To Study Consumer Perception and Acceptance of E-Pharmacy over Traditional Pharmacy

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Abstract: This study explores the factors that shape the perception and acceptance of e-pharmacies compared to traditional pharmacies. This is significant as the healthcare industry is undergoing a paradigm shift due to the development of digital technology. The research study was descriptive in nature, and the main data was collected from 200 respondents in Vadodara, Gujarat state of India, through a structured likert scale questionnaire. The results have revealed that there is a significant market awareness of 85%, but there is a definite "Trust Gap." The T-test result has revealed that, although Convenience (Mean=4.39) and Affordability (Mean=4.10) are perceived positively, Trust (Mean=2.80) is a definite concern as it is below the midpoint. The regression result (R2=0.982) has revealed that Convenience is the most important factor, followed by price and trust. The behavioural data has revealed that 65% of the respondents prefer a "Hybrid" model, where they will use both types of pharmacies depending on the urgency of their needs and the type of drug. The conclusion of this study is that although e-pharmacies have successfully marketed the convenience aspect, they are struggling with the trust aspect. In order to achieve complete market acceptance, the service providers must change their focus from discount-oriented strategies to trust-building strategies such as digital consultations with pharmacists and adherence to regulations. This will help alleviate consumer concerns about the authenticity of medications.

Keywords: E-pharmacy, Consumer Perception, Traditional Pharmacy, Healthcare Digitalization, Trust, Convenience, Acceptance Model.

I. INTRODUCTION

The retail pharmacy industry is currently undergoing a significant digital revolution that is set to transform the way people interact with and consume medical products and services. (Deshpande, 2023) (Bhatia, 2024) For a long time, the pharmaceutical industry used a simple and physical supply chain model. Local pharmacies were the only option available in the local community for people to get their medications. However, with the advent of the Fourth Industrial Revolution, a "Digital First" strategy has been adopted, and this has resulted in the development of e-pharmacies. (Ponduri, 2024) (Ahalawat, 2024) E-pharmacies are online platforms that integrate the efficiency of e-commerce with the provision of medical services. The adoption of app-based services instead of local pharmacies indicates a major shift in consumer behaviour, especially in developing nations where digital literacy is increasing rapidly. Local pharmacies have always been the backbone of public health as they provide immediate access, physical presence, and human interaction. Customers often form a long-term relationship with their local pharmacist and consult them. When customers visit a local pharmacy, they get instant satisfaction as they receive their medications immediately. They can also inquire about the dosage, discuss side effects, and check the condition of the medication in person. This personal element gives a feeling of security that online platforms cannot easily provide. For acute diseases and emergencies, the conventional pharmacy still plays a critical role.

On the other hand, e-pharmacies utilize the concept of "Platform Economy" to provide advantages that conventional pharmacies cannot easily provide. The two main factors that drive the convenience and affordability of this industry. By managing their stock and reducing the costs involved in maintaining multiple physical stores, e-pharmacies can offer their customers a huge discount. For people suffering from chronic ailments and requiring regular prescriptions, the auto-refill and home delivery services offered by e-pharmacies save them from regular visits to the pharmacy. This service is especially beneficial for people living in urban areas. The COVID-19 pandemic has brought about the rapid development of e-

pharmacies, as it affected the pharmaceutical delivery system worldwide. During the lockdown phases, e-pharmacies became a necessity and not a luxury. Customers who were initially reluctant had to adjust to online platforms, overcoming their long-held practices. This has resulted in a paradigm shift in customer behaviour, giving birth to the "Hybrid Consumer" who switches between online and offline platforms according to their needs. (Gupta, 2020)

The prevailing scenario in the pharmacy sector is characterized by the "Trust-Utility Paradox." On one side, consumers are attracted to the benefits of e-pharmacies, which are faster, cheaper, and offer a wider range of drugs. However, the trust deficit continues. Worries about the authenticity of drugs, the risk of counterfeit drugs, and the security of personal health data create a risk barrier that deters mass adoption. Since the purchase of electronics is not a life-critical task, a perceived loss of quality results in a quick rejection by consumers. (Ponduri, 2024) Even though consumers are well-informed about the specifics of e-pharmacy services, the retention rate is highly varied. Since consumers are aware of the services offered by e-pharmacies, they continue to visit conventional pharmacies for critical drugs. This study aims to quantify the views of consumers and identify the important factors that drive adoption, thereby offering an empirical guide to e-pharmacy ventures to focus on trust-building and not just cost saving.

