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RESEARCH ARTICLE

ADOPTION AND GENDER DYNAMICS IN THE USAGE OF SELF-SERVICE TECHNOLOGIES IN RETAIL: A STUDY FROM THRISSUR DISTRICT

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Abstract

Technological advancements have brought significant transformations across various sectors, particularly in the retail industry. Retailers are increasingly adopting innovative methods to deliver goods and services, while customers have become more accustomed to online purchasing, digital communication, and self-service options enabled by emerging technologies. Self-service technologies (SSTs) refer to service delivery systems that allow customers to perform transactions independently without direct interaction with service providers. These technologies offer several benefits, including cost efficiency, competitive advantage, convenience, accessibility, and improved service experience for both customers and retailers. In Kerala, SSTs have been widely implemented in retail outlets, hypermarkets, supermarkets, and shopping malls to enhance customer convenience and service efficiency. The present study aims to examine the usage pattern of self-service technologies among customers and to identify whether gender differences exist in the awareness and usage of these technologies. The study is based on primary data collected from 160 customers who use SSTs during their shopping activities in Thrissur district. The findings reveal that there is no significant difference between genders regarding the usage of self-service technologies. Among the various SSTs, online ordering platforms and self-service kiosks are identified as the most frequently used technologies. The study highlights the increasing importance of SSTs in modern retail environments and emphasizes the need for businesses to focus on improving customer experiences and ensuring accessibility across different demographic groups.

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Introduction:-

Technological advancement and the rapid diffusion of information and communication technologies (ICT) have significantly transformed the way businesses operate and how customers interact with products and services. In the retail sector, digital technologies have reshaped service delivery processes by enabling faster, more convenient, and customer-oriented shopping experiences. One of the major outcomes of this transformation is the emergence of Self-Service Technologies (SSTs), which allow customers to access services and complete transactions independently

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without direct assistance from employees (Meuter et al., 2000). SSTs have become an important component of modern retail environments by improving operational efficiency, reducing service costs, and enhancing customer convenience.

The adoption of SSTs has increased globally due to the expansion of e-commerce, mobile technologies, artificial intelligence, and digital payment systems. According to Meuter et al. (2000), technology-based service encounters provide customers with greater control and flexibility during service interactions. The Technology Acceptance Model (TAM) proposed by Davis (1989) explains that perceived usefulness and ease of use are significant factors influencing users' acceptance of new technologies. Recent studies also highlight that changing consumer expectations and increased digital engagement have accelerated the adoption of SSTs across retail and service industries (Wang et al., 2022). Technologies such as self-checkout systems, self-ordering kiosks, mobile shopping applications, and online ordering platforms have become increasingly common in retail settings.

The Indian retail sector is experiencing rapid transformation due to digitalization, changing consumer behaviour, and the growth of organized retail. India is among the largest retail markets globally, and technological integration is expected to play a crucial role in shaping future retail growth. Recent industry reports indicate that advancements in technology and artificial intelligence are creating new opportunities for retailers to improve customer engagement and operational efficiency (Future of Retail: Profitable Growth through Technology and AI, 2024). Retailers are increasingly adopting digital platforms, automated services, and self-service solutions to meet the growing demand for convenient and personalized shopping experiences. Studies such as Pillai et al. (2020) emphasize the increasing relevance of technology-driven retail models and automated retail services in improving customer interactions.

In India, SST applications are visible across various retail formats, including supermarkets, hypermarkets, shopping malls, and online retail platforms. Online ordering platforms, mobile shopping applications, self-service kiosks, information kiosks, and self-checkout systems have become important tools for enhancing customer convenience. These technologies not only provide customers with greater independence during shopping but also help retailers improve service efficiency and manage increasing customer expectations.

In the context of Kerala, the adoption of SSTs has gained importance with the expansion of organized retail outlets, digital payment infrastructure, and online shopping behaviour. Retail establishments such as supermarkets, hypermarkets, and shopping malls have increasingly incorporated technology-enabled services to improve customer experience. However, despite the growing presence of SSTs, limited empirical evidence exists regarding how customers in regional retail markets adopt and use these technologies.

Previous studies on SST adoption have mainly focused on developed economies and service sectors such as banking, tourism, healthcare, and hospitality (Liljander et al., 2006; Kokkinou & Cranage, 2013). While existing research has examined factors influencing technology acceptance and customer satisfaction, limited attention has been given to demographic differences, particularly gender-based variations in awareness and usage of SSTs in emerging retail environments. Understanding whether male and female customers differ in their acceptance and usage patterns is important for retailers to design inclusive and customer-friendly technology solutions.

