Digitalisation impact on Retail Sector in Comparison with Pre and Post Pandemic Periods - Consumers Perspective

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Abstract

The rapid expansion of digital technologies has significantly influenced the retail sector and transformed the way consumers search, evaluate, purchase, and pay for products. The present study examines the impact of digitalization on consumers' retail behaviour by comparing the pre pandemic and post pandemic periods. The study adopted a descriptive and analytical research design and collected primary data from 500 consumers across ten selected districts of Madhya Pradesh through a structured questionnaire. Consumer responses were measured using a five-point Likert scale across 15 statements covering online shopping, digital payments, mobile applications, online information, price comparison, home delivery, digital promotions, convenience, and satisfaction. Descriptive statistics and a paired samples t test were employed for data analysis. The findings reveal a clear shift towards greater adoption and acceptance of digital retail practices in the post pandemic period. The overall mean score declined from 45.61 to 33.51, while the paired samples t test showed a statistically significant difference (t = 33.910, p = 0.000). The study concludes that digitalization has substantially influenced consumers' retail behaviour, preferences, perceptions, and shopping experience.

Keywords; Digitalization, Retail Sector, Consumer Behaviour, Digital Payments, Post Pandemic Period

INTRODUCTION

The greatest financial crisis in almost a century was brought on by the Covid-19 epidemic, which affected the world economy and sparked an unprecedented crisis. Due to the current state of our society, which is exceedingly interconnected, the pandemic immediately affected global supply chains and demand, leading to a cross-border economic meltdown. In addition to its immediate impact on supply chains, the pandemic also had a detrimental effect on production, and it most crucially unsettled the financial markets of the world, exacerbating the crises [1]. A substantial shift toward online purchasing has resulted from the Covid-19 pandemic's profound influence on global consumer behavior. Many aspects of people's lives, including work, education, and socializing, have been significantly disrupted by the Covid-19 pandemic. Because of social distance limits, lockdown measures, and worries about in-person purchases, consumers started investigating the convenience and security of e-commerce platforms [2].

People are increasingly turning to online browsing to satisfy their purchasing requirements during the pandemic. Online buying has become more popular as a result of physical company closures and concerns about virus transmission. The e-commerce platform's contactless delivery options, increased product selection, and convenience have resonated with consumers, leading to a substantial increase in online transactions [3]. At the outset, online transactions were predominantly engaged in for necessities, including foodstuffs. Conversely, individuals expanded their online purchases to encompass non-essential items, including domestic appliances, apparel, and electronics, as the pandemic advanced.

Because the younger generation is seen as digital natives, tech-savvy adults, and health-conscious consumers who are adjusting to internet purchasing, the epidemic has accelerated retailers' digital shift [4]. Conventional brick and mortar companies quickly adapted their business plans to incorporate an online presence. Many companies created their own e-commerce websites or joined pre-existing online marketplaces in an effort to attract a wider audience of customers. For retailers to prosper and compete in the dynamic retail market, this shift to e-commerce has become essential. The significance of an omnichannel retailing strategy to deliver an organized and seamless shopping experience across various channels, including "brick-and-mortar stores, online platforms, mobile applications, social media, and any other touchpoints where customers interact with a brand", has been emphasized by the accelerated digital transformation in the retail sector. Creating a seamless experience that enables customers to switch across channels with ease while preserving uniformity in branding, product offers, pricing, promotions, and customer support is the core concept behind the omnichannel approach [5].

Overview of the Indian retail industry

A dynamic and fast-paced industry, the Indian retail sector is characterised by robust "consumer demand and the emergence of new competitors". India is currently the world's third-largest retail market, accounting for about 10% of the country's GDP (Gross Domestic Product) and almost 8% of jobs. "It ranks 63 in the World Bank's Doing Business 2023 report". India continues to draw international retail behemoths looking to join high-growth countries because of its sizable middle class and mostly unrealised potential [6].

Spending habits are changing as a result of rising purchasing power, particularly among urban consumers. Branded products in a variety of sectors, including clothing, jewellery, watches, cosmetics, footwear, food, and drinks, are becoming more and more commonplace in daily life. In 2024, the retail sector in India was valued at Rs. 81,57,859 crore (US$ 952 billion). It is expected to reach more than Rs. 1,37,10,400 crore (US$ 1.6 trillion) by 2030, with organized retail making up more than 35% of the market.