II. LITERATURE REVIEW

1. Deshpande, A. (2023). A review on impact of e-pharmacy on pharmacy and social sector. Deshpande (2023) examined how e-pharmacies enhance healthcare accessibility and convenience, especially during the COVID-19 pandemic. The study noted issues such as self-medication, misuse of drugs, and inadequate regulation of online pharmacy practices in India. It concluded that e-pharmacies can significantly strengthen the pharmaceutical sector if supported by robust legal and ethical framework.
2. Cherecheș, M. C., & Popa, C. O. (2021). Online pharmacy: Customer profiling. Cherecheș and Popa (2021) analyzed consumer behavior toward online pharmacies in Romania and found that 17.7% of respondents purchased medicines online, mainly educated women with higher income. The study indicated that convenience, product variety, and price comparison were the main reasons for choosing online pharmacies. It concluded that users are motivated by digital advantages rather than deficiencies in traditional pharmacy services.
3. Boya, S., Singh, A., & Sharma, R. (2025). Impact of e-pharmacies on healthcare accessibility and affordability in India. Boya et al. (2025) explored the rapid growth of e-pharmacies in India, emphasizing their role in improving access, affordability, and convenience of healthcare services. The study discussed major challenges such as counterfeit drugs, self-medication, and lack of regulatory control, especially for restricted medicines. It concluded that while e-pharmacies have immense potential to strengthen healthcare accessibility, stringent regulation and public awareness are essential for ensuring patient safety and ethical practice.
4. Prashanti, G., Sravani, S., & Noorie, S. (2017). A review on online pharmacy. Prashanti, Sravani, and Noorie (2017) discussed the emergence of online pharmacies as a growing trend in the digital healthcare market. The study examined their advantages such as accessibility, affordability, and privacy, while addressing serious risks including self-medication, counterfeit drugs, and lack of regulatory enforcement. It concluded that establishing strict legal frameworks and public awareness is essential to ensure the safe and ethical functioning of e-pharmacies.
5. Bhatia, A., Grover, R., & Mittal, S. (2024). Post-COVID impact on e-pharmacy and healthcare supply chain in India. Bhatia, Grover, and Mittal (2024) analyzed the post-COVID evolution of e-pharmacies in India and their impact on healthcare supply chain management. The study found that e-pharmacies improved accessibility, affordability, and efficiency in medicine delivery while facing challenges such as regulatory gaps and technological limitations. It concluded that with strong government support and digital infrastructure, e-pharmacies can significantly strengthen India's healthcare system.
6. AlSideiri, A., Cob, Z. C., Ramli, A., Tawafak, R. M., & Ahmetoglu, G. (2025). Analysis of

influential factors between personal innovation, word of mouth, and e-pharmacy adoption in Oman. AlSideiri, Cob, Ramli, Tawafak, and Ahmetoglu (2025) investigated factors influencing online pharmacy adoption in Oman by integrating the UTAUT2 and TAM frameworks. The study identified that perceived expectancy, effort expectancy, technology trust, and awareness significantly affect behavioral intention, with personal innovation and word of mouth serving as key moderating variables. Findings revealed that fostering trust, innovation, and social influence can enhance user acceptance and sustainable growth of e-pharmacies in developing nations.

