Green Logistics & Sustainability: Measuring Customer Interest in Eco-Friendly Software Solutions

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Abstract - With growing environmental concerns and a strong push for sustainable development, this study dives into how green logistics affects customer behaviour and preferences. The research aims to assess people's awareness of eco-friendly logistics options, their preferences, the key factors that shape their decisions, and their openness to adopting sustainable practices. To collect data, a structured questionnaire was sent out to 102 participants, and the results were analysed using the Chi-square test with SPSS. The findings show that while customers generally view sustainability in logistics positively, cost and delivery speed remain their top priorities. The study also points out some gaps in awareness and a limited willingness to pay more for green services. These insights are incredibly valuable for logistics companies aiming to implement sustainable practices that align with customer expectations. Overall, the findings contribute to the ongoing discussion about eco-friendly supply chains and offer practical implications for the logistics industry.

***Key Words*:** Green logistics, sustainable supply chain, customer awareness, eco-friendly practices, willingness to pay (WTP), environmental impact.

1.INTRODUCTION

The rapid development of the climate crisis, along with other global challenges pertaining to the environment, resulted in all industries adopting a form of corporate social responsibility—sustainability. As one of the most important elements of international commerce, Logistics, encompasses a multitude of activities that consume considerable amounts of carbon resources. This shifts the focus towards green logistics, which is a sub-discipline of logistics centered on the environmental aspects of logistics and supply chains.

Concurrently, traditional logistics practices are being reformed with the introduction of software technologies. The utilization of 'environmentally friendly' computer programs allows companies to manage and control their carbon emissions more efficiently. Eisenberg (2020) indicates that route optimization, real-time position monitoring, and the digitization of documents not only increase a company's productivity but also fulfill environmental objectives.

This study is called "Green Logistics and Sustainability: Measuring Customer Interest in Eco-Friendly Software Solutions." It is placed in the context of Femtosoft Technologies, a provider of digital services for the logistics industry. This research analyzes how clients perceive eco-friendly software solutions in logistics, focusing on the attitudes, preferences, and support from customers concerning modern digital tools for logistics. It portrays the amalgamation of customer responsibility concerning the environment and customer perceptions of eco-initiatives in the digital world of logistics.

2. Methodology

The approach taken in this study on green logistics and sustainable supply chain practices is mainly quantitative, relying on a survey-based method to collect important data. We crafted a structured questionnaire and shared it through Google Forms, reaching out to 102 respondents from various demographic backgrounds. The research design was descriptive, aimed at uncovering patterns, preferences, and levels of awareness among customers about eco-friendly logistics services. We used a non-probability convenience sampling technique, which made it easier to connect with a diverse group of participants within a short timeframe. The data we gathered were analyzed using tools like SPSS, focusing on frequencies and percentages to assess the responses. While we initially thought about using advanced tests like Chi-square, Mann-Whitney U, and Kruskal-Wallis, we ultimately decided to stick with descriptive statistics, given the nature of our dataset and the study's scope. This methodology helped us gain a solid understanding of customer behavior, the challenges they face, and their

willingness to embrace and support green logistics initiatives.

3. Results and Discussions

3.1 Gender-wise distribution of the Respondents

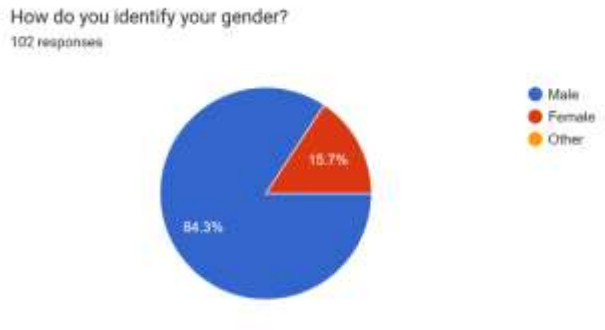

Fig-1: Distribution of Respondents based on Gender

INTERPRETATION:

Most respondents are male (84.3%), with females comprising only 15.7% of the total.

