



A STUDY ON THE EFFECTIVENESS OF LOGISTICS SERVICES QUALITY AND HOW IT AFFECTS CUSTOMER SATISFACTION IN THE E-COMMERCE SECTOR

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ABSTRACT:

Technology advancements, internationalization, and the COVID-19 epidemic have all contributed to a recent increase in the number of e-commerce logistics activities. Yet, an examination of the literature for this study revealed a dearth of studies on the quality of commerce logistics services. This study aims to close this gap in the body of knowledge. It seeks to pinpoint the elements of e-commerce logistics service quality that influence customer's happiness. Using a structured questionnaire, responses from 102 Chennai-based e-commerce customers was gathered. Collected data was analysed using methods like Factor analysis, Chi square test, Correlation analysis, weighted average method. It was discovered that timely delivery, safe handling, order accuracy, and easy returns had a positive impact on customer satisfaction. And, customer satisfaction and service quality were found to be positively correlated.

KEYWORDS:

Customer Satisfaction, E-Commerce, Logistics Service Quality

1. INTRODUCTION

E-business can encourage the effective exchange of information and the removal of extraneous supply chain participants. As digital technology is increasingly interwoven into business operations daily, the introduction of contemporary digital infrastructure including cellular networks, smart-phones, and location technologies marks the subsequent drastic transformation in that technology. Logistics, in a broader sense, is the organizing and movement of supplies, inventories, and equipment from one site to another for storage. E-logistics, on the other hand, describes the logistics process using electronics, technology, or the internet. E-fulfillment is the integration of technology, procedures, and people to guarantee consumer satisfaction in past, present, and future online purchasing experiences. With the exclusion of

customer support chores carried out through third-party outsourcing, in-house operations, and drop shipping, true e-commerce frames include being fully automated from customer order receipts to picking, packaging, shipping, and the timely updating of client profiles.

1.2 OBJECTIVE OF STUDY

- To find out the major factors affecting Logistics service quality of e-commerce firms.
- To find out the relationship between various logistics service quality dimensions and customer satisfaction.
- To find out the effect of logistics service quality on customer satisfaction

1.3 SCOPE OF THE STUDY

This study will help to understand logistics service quality and how it affects customer satisfaction in E-commerce sector. It will also enable the readers to understand how e commerce is influencing the logistics business and helps in making sound profit.

2. REVIEW OF LITERATURE

(Hameed imran, S.lakshmidivi., 2023) In their study on perception of logistics service quality in nykka among college students in Chennai, the authors have found that the key dimensions of logistics service quality can be classified into timely delivery, easy reverse logistics, product quality and safety. The study explored the fact that customers of nykka were satisfied with quality of delivery service and least satisfied with reverse logistics aspect.

On the other hand, When customers' expectations and views are compared, the quality of the logistics service is revealed **(Giao et al., 2020)**.

Customers' views of quality may vary, thus it is important to precisely identify the aspects that influence it. The features of service quality vary based on the type of service **(Chaisaengduean, 2019)**.

It is vital to enhance the concrete elements of the logistics service and manage the customer's expectations in order to increase the quality of logistical operations that directly influence the benefit of customers from the products they purchase **(Gil-Saura et al., 2008)**.

An effective means of competitive differentiation is superior logistics. The authors offer empirical evidence for nine related logistics service quality constructs, show their normality, validity, and dependability across four client groups of a sizable logistics firm, and offer empirical support for a logistics service quality process **(Mentzer et al., 2001)**

E-commerce and service caliber. The purpose of the study is to determine whether e-commerce-related services are applicable. The argument is that factors like competence, civility, cleanliness, comfort and friendliness, helpfulness, care, commitment, and flexibility are not particularly

relevant in e-commerce because there is no human connection during the Web site experience **(Cox and Dale, 2001)**

The causes and effects of consumer loyalty in a B2C online setting. The study attempts to identify the eight variables that could have an impact on e-loyalty and create scales to assess those variables. According to the study, e-loyalty affects two customer-related outcomes: The desire to spend more and word-of-mouth advertising **(Srinivasan et al., 2002)**

The importance of service quality in e-commerce is becoming more widely acknowledged. Service quality is the primary predictor of successful e-commerce since online technical feature comparisons of products are fundamentally free, practical, and easier than comparisons of products through traditional channels. The study seeks to determine whether a conceptual model of the factors influencing the quality of e-services has been put forth and explored **(Santos, 2003)**