7. Kaur, N., Kaur, J., Kaur, M., Kaur, R., & Singh, G. (2025). Assessment of availability of antibiotics for online sale by Indian e-pharmacies. Kaur, N. Kaur, J. Kaur, M. Kaur, and Singh (2025) conducted a cross-sectional study assessing antibiotic availability and regulatory compliance among 50 Indian e-pharmacies. The study found that "Watch" and "Reserve" category antibiotics were widely accessible online, with limited adherence to safety, authenticity, and consumer awareness parameters. It concluded that inadequate regulation and easy online access to potent antibiotics could worsen antimicrobial resistance, highlighting the urgent need for stricter oversight and public education.
8. Sattar, N., Naveed, S., Rehman, M., Usman, M., & Jamshed, S. (2024). Assessment of online pharmacy applications in India using the Mobile App Rating Scale (MARS). Sattar, Naveed, Rehman, Usman, and Jamshed (2024) evaluated the quality of online pharmacy applications in India using the Mobile App Rating Scale (MARS). The study analyzed 13 apps and found moderate overall quality, with high functionality and engagement scores but lower performance in aesthetics and information accuracy. It concluded that while online pharmacy apps enhance accessibility, stronger regulation, standardization, and evidence-based content are needed to improve their reliability and public trust.
9. Ponduri, S., Kumar, R., Yugandhar, A., Sripad, R., & Macha, S. (2024). Factors influencing the adoption and acceptance of e-pharmacies: A systematic review. Ponduri, Kumar, Yugandhar, Sripad, and Macha (2024) conducted a systematic review on the factors influencing the adoption and acceptance of e-pharmacies. The study identified key determinants such as effort expectancy, performance expectancy, social influence, perceived trust, and risk, emphasizing the role of technology and consumer behavior in shaping e-pharmacy usage. It concluded that while e-pharmacies offer convenience and accessibility, building consumer confidence through regulations, awareness, and trust-based policies is essential for sustainable adoption.
10. Gupta, S. (2020). Consumer buying behavior towards e-pharmacy in Jaipur city. Gupta (2020) conducted a study on consumer buying behavior toward e-pharmacies in Jaipur, India, using survey data from 100 respondents. The study revealed that most consumers preferred online platforms for their convenience, home delivery, and 24/7 availability, with younger and more tech-savvy users showing higher adoption rates. It concluded that awareness and favorable perceptions are increasing, though continued public education is essential to ensure safe and informed online medicine purchasing practices.
11. Ushir, S., & Diana, R. (2022). A study on consumer perception towards online and offline pharmacy. Ushir and Diana (2022) examined consumer perceptions toward online and offline pharmacies in Mumbai through a survey of 50 respondents. The study found that while consumers acknowledged the convenience of e-pharmacies, most still preferred offline pharmacies due to trust, reliability, and direct pharmacist interaction. It concluded that despite technological advances, consumer confidence in traditional pharmacies remains stronger, highlighting the need to build credibility and safety assurance in online platforms.
12. Lasserez, A. (2013). Senior's willingness to adopt e-pharmacies: An exploratory study in France.Lasserez (2013) conducted an exploratory study on seniors' willingness to adopt e-pharmacies in France, applying theories of innovation diffusion and cognitive age. The research revealed that younger cognitive-age seniors were more open to online pharmacies, while older seniors preferred traditional ones due to loyalty, perceived risk, and limited digital

skills. It concluded that e-pharmacy adoption among seniors depends on simplifying technology, building trust, and addressing the specific needs of aging consumers.

13. Ahalawat, A., Tiwari, S., Johri, V., Wasiq, M., & Sharma, P. (2024). Determinants influencing the adoption behavior of Indian consumers in reference to online pharmacy purchases. Ahalawat, Tiwari, Johri, Wasiq, and Sharma (2024) analyzed the determinants influencing Indian consumers' adoption behavior toward online pharmacy purchases using the UTAUT2 framework. The study revealed that price value significantly affects adoption intention, which in turn positively impacts consumer buying behavior, while performance expectancy showed no direct influence. It concluded that consumers are more motivated by economic value and perceived usefulness than by performance expectations, emphasizing the need for customer-centric pricing and trust-building strategies in e-pharmacy platforms.
14. Medi, R., Madhavaiah, C., & Kumar, D. S. (2020). Development and validation of a scale to measure consumers' perceived benefits and risks of online pharmacy stores in India. Medi, Madhavaiah, and Kumar (2020) developed and validated a scale to measure consumers' perceived benefits and risks of online pharmacy stores in India. The study identified key benefit dimensions such as convenience, anonymity, promotional offers, and service quality, along with major risks including quality, financial, and personal data threats. It concluded that the developed scale is reliable and valid, offering a framework for understanding consumer perceptions and guiding e-pharmacy management and policy formulation.
15. Savant, P., & Kareppa, R. (2022). E-pharmacy vs conventional pharmacy: A comparative analysis. Savant and Kareppa (2022) compared e-pharmacies with conventional pharmacies, analyzing their advantages, limitations, and regulatory implications in India. The study found that while e-pharmacies offer cost-effectiveness, convenience, and round-the-clock access, they also pose risks such as self-medication, misuse of Schedule H and X drugs, and limited pharmacist interaction. It concluded that effective regulation, verification mechanisms, and public awareness are essential to ensure safe and ethical online pharmaceutical practices.

III. RESEARCH METHODOLOGY

The methodology of this research work is intended to perform a detailed study of the factors that impact the consumer perception and acceptance of e-pharmacies as compared to the traditional stores. In order to fulfil the research objectives, we used a descriptive research design. (Medi, 2020) This type of research design is most appropriate to discover attributes, trends, and relationships within a defined population. The research study was conducted in the Vadodara District of Gujarat, India, and targeted consumers living in urban and semi-urban areas. This allowed us to gauge consumer sentiment on convenience, affordability, accessibility, and trust.