3.2 Educational Qualification of the Respondents

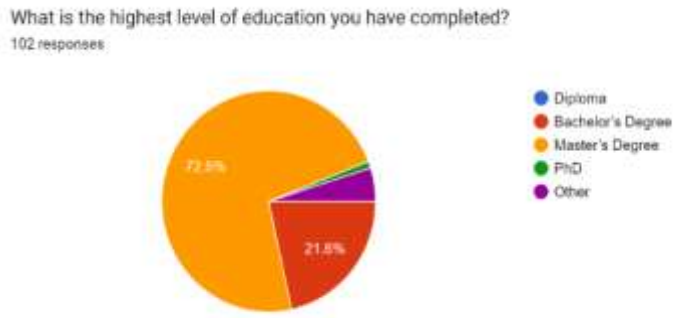

Fig -2: Distribution of Respondent's Educational Level

INTERPRETATION

A dominant 72.5% of the respondents hold a Master's Degree, while 21.6% have a Bachelor's Degree. Only a small portion have a PhD or other qualifications.

3.3 Industry type of Respondents

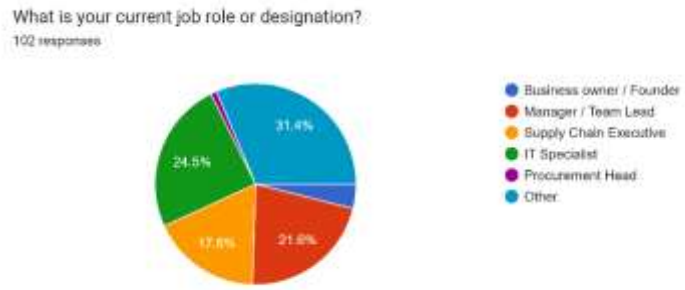

Fig-3: Distribution of Industry Type of Respondents

INTERPRETATION:

The largest group of respondents work in Manufacturing (31.4%), followed by Logistics (27.5%), indicating strong participation from sectors closely linked to supply chains.

3.4 Respondents Familiarity with Green Logistics

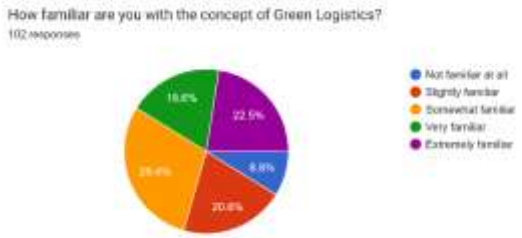

Fig-4: Distribution of Respondents Familiarity with Green Logistics

INTERPRETATION:

Most respondents are at least somewhat familiar with green logistics, with 29.4% somewhat familiar and 22.5% extremely familiar. Only 8.8% reported being not familiar at all.

3.5 Respondents willing to pay (WTP) for Eco-Friendly delivery services

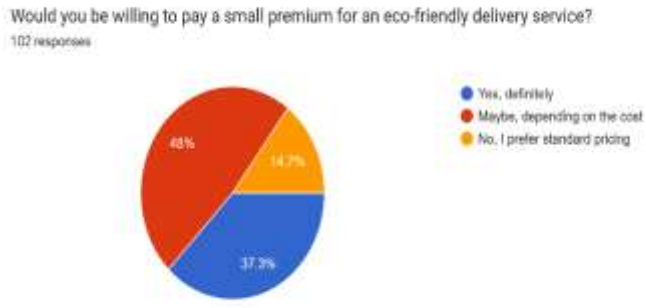

Fig-5: Distribution of Respondents WTP for Eco-Friendly Delivery Services

INTERPRETATION:

Most respondents (65.6%) have occasionally or always considered sustainability while selecting delivery options.

3.6 Challenges for companies implementing in green logistics

Fig-6: Challenges for Companies Implementing in Green Logistics

INTERPRETATION:

High cost is perceived as the most significant barrier to green logistics (35.3%), followed by partner resistance (23.5%) and lack of infrastructure (22.5%).