The organizations understand the need of having a strong supporting logistics or electronic logistics department from both a business and consumer standpoint. The purpose of the study is to determine how e-logistics models and practices affect enterprises' forward and reverse logistics functions **(Sarkis et al., 2004)**

The connection between the many aspects of e-service quality and factors like customer satisfaction and purchase intent. The study's analytical findings demonstrated that customer happiness and overall service quality are influenced by factors such as website design, dependability, responsiveness, and trust **(Lee and Lin, 2005)**

Effective customer satisfaction research is a crucial prerequisite for e-commerce to succeed in the market's fierce competition. The goal of the study is to identify the issues that need to be resolved for e-commerce customer satisfaction, as well as how to evaluate customer satisfaction using cutting-edge techniques and how to use the results of the evaluation to improve their services **(Fasanghari et al., 2008)**

Logistics Service Quality

Delivering high-quality services helps build corporate brands and increases consumer happiness. As a result, both academics and practitioners are now interested in the topic of service quality. Companies must determine how consumers perceive service quality and make necessary improvements if they want to compete successfully in the future. Companies have the chance to set themselves apart from rivals thanks to logistics **(Leuschner & Lambert, 2016)**.

Customer Satisfaction

In the past few decades, globalization has become a powerful force that shapes the corporate strategy and policy of corporations. As companies earn clients by successfully competing in an increasingly competitive globalized market, customer happiness is considered as crucial and evolving into a major component of corporate strategy **(Chin et al., 2013)**.

FACTORS AFFECTING LOGISTICS SERVICE QUALITY

Timely Delivery

The advancement of technology and globalization make it easier for today's consumers to access the goods they want. Many clients likewise dislike waiting; therefore they anticipate that their orders will be fulfilled on schedule. One of the first-mentioned aspects of the quality of a logistics service in the literature is timeliness. It is described as the on-time, as promised, delivery of consumers' orders (**Zailani et al., 2018**).

Order Accuracy

Consumers prefer that their ordered goods arrive in the quantity and quality that was indicated at the time of ordering, and that alternative goods are not provided. If the products provided match the ones ordered and are in the right quantities, the order was accurate (**Politis et al., 2014**).

Safe Handling

For the consumer, the state of the delivered goods is just as important as their prompt and thorough delivery. The products may sustain harm during shipment if they are not adequately shielded. The ordered goods must be delivered in its entirety to the clients. If not, customers can pick a different source for their subsequent transaction. Thus, it's important to identify the variables that could have an impact on the order condition (**Zlatkovic, 2013**).

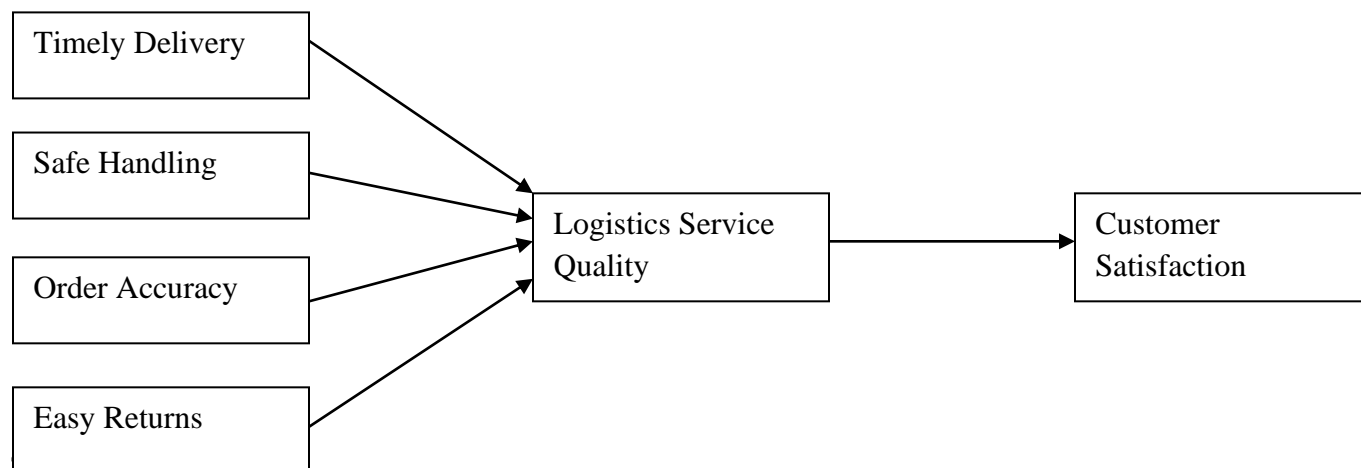
Easy Returns

Return processing can take a lot of time and add to the company's expenses. However, in the highly competitive climate of today, businesses must recognize that product returns are unavoidable and that return management may help cut costs, spot opportunities for improvement, foster stronger client connections, and support the long-term success of the company (**Chen et al., 2017**).