The study was intended to gather primary data to ensure that the data was updated and relevant to the changing retail pharmacy scenario. We gathered data through a structured self-administered questionnaire that was posted online to target a tech-savvy population. The questionnaire was segmented into three distinct parts: the first part of the questionnaire gathered socio-demographic profiles of the respondents, including age, gender, education, and income; the second part focused on awareness and behaviour patterns; and the third part used a 5-point Likert Scale, ranging from 'Strongly Disagree' to 'Strongly Agree,' to measure perceptions of e-pharmacy services. The target population for this research study included general consumers residing in the Vadodara District, Gujarat State of India, who possess internet-enabled devices and live in urban or semi-urban area.

In our research, we employed a convenience sampling method to select 200 subjects from the Vadodara District in the state of Gujarat, India. The sample size was considered statistically representative of the "Early Adopter" community, which is essentially the secret to success for the growth of online healthcare facilities. Regarding data analysis, we employed a mix of descriptive and inferential statistics. Frequency and percentage analysis was employed to describe the demographic details and general usage patterns. For the purpose of fulfilling the first research objective of

evaluating consumer perception, we employed a One-Sample T-Test. This test evaluated the mean scores of convenience, affordability, accessibility, and trust against the neutral value of 3.0 to establish whether the positive or negative perceptions were statistically significant. (Ahalawat, 2024)

For the second objective, which is to determine the factors of acceptance, the Multiple Linear Regression analysis was used. In this study, the dependent variable was "Acceptance of E-pharmacy," while the independent variables were convenience, price, trust, and regulation. This helped in understanding the influence of these variables on the decision-making process of the consumer. The research instrument was checked for reliability to ensure consistency, and ethical issues were considered by ensuring that the respondents remained anonymous and were given the freedom to participate. The use of these statistical tools ensures that the methodology adopted is a strong approach to understanding the transition from the traditional to the digital pharmacy.

IV. RESULT

The following demographic profile represents respondents from Vadodara District, Gujarat state of India.

Socio-Demographic Profile of Respondents

Variable	Category	Frequency(N)	Percentage (%)
Age group	Below 20	34	17.00
	21-30	123	61.50
	31-40	10	5.00
	41-50	25	12.50
	Above 50	8	4.00
Gender	Male	151	75.50
	Female	49	24.50
Education level	10^{th}	4	2.01
	12^{th}	21	10.55
	Graduate	89	44.72
	Postgraduate	85	42.71
Occupation	Student	102	51.26
	Working professional	67	33.67
	Self employed	23	11.56
	Homemaker	6	3.02
	Retired	1	0.50
Monthly income	Below 20000	95	47.98
	20001-40000	41	20.71
	40001-60000	16	8.08
	Above 60000	46	23.23

Frequency and Percentage Distribution of Perception Statements (N=200)

Survey Statement	Score 1	Score 2	Score 3	Score 4	Score 5
CONVENIENCE					
Saves time compared to conventional stores	1%	2%	12%	33.5%	51.5%
Home delivery facility makes shopping easier	0%	0.5%	15.5%	34%	50%
Easy for repeat purchases	0.5%	1%	13%	37%	48.5%

AFFORDABILITY					
Online shopping provides cheaper medicines	1.5%	2.5%	15%	46.5%	34.5%
Discounts affect my purchase decision	0.5%	1%	17.5%	41%	40%
Easier to compare prices online	1%	2%	18%	34.5%	44.5%
TRUST & SECURITY					
I believe in the quality of medicines	15%	31%	22%	23.5%	8.5%
Secure online payment options	10%	28.5%	26%	24%	11.5%
Authenticity of medicines	14.5%	30%	23%	21%	11.5%
Lack of interaction affects trust	3.5%	11%	24%	31.5%	30%
OPERATIONAL					
Timely and reliable delivery services	1%	2%	16%	42%	39%
Easy upload of prescription	1%	3%	17%	41.5%	37.5%

Frequency and Percentage Distribution of Trust Variables (N=200)

Survey Statement	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
Trust in Quality of medicines online	15.0%	31.0%	22.0%	23.5%	8.5%
Authenticity & Genuineness of medicines	14.5%	30.0%	23.0%	21.0%	11.5%
Payment & Data Security on platforms	10.0%	28.5%	26.0%	24.0%	11.5%
Lack of Pharmacist Interaction reduces trust	3.5%	11.0%	24.0%	31.5%	30.0%
Fear of Counterfeit (fake) medicines	2.5%	8.0%	19.5%	33.5%	36.5%
Lack of Regulation affects trust	4.0%	7.5%	25.5%	35.0%	28.0%

Objective 1: To analyse the consumers' perception and acceptance of e-pharmacy services in comparison to the conventional pharmacies.