The growing retail infrastructure supports the sector's expansion even further. Anarock estimates that by 2026, just the seven largest Indian cities would have 16.6 million square feet more retail mall space. According to a Deloitte–Retailers Association of India (RAI) estimate, urbanisation, rising incomes, and shifting consumer preferences would propel "organised retail's growth from Rs. 11,31,108 crore (US$ 132 billion) in 2024 to Rs. 19,70,870 crore (US$ 230 billion) by 2030"[1].

With the biggest population in “the world, a growing middle-income group of over 158 million homes”, increased household spending, urbanisation, connected rural customers, and a demographic advantage, India is now one of the most alluring places for retail investment. To help foreign companies establish fully owned subsidiaries and capitalize on India's retail potential, the government has also implemented progressive regulations and reforms.

Comparison of Pre- and Post-Pandemic Digitalization

The COVID-19 pandemic brought significant changes to the Indian retail sector, affecting both consumer behaviour and the way retail businesses operated. Before the pandemic, retail activity was largely driven by supermarkets, shopping malls, local markets, and physical stores, where consumers generally preferred in-person shopping. Although e-commerce and business-to-consumer platforms were already developing, traditional brick-and-mortar retail continued to dominate consumer purchasing. Retailers were gradually adopting digital technologies such as Point-of-Sale (PoS) systems, Internet of Things (IoT), and digital marketing to improve customer experience and operational efficiency.

The pandemic accelerated this ongoing digital transformation. Lockdowns, social-distancing requirements, and concerns about physical contact encouraged consumers to shift towards online shopping, digital payments, and digitally assisted purchasing. Even after restrictions were relaxed, many consumers continued to value the convenience and safety of digital retail channels. Consequently, e-commerce experienced considerable growth, while traditional physical retail faced significant challenges. Retailers also began adopting a digital-first approach, integrating online and offline channels to maintain customer engagement and sales. Digital platforms, mobile applications, social media, and online stores became important tools for reaching consumers and providing personalized services. Retailers increasingly recognized differences between digital beginners, digital adopters, and digital-native consumers and adjusted their strategies accordingly. Thus, the post-pandemic retail environment

[1] https://www.ibef.org/industry/retail-india#

reflects greater digital integration, changing consumer preferences, and increased reliance on technology compared with the pre-pandemic period.

Table 1: Comparison Pre- and Post-Pandemic retail shift

Feature	Before the pandemic	After the pandemic
E-commerce	Steady, predictable growth, especially for non-essential goods.	Explosive, accelerated growth across all categories, including groceries.
Consumer behavior	In-store browsing was a significant part of the shopping journey.	Increased reluctance to enter physical stores out of safety concerns.
Pace of adoption	Gradual, incremental adoption of new technologies.	Rapid, urgent acceleration driven by necessity and survival.
Omnichannel	A developing strategy for some forward-thinking retailers.	A core, high-priority function for almost all retailers to enable seamless shopping.
Contactless tech	Mostly limited to mobile payments in some regions and niche apps.	Widespread, mainstream adoption covering payments, pickup, and even automated stores.

Challenges in Retail Digitalization

Digitalisation has created significant opportunities for retailers to improve efficiency, customer engagement, and market reach. However, the transition from traditional to technology-driven retail also involves several operational, financial, technological, and managerial challenges. Retailers must address these barriers carefully to achieve sustainable digital transformation and provide reliable and convenient experiences to consumers.

i. **Legacy Systems and Infrastructure:** Many retailers continue to depend on outdated systems that are difficult to integrate with modern digital platforms. Upgrading infrastructure and ensuring compatibility between old and new technologies can be complex and costly.

ii. **Data Privacy and Security:** Increased use of digital platforms generates large volumes of customer information, creating risks of data breaches, cyberattacks, and misuse of personal information. Retailers therefore need strong cybersecurity and data-protection practices.

iii. **Change Management:** Employees may resist new technologies and working methods. Effective training, communication, and organisational support are necessary to develop digital skills and encourage acceptance of technological change.

iv. **High Implementation Cost:** Digital transformation requires considerable investment in software, hardware, employee training, system upgrades, and maintenance. These costs can be particularly challenging for small and medium-sized retailers.

v. **Changing Customer Expectations:** Digital consumers increasingly expect fast, convenient, personalised, and seamless shopping experiences. Retailers must continuously improve their digital services to remain competitive.

vi. **Supply Chain Management:** Growing online orders increase pressure on inventory, warehousing, delivery, and order fulfilment systems. Integrating online and offline supply chains can create additional operational difficulties.

vii. **Customer Data Management:** Collecting customer information is useful, but organising, analysing, and accurately interpreting data across different channels remains challenging.

viii. **Technology and Expertise:** Successful digitalisation requires appropriate technologies and skilled professionals. Finding suitable technological solutions and experienced partners can be difficult.

ix. **Unclear Digital Strategy:** Digital transformation requires clear objectives, planning, leadership, and coordination. An unclear strategy can result in inefficient investments and unsuccessful implementation.