3. RESEARCH METHODOLOGY

The research conducted is descriptive in nature; The study used both primary and secondary data collected from 102 respondents in Chennai. The researcher used convenience sampling method four sampling. Data collection and analysis are done using SPSS. Chi square, Weighted average, Correlation analysis, and Factor analysis are done to verify the aim of objectives.

Figure1. Research model



4.1 FACTOR ANALYSIS

Kaiser-Meyer-Olkin Measure is an index which defines of sampling Adequacy. The KMO test value is 0.598 which is more than 0.5 can be considered acceptable and valid to conduct data reduction technique.

Table 4.1.1 shows the KMO and Barlette Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.598
Bartlett's Test of Sphericity	Approx. Chi-Square	295.623
	df	105
	Sig.	<.001

The Bartlett's test of Sphericity helps a researcher to decide, whether the results of factor analysis are worth considering and whether we should continue analyzing the research work. The significance level for the Bartlett's Test of Sphericity is <0.001. which shows that there is a high level of correlation between variables, which make it adequate to apply factor analysis.

Table 4.1.2 shows the communalities

Communalities			
Variable	Variable Name	Initial	Extraction
1	Delivery occurs on the day that was agreed.	1.000	.602
2	Order processing and delivery times are consistent.	1.000	.750
3	The weather has no bearing on when delivered.	1.000	.569
4	Item protection is provided during shipping.	1.000	.754
5	My order was delivered with no harm to the goods.	1.000	.454
6	Rarely are things delivered in poor condition.	1.000	.651
7	The products that were delivered met the requirements.	1.000	.758
8	When the item I requested is out of stock, the suggested item from the business is acceptable.	1.000	.605
9	If the order conditions are not met by the delivered product. The steps are simple.	1.000	.734
10	The business provides acceptable remedies if the delivered product does not meet the requirements	1.000	.648
11	A payment option is provided in the return process.	1.000	.561
12	I will not charge a shipping cost for returns.	1.000	.639
13	I respond that this purchasing site is good.	1.000	.792
14	This website is the first place I look when I need.	1.000	.730
15	I make maximum effort to use this shopping site.	1.000	.587
Extraction Method: Principal Component Analysis.			

Every variable in the communality initially is expected to share 100% variance. Hence initially every item is having value 1.00 which mean 100% variance share by each item. The extraction value is ranging from 0.454 to 0.792 which shows that minimum variance share of item after extraction is 45.40% and maximum variance share of item is 79.20%.

Table 4.1.3 shows the total variance explained

Total Variance Explained									
Component	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.101	20.675	20.675	3.101	20.675	20.675	2.131	14.203	14.203
2	1.710	11.403	32.077	1.710	11.403	32.077	1.737	11.582	25.786
3	1.488	9.922	41.999	1.488	9.922	41.999	1.619	10.796	36.582
4	1.355	9.035	51.034	1.355	9.035	51.034	1.564	10.428	47.010
5	1.109	7.396	58.430	1.109	7.396	58.430	1.526	10.173	57.183
6	1.069	7.127	65.557	1.069	7.127	65.557	1.256	8.374	65.557
7	.914	6.094	71.651						
8	.881	5.876	77.527						
9	.790	5.264	82.791						
10	.558	3.721	86.512						
11	.538	3.589	90.101						
12	.407	2.714	92.815						
13	.395	2.633	95.447						
14	.384	2.557	98.005						
15	.299	1.995	100.000						

The findings show that the 15 assertions that were taken into consideration for the study may be reduced to just six components, with component numbers having Eigen values greater than 1. The major components, or the six factors, account for 65.557 percent of the variance in the statements that are included. If the explained variance is adequate, additional analysis will be performed using the extracted components.