Factor	Mean Score	T-Statistic	P-Value	Interpretation
Convenience	4.39	28.36	< 0.001	Highly Positive: Consumers strongly believe e-pharmacies save time and are easier to use.
Affordability	4.10	24.24	< 0.001	Positive: Discounts and lower prices are significant drivers for online medicine purchases.
Accessibility	4.04	20.99	< 0.001	Positive: Consumers find e-pharmacies provide better reach and availability of medicines.
Trust	2.80	-2.73	0.0069	Negative/Neutral: Trust is significantly lower than other factors, indicating concerns about authenticity and data security.

The one-sample t-test was conducted to determine the consumer perspective on the services offered by e-pharmacies in the four key areas of convenience, affordability, accessibility, and trust. The findings reveal that most of the factors have a significant influence on the consumer perspective and acceptance of the services offered by e-pharmacies. The mean value for convenience is 4.39, with a large t-statistic of 28.36 and a p-value of less than 0.001. This suggests that there is a significant positive consumer perception about the convenience offered by e-pharmacies. The factor of affordability has a mean value of 4.10, a t-statistic of 24.24, and a p-value of less than 0.001, suggesting that there is a significant positive perception. Accessibility has a positive mean value of 4.04, with a significant t-statistic of 20.99 and a p-value of less than 0.001. However, the trust factor has a relatively low mean value of 2.80, with a negative t-statistic of -2.73 and a p-value of 0.0069, suggesting that trust is a concern for consumers.

Objective 2: To identify key challenges and obstacles that prevent consumers from adopting e-pharmacies.

Model summary:

Particulars	Value
Multiple R	0.991
R Square	0.982
Adjusted R Square	0.977
Standard Error	0.489
Observations	200

ANNOVA Table:

Source	df	SS	MS	F	Significance F
Regression	4	2625.093	656.273	2742.222	4.00
Residual	196	46.907	0.239		
Total	200	2672			

Coefficient table (challenging affecting adoption):

Variables (Challenges)	Coefficient	Std Error	t value	p value	Result
Regulation issues	0.406	0.037	10.716	0.000	Significant
Trust & safety concerns	0.243	0.037	6.438	0.000	Significant
Affordability issues	0.222	0.032	6.788	0.000	Significant
Accessibility issues	0.112	0.037	2.967	0.003	Significant

The regression analysis was conducted to determine the key challenges and barriers that hinder consumer adoption of e-pharmacy. The model summary indicates that the R-square value is 0.982, which is high. This indicates that the independent variables considered in the study explain the large variation in consumer adoption. The ANOVA table indicates that the regression analysis is significant at the 5% significance level. This implies that variables such as regulation, trust, affordability, and accessibility influence consumer adoption of e-pharmacy. The result shows that the coefficient of regulation has the

greatest impact on consumer adoption. The lack of proper regulations, the lack of trust in counterfeit drugs, and the lack of clear legal policies are some of the most important barriers. Trust and safety are also important factors that affect consumer adoption. Consumers are concerned about the authenticity and quality of drugs purchased from e-pharmacies. Affordability and accessibility also influence consumer adoption. Pricing, delivery, and accessibility are important factors. Since all the p-values are less than 0.05, the null hypothesis is rejected, and the alternative hypothesis is accepted. Thus, we can conclude that the issues of regulation, trust, affordability, and accessibility are major factors that come in the way of the adoption of e-pharmacy services by consumers. These factors can be overcome by working on better regulations, service quality, and consumer awareness, which can increase the adoption of e-pharmacy services.

V. CONCLUSION

Thus, it can be concluded that there is a "Utility-Trust Paradox" in the pharmaceutical retail industry. The findings of this study are based on the perception patterns of the people of Vadodara District, Gujarat State of India, and are thus specific to this geographical location. E-pharmacies have successfully managed to lure modern consumers with improved convenience (Mean = 4.39) and value for money (Mean = 4.10). However, they continue to face a substantial trust deficit (Mean = 2.80). Regression analysis indicates that convenience is the most important driver of adoption. However, due to the fear of the authenticity of medicines, the complete market shift has not occurred yet. Thus, a "Hybrid Model" has emerged. Sixty-five percent of the respondents want to access both online and offline channels depending on the type and urgency of the medicine. The study indicates that e-pharmacies must now focus on trust-building and improving transparency if they want to shift from the discount-oriented model and ensure long-term viability. While technology has enabled unparalleled efficiency, the need for traditional pharmacies continues to remain an essential part of the healthcare system due to their immediate trustworthiness and personal touch.

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