Therefore, the present study attempts to address this research gap by examining the awareness and usage pattern of self-service technologies among customers in Thrissur district, Kerala. The study specifically investigates whether gender differences exist in the awareness and usage of SSTs. By analysing customer experiences in a regional retail context, the study contributes to a better understanding of SST adoption behaviour and provides insights for retailers seeking to enhance technology-enabled shopping experiences for diverse customer groups.

Literature Review:-

Self-Service Technologies (SSTs) have emerged as an important area of research due to their increasing role in transforming customer-service interactions. Meuter et al. (2000) defined SSTs as technological interfaces that enable customers to produce services independently without direct involvement from service employees. The evolution of SSTs from automated vending machines and self-service facilities to advanced digital platforms such as online shopping applications, self-checkout systems, and interactive kiosks reflects the growing importance of technology-mediated service delivery in retail environments.

The adoption of SSTs has been widely examined through technology acceptance theories, particularly the Technology Acceptance Model (TAM) introduced by Davis (1989). According to TAM, perceived usefulness and

perceived ease of use are the primary determinants influencing an individual's acceptance of new technologies. In the context of SSTs, customers are more likely to adopt technology-based services when they perceive them as convenient, efficient, and easy to operate. Therefore, these factors play a significant role in understanding customer awareness and usage behaviour towards SSTs.

Previous studies have highlighted that customer attitudes towards SST adoption are influenced by technological readiness, perceived benefits, and confidence in using digital systems. Liljander et al. (2006) examined the relationship between technology readiness and SST adoption and found that customers with higher levels of technological readiness showed more positive attitudes towards technology-based services. The study indicates that individual differences in technology acceptance can influence the willingness to use SSTs. This suggests that demographic characteristics may also contribute to variations in SST awareness and usage patterns.

Research conducted by Kokkinou and Cranage (2013) demonstrated that SSTs can improve service efficiency by reducing waiting time and enhancing customer convenience. However, the effectiveness of SSTs depends on factors such as system reliability, processing speed, and customer ability to interact with the technology. Similarly, Djelassi et al. (2018) emphasized that customers' evaluation of SST experiences influences satisfaction and overall store perceptions. Their findings indicate that successful SST implementation requires retailers to focus not only on technology availability but also on improving customer experience.

Recent studies have further expanded the understanding of SST usage by considering changing consumer behaviour and external influences. Wang et al. (2022) examined SST usage during the COVID-19 pandemic and observed that increased digital interactions changed customers' perceptions and motivations towards technology-based services. The study highlighted that convenience, reduced social interaction, and changing lifestyle patterns encouraged greater acceptance of SSTs. These findings indicate that SST adoption is influenced by both technological factors and situational factors affecting customer behaviour.

In the Indian retail context, the adoption of technology-driven retail models has increased due to digital transformation, growth of e-commerce, and changing customer expectations. Pillai et al. (2020) highlighted the importance of automated retail technologies and found that factors such as usefulness, ease of use, customization, and interactivity influence customer acceptance of AI-enabled retail environments. However, most existing studies have focused on technology acceptance, service quality, and customer satisfaction, while limited attention has been given to demographic influences on SST adoption.

Although previous research provides significant insights into the factors influencing SST adoption, there remains a gap in understanding whether demographic characteristics, particularly gender, create differences in awareness and usage behaviour. Some studies suggest that technology acceptance may vary among individuals due to differences in familiarity, confidence, and access to digital technologies, while others indicate that technological advancements may reduce such differences. This inconsistency highlights the need for further empirical investigation.

Based on these theoretical perspectives and previous findings, the present study integrates perceived usefulness, ease of use, technology readiness, and demographic influence to examine SST adoption among retail customers. The study specifically focuses on identifying the usage pattern of SSTs and determining whether significant gender differences exist in the awareness and usage of SSTs among customers in Thrissur district, Kerala. Thus, the study contributes to the existing literature by providing insights into SST adoption behaviour in a regional retail context.