Table 4.1.4 shows the rotated component matrix

Rotated Component Matrix ^a						
Indicator	Component					
	Service quality	Customer trust	Product quality	Return convenience	Reliability	Overall satisfaction
When the item I requested is out of stock, the suggested item from the business is acceptable.	.732					
Rarely are things delivered in poor condition.	.632					
My order was delivered with no harm to the goods.	.548					
I will not be charged a shipping cost for returns.	.525					
The business provides acceptable remedies if the delivered product does not meet the requirements	.521					
Item protection is provided during shipping.		.847				
I make maximum effort to use this shopping site.		.661				
The products that were delivered met requirements.			.823			
If the order conditions are not met by the delivered product. The steps are simple.			.768			
The weather has no bearing on when delivered.				.743		
Delivery occurs on the day that was agreed.				.558		
A payment option is provided in the return process.				.520		
Order processing and delivery times are consistent.					.794	
This website is the first place I look when I need.					.694	
I respond that this purchasing site is good.						.860
Eigen value	3.101	1.710	1.488	1.355	1.109	1.069
Variance (%)	20.675	11.403	9.922	9.035	7.396	7.127
Cumulative Variance (%)	20.675	32.077	41.999	51.034	58.430	65.557

The above table shows the rescaled factor loadings of the Rotated Component Matrix. The rescaled factor loadings display the first factor is “**Service quality**”, the second factor is “**Customer trust**”, third factor is “**Product quality**”, fourth factor is “**Return convenience**”,

fifth factor is “**Reliability**” and sixth factor is “**Overall satisfaction**”. The six factors have a loading value greater than 0.5 which proves that all the factors are highly consistent internally.

4.2 CHI-SQUARE

Table 4.2.1

CHI-SQUARE test is executed to find the significant difference between consistency in Order processing & delivery times and Customer satisfaction & sticking in the same e-commerce site for all future orders.

H₀: There is no significant relationship between the variables consistency in Order processing & delivery times and Customer satisfaction & sticking in the same e-commerce site for all future orders.

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	28.032 ^a	16	.031
Likelihood Ratio	25.794	16	.057
Linear-by-Linear Association	8.372	1	.004
N of Valid Cases	102		
a. Expected count is less than 5 in 18 cells (72.0%). There must be at least a 0.03 anticipated count.			

The aforementioned table shows that the significant P value is found to be $0.031 < 0.05$, as a result, the null hypothesis might be said to be rejected. Therefore, it is interpreted that, there is likeliness between consistency in Order processing & delivery times and Customer satisfaction & sticking in the same e-commerce site for all future orders.

Table 4.2.2

CHI-SQUARE test is executed to find the significant difference between safe delivery of my order without harm and customer satisfaction & staying in the e-commerce site for all orders.

H₀: There is no significant relationship between the variables safe delivery of my order without harm and customer satisfaction & staying in the e-commerce site for all orders.

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	32.247 ^a	16	.009
Likelihood Ratio	31.614	16	.011
Linear-by-Linear Association	4.807	1	.028
N of Valid Cases	102		
a. 17 cells (68.0%) have an expected count that is fewer than 5. There must be at least a 0.09 anticipated count.			

The aforementioned table shows that the significant P value is found to be $0.009 < 0.05$, as a result, the null hypothesis might be said to be rejected. Therefore, it is interpreted that, there is likeliness between safe delivery of my order without harm and customer satisfaction & staying in the e-commerce site for all orders.

Table 4.2.3

CHI-SQUARE test is executed to find the significant difference between order accuracy (model, color, fit) and customer satisfaction & staying in the e-commerce site for all orders.

H₀: There is no significant relationship between the variables order accuracy (model, color, fit) and customer satisfaction & staying in the e-commerce site for all orders.

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	27.726 ^a	16	.034
Likelihood Ratio	21.565	16	.158
Linear-by-Linear Association	5.025	1	.025
N of Valid Cases	102		
a. Expected count is less than 5 in 18 cells (72.0%). There must be at least a 0.15 anticipated count.			

The aforementioned table shows that the significant P value is found to be $0.034 < 0.05$, as a result, the null hypothesis might be said to be rejected. Therefore, it is interpreted that, there

is likeliness between order accuracy (model, color, fit) and customer satisfaction & staying in the e-commerce site for all orders.

Table 4.2.4

CHI-SQUARE test is executed to find the significant difference between order discrepancy handling and customer satisfaction & staying in the e-commerce site for all orders.

H₀: There is no significant relationship between the variables order discrepancy handling and customer satisfaction & staying in the e-commerce site for all orders.

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	36.229 ^a	16	.003
Likelihood Ratio	38.162	16	.001
Linear-by-Linear Association	1.089	1	.297
N of Valid Cases	102		
a. 17 cells (68.0%) have an expected count that is fewer than 5. There must be at least a 0.18 anticipated count.			