3.7 Delivery Service based on Environmental Sustainability initiatives

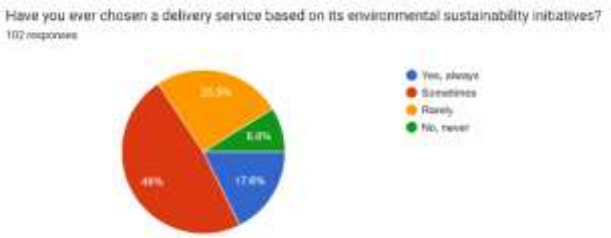

Fig-7: Distribution of Respondents on Delivery Service based on Environmental Sustainability Initiatives

INTERPRETATION:

Most respondents (65.6%) have occasionally or always considered sustainability while selecting delivery options.

3.8 Chi-Square (Gender Vs Familiarity with Green Logistics)

Hypothesis

Null Hypothesis (H_0): There is no significant relationship between gender and familiarity with green logistics.

Alternative Hypothesis (H_1): There is a significant relationship between gender and familiarity with green logistics.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	7.725[a]	4	.102
Likelihood Ratio	7.733	4	.102
N of Valid Cases	102		

a. 5 cells (50.0%) have expected count less than 5. The minimum expected count is 1.41.

Table 1: Chi-Square (Gender Vs Familiarity with Green Logistics)

INTERPRETATION:

Since the p-value is greater than the significance level of 0.05, we fail to reject the null hypothesis. This means there is no statistically significant association between gender and awareness of green logistics among the respondents.

INFERENCE:

Although descriptive data suggested more male respondents reported higher familiarity with green logistics, the relationship was not statistically significant. Hence, the hypothesis that gender influences awareness levels is not supported by the data.

3.9 Chi-Square (Level of Education Vs Willingness to Pay Premium for Eco-Friendly Services)

Hypothesis

Null Hypothesis (H_0): There is no significant relationship between the highest level of education and willingness to pay a premium for eco-friendly services.

Alternative Hypothesis (H_1): There is a significant relationship between the highest level of education and willingness to pay a premium for eco-friendly services.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	12.927[a]	6	.044
Likelihood Ratio	11.786	6	.067
N of Valid Cases	102		

a. 7 cells (58.3%) have expected count less than 5. The minimum expected count is .15.

Table 2: Chi-Square (Level of Education Vs Willingness to Pay Premium for Eco-Friendly Services)

INTERPRETATION:

- The p-value of 0.044 is less than 0.05.

- This means that we reject the null hypothesis and conclude that there is a statistically significant relationship between highest level of education and willingness to pay a premium for eco-friendly services.

INFERENCE:

The analysis indicates that the level of education influences an individual's willingness to pay for eco-friendly services. Specifically:

- Master's degree holders show the highest tendency to pay for eco-friendly services.

- Bachelor's degree holders are more likely to consider paying depending on the cost.

- Individuals with PhDs show very limited responses, with only one individual responding positively.

This suggests that more educated individuals (with a Master's degree) might be more inclined to prioritize eco-friendly practices, possibly due to better awareness or value alignment with sustainability.

3.10 Chi-Square (Gender Vs Delivery Service Based on its Environment)

Hypothesis

Null Hypothesis (H_0): There is no significant association between gender and the tendency to choose delivery services based on environmental sustainability initiatives.

Alternative Hypothesis (H_1): There is a significant association between gender and the tendency to choose delivery services based on environmental sustainability initiatives.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	7.315[a]	3	.063
Likelihood Ratio	8.335	3	.040
N of Valid Cases	102		

a. 3 cells (37.5%) have expected count less than 5. The minimum expected count is 1.41.

Table 3: Chi-Square (Gender Vs Delivery Service Based on its Environment)

INTERPRETATION:

- The Pearson Chi-Square p-value = 0.063 is slightly above the typical significance level of 0.05, so we fail to reject the null hypothesis using Pearson Chi-Square.

- However, the Likelihood Ratio p-value = 0.040, which is below 0.05, suggests a statistically significant association between gender and eco-based delivery choices.

INFERENCE:

Although descriptive data suggested more male respondents reported higher familiarity with green logistics, the relationship was not statistically significant. Hence, the hypothesis that gender influences awareness levels is not supported by the data.