Statement of Problem:-

Technological growth and its usage have made a tremendous change in different sectors, especially in retail sector. The advent of SSTs in retail sector has led to proliferation of self-checkout machines (Bulmer et al., 2018; Reynolds-McIlroy and Morrin, 2019) and self-scanning hand-held devices (Marzocchi and Zammit, 2006) and growing use of technology-mediated service environments to improve efficiency and reduce labour costs (Patti et al., 2020). In India, the expansion of organized retail, e-commerce platforms, digital payment systems, and technology-enabled shopping environments has accelerated the adoption of SSTs. Kerala has also witnessed increasing implementation of SSTs in supermarkets, hypermarkets, shopping malls, and online retail platforms. However, limited empirical studies have examined the actual usage patterns of SSTs among customers in regional retail markets. Particularly, there is insufficient understanding of whether demographic factors such as gender influence customers' awareness and usage of SSTs. Gender-based analysis is important because technology adoption

behaviour may vary among male and female customers due to differences in digital experience, perceived confidence, accessibility, and interaction patterns with technology. Therefore, the present study attempts to address this research gap by examining the awareness and usage pattern of Self-Service Technologies among customers in Thrissur district, Kerala. The study also seeks to determine whether significant gender differences exist in the awareness and usage of SSTs. The findings of the study can provide useful insights for retailers in designing customer-friendly and inclusive technology-based service environments.

Objective:-

1. Identify the usage pattern of self-service technologies among customers.
2. Determine if there is any gender difference regarding the awareness and usage of SSTs.

Hypothesis:-

Based on the objective's hypothesis were fixed:-

Awareness Hypotheses:

- H₀: There is no significant difference between males and females regarding their awareness of self-service technologies.
- H₁: There is a significant difference between males and females regarding their awareness of self-service technologies.

Usage Hypotheses:

- H₀: There is no significant difference between males and females in their usage of self-service technologies.
- H₁: There is a significant difference between males and females in their usage of self-service technologies.

Scope of The Study:-

SSTs are used constantly in consumers' daily lives, which reflects how these technologies continue to influence consumption in a variety of settings, especially while shopping in stores. SSTs provide both opportunities and challenges for Customers and retail stores. The proposed study wants to identify the usage pattern of SSTs among customers and to determine gender difference regarding the awareness and usage of SSTs. 160 respondents were collected from Thrissur district from the customer who use these SSTs in their shopping.

Research Methodology:-

The present study adopts a descriptive research design to examine the awareness and usage pattern of Self-Service Technologies (SSTs) among retail customers and to identify whether gender differences exist in the adoption of these technologies. The study was conducted among customers who use SSTs during their shopping activities in Thrissur district, Kerala.

The study is based on primary data collected through a structured questionnaire. The questionnaire was administered using Google Forms to customers who had experience using self-service technologies such as online ordering platforms, mobile shopping applications, self-service kiosks, information kiosks, and self-checkout systems. The measurement items were developed by considering key constructs from previous technology adoption literature, particularly perceived usefulness, ease of use, technology readiness, and customer interaction with SSTs. Respondents' awareness and usage levels were measured using a structured rating scale. A five-point Likert scale ranging from low to high level of agreement/usage was used to capture respondents' perceptions and experiences regarding SST adoption. The convenience sampling method was adopted due to the accessibility of respondents and the exploratory nature of the study.

A total of 196 responses were collected initially. The collected responses were screened carefully to ensure completeness and consistency. Responses with missing information, incomplete answers, or inconsistent entries were excluded from the final dataset. After the screening process, 160 valid responses were selected and used for analysis.

Analysis & Interpretation of Data:-

This section of the paper deals with analysis and interpretation of the collected data. Percentage analysis, Average and Independent T test was used to analyse the data collected.

Table 1 Demographic Profile of Respondents

Demographic Profile		Frequency	Percent
Gender	Female	74	46
	Male	86	54
Age	Below 30	53	33
	30-50	56	35
	50 Above	51	32
Education Level	12	44	27
	Post Graduate	39	24
	SSLC	33	21
	Under Graduate	44	28
Occupation	Business	22	14
	Employee	26	16
	House Wife	23	14
	Not Working	28	17
	Profession	22	14
	Self-Employee	22	14
	Student	17	11
Annual Income (Rs)	10,00,000 Above	56	35
	5,00,000 – 10,00,000	59	37
	Less than 5,00,000	45	28
Regional Status	Rural	59	37
	Semi-Urban	51	32
	Urban	50	31
Marital Status	Married	78	49
	Single	82	51