The aforementioned table shows that the significant P value is found to be $0.003 < 0.05$, as a result, the null hypothesis might be said to be rejected. Therefore, it is interpreted that, there is likeliness between order discrepancy handling and customer satisfaction & staying in the e-commerce site for all orders.

4.3 CORRELATION

The data shows that there are no challenges encountered Order processing & delivery times and Customer satisfaction & sticking in the same e-commerce site for all future orders. The two variables have a positive correlation since there is a statistically significant linear relationship between them ($r = 0.288$, $p = 0.003$). As a result, it was determined that customers were happy with logistics service quality.

Table 4.3 Shows the correlation

		Order processing & delivery times	Customer satisfaction & sticking in the same e-commerce site for all future orders.
Order processing & delivery times	Pearson Correlation	1	.288**
	Sig. (2-tailed)		.003
	N	102	102
Customer satisfaction & sticking in the same e-commerce site for all future orders.	Pearson Correlation	.288**	1
	Sig. (2-tailed)	.003	
	N	102	102
**. The significance level for correlation is 0.01 (2-tailed).			

4.4 WEIGHTED AVERAGE

Table 4.4 Show the weighted Average

	Timely Delivery	Order Accuracy	Safe Handling	Easy Returns	TOTAL
Strongly Agree	85	80	85	85	335
Agree	200	168	152	164	684
Neutral	84	87	90	78	339
Disagree	22	24	28	24	98
Strongly Disagree	1	5	3	6	15
TOTAL	392	364	358	357	1471

According to weighted average analysis conducted most of the customers opined that timely delivery is their 1st preference for the logistics service quality and order accuracy was

ranked 2nd in the factor contributing to logistics service quality and safe handling was ranked 3rd factor in logistics service quality finally easy returns was 4th rank factor in logistics service quality.

FINDINGS

- Factor analysis is identified six underlying factors contributing to customer satisfaction: Service quality, Customer trust, Product quality, Return convenience, Reliability and Overall satisfaction.
- Chi-square 1 analysis demonstrated a significant relationship between the variables consistency in order processing & delivery times and customer satisfaction & staying in the e-commerce site for all orders $0.031 < 0.05$, indicating that who receive the product at the correct time to express an intention to repurchase from the same e-commerce site.
- Chi-square 2 analysis demonstrated a significant relationship between the variables between safe delivery of my order without harm and customer satisfaction & staying in the e-commerce site for all orders $0.009 < 0.05$, indicating that who got the product without any damages to express an intention to repurchase from the same e-commerce site.
- Chi-square 3 analysis demonstrated a significant relationship between the variables between order accuracy (model, color, fit) and customer satisfaction & staying in the e-commerce site for all orders $0.034 < 0.05$, indicating that who got the same product which they ordered to express an intention to repurchase from the same e-commerce site.
- Chi-square 4 analysis demonstrated a significant relationship between the variables between order discrepancy handling and customer satisfaction & staying in the e-commerce site for all orders $0.003 < 0.05$, indicating that the return process its easy if they didn't like the product to express an intention to repurchase from the same e-commerce site.
- Correlation analysis revealed a strong positive correlation between timely delivery and customer satisfaction ($r = 0.288$, $p = 0.003$) indicating a preference for e-commerce customer satisfaction.
- Weighted average calculations indicated to satisfied the customers that the timely delivery than the order accuracy, safe handling and easy returns

CONCLUSION

This study provides empirical evidence of the positive impact of logistics service quality in e-commerce sector. The strong positive correlation to suggest that timely delivery can contribute to higher levels of customer satisfaction. The findings also emphasize the importance of timely delivery, order accuracy, safe handling, easy returns as critical dimensions of logistics service quality that significantly influence customer satisfaction. Furthermore, the relationship between the variables consistency in order processing & Timely delivery, Safe delivery of my order without harm, Order accuracy (model, color, fit), Order discrepancy handling and Repurchase from the same e-commerce site intention underscores the potential of logistics service quality improvements to foster customer loyalty and repeat business. These findings have implications for e-commerce businesses aiming to enhance customer satisfaction and loyalty by prioritizing logistics service quality. By understanding the dimension of logistics service quality that matter most to customers, e-commerce platforms can strategically invest in improving their logistics processes and delivery capabilities. Overall, this research contributes to the understanding of customer satisfaction in the e-commerce context and provides valuable insights for managers and practitioners seeking to optimize logistics service quality to drive customer satisfaction and business success.

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