3.11 Chi-Square (Industry Vs Challenges in Implementing Green Logistics)

Hypothesis

Null Hypothesis (H_0): There is no significant association between the industry and the biggest challenge for companies implementing green logistics.

Alternative Hypothesis (H_1): There is a significant association between the industry and the biggest challenge for companies implementing green logistics.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	30.262[a]	16	.017
Likelihood Ratio	38.470	16	.001
N of Valid Cases	102		

a. 17 cells (68.0%) have expected count less than 5. The minimum expected count is .47.

Table 4: Chi-Square (Industry Vs Challenges in Implementing Green Logistics)

INTERPRETATION:

• The p-value (0.017) is less than 0.05, so we reject the null hypothesis (H_0). This means that there is a significant association between the industry and the perceived challenge in implementing green logistics.

• The Pearson Chi-Square value of 30.262 indicates the strength of the association between these variables, further confirming the existence of a relationship between industry type and perceived challenges.

INFERENCE:

The analysis suggests that the challenges faced by different industries in implementing green logistics solutions do vary. For example:

• Logistics companies reported higher concerns about high costs of implementation and lack of infrastructure.

• E-Commerce and Retail sectors focused more on challenges related to lack of consumer awareness.

• Manufacturing industry showed concerns related to both high costs and lack of infrastructure.

Thus, industries face different hurdles based on their specific needs, suggesting that tailored approaches are necessary to address these unique challenges in green logistics adoption.

3.12 Chi-Square (Job Role/Designation Vs Willingness to Pay for Eco-Friendly Logistics Services)

Hypothesis

Null Hypothesis (H_0): There is no significant relationship between job role/designation and willingness to pay for eco-friendly logistics services.

Alternative Hypothesis (H_1): There is a significant relationship between job role/designation and willingness to pay for eco-friendly logistics services.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	6.671[a]	10	.756
Likelihood Ratio	7.359	10	.691
N of Valid Cases	102		

a. 10 cells (55.6%) have expected count less than 5. The minimum expected count is .15.

Table 5: Chi-Square (Job Role/Designation Vs Willingness to Pay for Eco-Friendly Logistics Services)

INTERPRETATION:

• The p-value is 0.756, which is greater than 0.05.

• Therefore, we fail to reject the null hypothesis.

INFERENCE:

There is no statistically significant relationship between job role/designation and willingness to pay a small premium for eco-friendly logistics services. This implies that the job role/designation of customers does not influence their willingness to pay for eco-friendly logistics services.

4. CONCLUSION

The study took a deep dive into customer awareness, preferences, challenges, and their willingness to embrace eco-friendly logistics services. By analyzing 102 valid survey responses and using statistical tools like Chi-square tests, several key conclusions emerged:

Customer Awareness: A significant number of respondents were aware of green logistics practices, with many occasionally opting for services based on their environmental sustainability. This indicates a moderate to high level of awareness among customers.

Preferences: Most participants showed a keen interest in eco-friendly delivery services, with many willing to pay a little extra, especially if the cost was justified by

the quality of service or the positive environmental impact. This points to a promising shift in customer attitudes towards sustainability in logistics.

Demographics & Behavior: The data revealed that younger individuals and professionals in logistics, IT, and manufacturing sectors were more open to sustainable options. Interestingly, gender and job role didn't significantly influence decision-making regarding the adoption of green logistics.

Key Challenges: Companies identified high implementation costs, lack of infrastructure, and resistance from supply chain partners as the main challenges. The significance of these challenges varied slightly by industry, as confirmed by the Chi-square test (p-value = 0.017), suggesting that tailored strategies are needed for different sectors.

Statistical Insight: Most Chi-square tests indicated no strong link between demographic factors (like gender and role) and the willingness to adopt or pay for green logistics. This suggests that interest in sustainability spans across various user groups.

In summary, the findings indicate that customers are becoming more open to sustainable logistics, but they expect cost efficiency, transparency, and improved awareness initiatives. For companies, this presents a growing opportunity to stand out through green logistics—not just as an ethical obligation but as a competitive advantage.

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