Source: Primary Data

Table 1 depicts the results of demographics of the respondents. This consist of basic variable of respondents such as gender, age, education, occupation, annual income, regional status, Marital status. The table shows that the data consists of 46 percent of female and 54 percent of male respondents. It is found that majority of the respondents belongs to age group 30 to 50 years (35 percent) which is followed by below 30 age group (33 percent), whereas 32 percent of the respondents belongs to above 50 age group of respondents. In case of education level large number of respondents are under graduates (28 percent). 17 percent of respondents are not working, and 16 percent of respondents constitute employees. The data includes 37 percent of respondents who have annual income between Rs 5,00,000 to 10,00,000 and 35 percent of respondents have above 10,00,000 annual incomes. It is further found that majority of the respondents resides in rural area and 32 percent respondents resides in semi-urban area. And majority of the respondents are single (51 percent) and 49 percent are married.

Table 2 Retail shop preference and Customers frequency of retail shopping

	Average
Super markets	3.11
Hypermarket	2.98
shopping mall	2.97
Online shopping sites	3.05
Shopping Apps	2.89

Source: Primary Data

Table 2 interprets the Retail shop Preference of respondents. Mean Average has been calculated to measure the preference. It is found that majority of respondents prefer Supermarket (3.11) for shopping followed by online shopping (3.05), Hypermarket (2.98), shopping mall (2.97) and finally shopping Apps (2.89) for shopping.

Table 3 Frequency of Retail Shopping

	Frequency	Percent
Daily	26	5.56
weekly	86	18.38
Bi-weekly	90	19.23
Monthly	156	33.33
Rarely	110	23.50

Source: Primary Data

Table 3 depicts the frequency of retail shopping done by respondents. It is found that majority of the respondents do shopping on monthly basis (33.33 percent) while 23.50 percent respondents rarely do shopping. Whereas 19.23 percent go for shopping Bi-weekly, weekly (18.38) and daily (5.56) .

Table 4 SST Awareness and Usage.

SST Awareness	Average
Online Ordering platform	3.11
Mobile Shopping Apps	3.06
Self-service Kiosk	3
Information Kiosks	3.1
Self-Check outs Kiosks	3.09
Usage of SSTs	
Online Ordering platform	3.12
Mobile Shopping Apps	3.03
Self-service Kiosk	3.10
Information Kiosks	2.98
Self-Check outs Kiosks	2.98
SST Usage Duration	
Online Ordering platform	2.41
Mobile Shopping Apps	2.46
Self-service Kiosk	2.39
Information Kiosks	2.36
Self-Check outs Kiosks	2.39
SST Usage Frequency	
Online Ordering platform	3.06
Mobile Shopping Apps	2.93

Self-service Kiosk	2.79
Information Kiosks	2.98
Self-Check outs Kiosks	2.86

Source: Primary Data

The awareness and usage levels of Self-Service Technologies (SSTs) were measured using a structured rating scale. The mean score method was used to identify the relative level of awareness and usage of different SSTs among respondents. Higher mean values indicate a higher level of awareness or greater usage intensity, whereas lower mean values indicate comparatively lower awareness or usage. Table 4 shows the SST Awareness and Usage pattern of respondents. Mean Average is calculated to measure the awareness and usage of respondents towards SSTs. It has been found that most of the respondents are aware about Online Ordering platform (3.11) which is followed by Self-Check outs Kiosks (3.09), Mobile Shopping Apps (3.06), Information Kiosks (3.10) and Self-service Kiosk (3).

Regarding the usage, majority of respondents are using Online Ordering platform (3.12), next most used SST is self-service kiosk with an average of 3.10, and the least used SSTs are information kiosks and self-check outs kiosks with an average of 2.98. In case of duration of usage all the SSTs under study have the same average ranging from 2.36 to 2.41 i.e respondents are using these SSTs for 6 months to 1 year or more. Moreover, the SST usage frequency shows that most frequently used SST is online ordering platforms (3.06) whereas all the other SSTs like Mobile shopping Apps, self-service kiosk, information kiosks, and self-check outs kiosks have an average of 2.279 to 2.98.

An independent sample t-test was employed to examine whether significant differences exist between male and female respondents regarding awareness and usage of SSTs. Before conducting the t-test, the underlying assumptions of the test were considered. First, the observations were treated as independent because responses were collected from individual customers without any overlap between groups. Second, the normality assumption was considered based on the sample size and distribution of responses. Since the study included 160 respondents, the sample size was considered adequate for applying parametric tests based on the Central Limit Theorem. Third, the equality of variance assumption was assessed using the variance comparison/Levene's test. The results indicated that the variances between male and female groups were approximately equal; therefore, the equal variance assumption was satisfied. Based on these assumptions, the independent sample t-test was considered appropriate for analysing gender differences in SST awareness and usage. The results were interpreted using the significance level of 5 percent ($p < 0.05$).

