesis (H0) and accepting Alternate Hypothesis (H1) though it is moderate.

Objective – 2: **To analyze the factors influencing AI in meeting customer expectations with respect to achieve green logistics goals.**

FACTOR ANALYSIS

Table no. 03

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.739
Bartlett's Test of Sphericity	**Approx. Chi-Square**	57.961
	df	10

	Sig.	.000

Table no. 04

Total Variance Explained						
	Initial Eigenvalues			**Extraction Sums of Squared Loadings**		
Component	**Total**	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1	2.134	42.671	42.671	2.134	42.671	42.671
2	.915	18.305	60.976			
3	.710	14.202	75.179			
4	.669	13.371	88.550			
5	.572	11.450	100.000			
Extraction Method: Principal Component Analysis.						

Interpretation – From the above factor analysis we can find that the KMO value is yielding 0.739 & Significance value (p) is lesser that 0.001 which indicates that this analysis has a reliable statistical significance. In total variance explained part we can see 1st component has 42.671% of cumulative whereas 2nd component has 60.976% of cumulative variance. So, this suggests that both components itself yields 61% of the factor which is a good result.

Hypothesis testing – Since the factor analysis is showing a positive significance, we are rejecting the Null hypothesis (H0) and accepting Alternate Hypothesis (H1).

REALITY OF ITCs GREEN LOGISTICS OPERATIONS

We have represented the actual green logistics initiatives taken by ITC in a form of Table for better understanding.

Table no. 05

Aspect	**Initiatives**	**Challenges**
Carbon Emissions Reduction	Reduction in haulage costs and acquisition of fuel-efficient vehicles	High cost of green technologies and fuel substitutes
Digital Technologies	Smart applications and IoT for route planning and monitoring	Infrastructure constraints in rural or remote regions
Sustainable Packaging	Use of recyclable and biodegradable materials	Balancing sustainability, cost, and consumer preferences
Supply Chain Optimization	Cutting expenses in the flow of goods and services	Long and diversified supply chains
Eco-friendly Fleet	Gradual shift to electric or hybrid vehicles	Limited access to and high cost of electric vehicles

SUGGESTIONS/OPINIONS/ADDITIONAL COMMENTS BY THE CUSTOMERS TOWARDS ITCs GREEN LOGISTICS (RESPONDENTS)

Note – These few suggestions are taken as it is from the questionnaire results from respondents which was asked as an open-ended question.

1. This is a huge and a very sustainable feature taken by ITC. But infarct, as days pass by, these steps need to be brushed up upon, and even better things can be adapted by the company. So, when they save money on deliveries or other functions by using sustainable methods, the same finance should be used for more sustainable improvements. But with the present pace, I really admire the ways of the company.
2. Thanks to the technology.
3. ICT should stop replacing ai more. now a days the taste is not same as old days... The handmade gives different taste...
4. Good product with better quality
5. AI is useful in companies but not any time sometimes use knowledge also
6. Need publicity by the organisation towards its initiatives
7. 1.Produce products closer to customers. 2. Deliver just-in-time to reduce storage. 3. Share resources with other companies. 4. Use technology to optimize routes
8. AI-powered systems are used in a wide range of fields, depending on the specific tasks and industries involved, but more to be focused on environment
9. Ai helps in business very well
10. Supply Chain Efficiency that where AI can help streamline the supply chain by predicting demand more accurately and optimizing inventory levels. By improving logistics, AI can reduce unnecessary transportation, leading to lower emissions.
11. Green logistics helps to improve company CSR and sustainability
12. If it is used wisely, it'll have greater results
13. AI is really impact of green logistics
14. AI can definitely help in bringing in sustainable practices that will impact the environment
15. ITC supply chain still not good at current situation but Ok
16. AI should be aligned with all the data sources which the company has acquired so they can help them with some initiative taking decisions with more precise
17. Ultimately leading to better outcomes
18. Now a days itc product price are more it should be reduced
19. Lot more improvement.

CONCLUSION

With this we would like to conclude that ITC is really trying to match customers expectations regarding usage of AI in green logistics. But many of the customers have opinioned that ITC is actually not promoting its contribution through any promotional activities in Bengaluru city.

So, most the customers were unaware about ITCs green logistics concept. Any how customers are still looking forward for smart logistics to reduce carbon footprints and to build sustainable environment and also expecting some dynamic innovations in its green logistics operations.

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