Table 5 Awareness Hypotheses t-test: Two sample Assuming Equal Variance

	Female	male
Mean	3.1	3.037209302
Variance	0.433150685	0.340246238
Observations	74	86
Pooled Variance	0.383170445	
Hypothesized Mean Difference	0	
df	158	
t Stat	0.639741319	
P(T<=t) two-tail	0.523267317	
t Critical two-tail	1.975092073	

Source: Primary Data

Table 5 represents the result of t-test to measure the difference between males and females regarding their awareness of self-service technologies. The t-test shows no significant difference between the mean values for females (3.1) and males (3.037) at the 5% significance level. the t-statistic (0.6397) is less than the critical t-value (1.9751), and the p-value (0.5233) is greater than 0.05. Therefore, we also fail to reject the null hypothesis in the two-tailed test. Hence, there is no significant difference between males and females regarding their awareness of self-service technologies.

Table 6 Usage Hypotheses

	Female	Male
Mean	3.064864865	3.025581395
Variance	0.288337653	0.35745554
Observations	74	86
Pooled Variance	0.325521326	
Hypothesized Mean Difference	0	
df	158	
t Stat	0.434235383	
P(T<=t) two-tail	0.664709927	
t Critical two-tail	1.975092073	

Source: Primary Data

Table 6 elaborates the t-test analysis for measuring if there is any difference between males and females in their usage of self-service technologies. The t-test shows no significant difference between the mean values for females (3.065) and males (3.026). The two-tailed p-value (0.665) is much higher than the significance level of 0.05, and the t-statistic (0.434) is less than the critical value (1.975). Therefore, we fail to reject the null hypothesis, indicating that the observed difference is likely due to random chance.

Conclusion:-

The present study examined the awareness, usage pattern, and gender differences in the adoption of Self-Service Technologies (SSTs) among retail customers in Thrissur district, Kerala. The findings indicate that customers have considerable awareness and usage of SSTs, particularly online ordering platforms and self-service kiosks. The study also reveals that there is no significant difference between male and female customers regarding the awareness and usage of self-service technologies. This suggests that the increasing digitalization of retail services has created a relatively uniform adoption pattern among customers across genders.

The findings highlight the growing importance of SSTs in modern retail environments. Retailers are increasingly relying on technology-enabled service solutions to improve operational efficiency, reduce waiting time, and provide customers with greater convenience and flexibility. However, successful SST implementation requires more than simply introducing technology; retailers need to focus on creating customer-friendly systems that are easy to understand, accessible, and reliable.

From a practical perspective, retailers can enhance SST adoption by improving the usability and design of digital interfaces, providing clear instructions and customer support during initial usage, and ensuring that technology-based services are convenient for customers with different levels of digital familiarity. Training assistance, interactive guidance, and user-friendly interfaces can encourage hesitant customers to adopt SSTs. Retailers can also strengthen digital engagement by integrating personalized recommendations, mobile-based services, digital payment options, and seamless online-to-offline shopping experiences.

The study also suggests that retailers should continuously evaluate customer feedback and usage behaviour to improve SST performance. Since customer experience plays a significant role in technology acceptance, reducing technical difficulties, improving system reliability, and maintaining privacy and security can increase customer trust and satisfaction. These strategies can help retailers build long-term customer relationships and gain competitive advantage in an increasingly digital retail environment.

Despite its contributions, the study has certain limitations. The research was conducted among 160 respondents from Thrissur district using convenience sampling, which may restrict the generalizability of the findings to the wider population. The study focuses mainly on awareness and usage patterns of SSTs and does not examine other behavioural factors such as perceived risk, trust, satisfaction, technology anxiety, or intention to continue using SSTs.

Future research can overcome these limitations by expanding the geographical scope to include respondents from different regions and adopting probability-based sampling methods for better representation. Further studies may also incorporate additional behavioural and psychological variables to develop a more comprehensive understanding of SST adoption. Comparative studies across different retail formats and demographic groups can provide deeper insights into customer acceptance and help retailers design more effective technology-driven service strategies.

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