Consumer Behavior: Post-Pandemic Trends

Things will change drastically after the coronavirus. Around the world, people are talking about what the new "normal" will be like when the shockwaves subside. It will be years, if not decades, before the significant effects on urbanisation, globalisation, and international trade become apparent. During this period of change, companies are concentrating on better understanding what customers need and desire. Here are few ways that post-pandemic consumer behaviour is changing, along with some notable patterns that marketers should be aware of[2].

1. **Less Enthusiasm for In-Store Visits**

Global lockdowns and social distancing measures brought on by the COVID-19 pandemic caused a surge in online shopping and the broad adoption of digital-based consumer habits such as "curbside pickup, supermarket and restaurant delivery, and BOPIS (buy online, pick up in-store)". Nearly half of respondents to a Global Web Index study state that they won't be going to stores "for some time" or "for a long time. Even while it's realistic to assume that customers will return to physical stores once restrictions are removed, it's conceivable that overall in-store visits could decrease, possibly even into the next year, as they wait to see how things work out.

2. **Consumers Are Concerned**

Globally, consumers have been concerned throughout the coronavirus. Four different consumer categories that arose during the crisis were identified in recent Ernst & Young study, along with five strategies for adjusting to post-coronavirus buying patterns. They include customers who will keep cutting back on their spending despite unemployment and economic uncertainty, as well as cautiously lavish consumers who are looking forward to the chance to loosen up little once constraints are lifted. Consumer concerns are genuine, regardless of how they materialise, and businesses will have to address them.

3. **Workplaces Shifting to the Home**

The term "work from home" (WFH) gained popularity in 2020. And it appears to have gained a lot of traction. For instance, Twitter has said that it will permit its staff to work remotely "forever." There will undoubtedly be many more. More than half of participants in an eMarketer study said they would either want to or continue working from home. Consumer behaviour is also altered by this significant change in the workplace, as seen by the rise in demand for remote work tools and technology, the usage of desktop computers rather than mobile ones, and greater flexibility in time management.

4. **Contactless Payments**

Consumers are searching for measures to lower the risk of exposure during the coronavirus period, such as switching to online shopping to minimise physical touch with items or wearing gloves in the super market. The shift towards contactless payment methods, such e-wallets and tap credit cards, has also had an impact. For many retailers and their patrons, this is the preferred way of payment. Because they are convenient and simple to apply, safety precautions like these will become increasingly standard until the virus is totally eliminated or under control. They may even remain in place long after the crisis is gone.

5. **Interactions Go Virtual**

This year, a lot of individuals used video conferencing and virtual meetings, and not only for business. A little over 44% of Americans surveyed during the social distance period said they used Facebook Messenger, 31.5% said they utilised Zoom, and more over 47% said they used Apple's FaceTime app to talk to friends and family. As individuals get increasingly used to virtual interactions and the ease they provide, the usefulness of these tools in social situations could be here to stay. Brands now have another avenue to communicate with consumers and forge closer bonds with them because to this.

6. **People Are Looking to Economize**

There is a possibility that there will be a pervasive transition towards more frugal spending as consumers worldwide prepare for a probable recession. During the coronavirus era, there were already indications that individuals were cutting down on their spending; more than 60% of consumers reported doing so because they were worried about the stock market or the economy. Even prior to the pandemic, consumers were known to engage in the practice of "deal-seeking," as 87% of respondents indicated that a discount offer would substantially influence their decision to purchase items online. Anticipate more conservative spending and a desire for items that are affordable and offer good value if a severe recession occurs[3].

OBJECTIVES OF THE STUDY

1. To examine the impact of digitalization on consumers' purchasing behaviour in the retail sector during the pre-pandemic and post-pandemic periods.
2. To study the changes in consumers' adoption and usage of digital retail platforms and digital payment methods between the pre-pandemic and post-pandemic periods.

[2] https://www.adroll.com/blog/consumer-behavior-13-post-pandemic-trends-to-watch

[3] https://www.adroll.com/blog/consumer-behavior-13-post-pandemic-trends-to-watch

3. To identify the major challenges faced by consumers in adopting digitalization in retail transactions during the post-pandemic period.
4. To compare consumers' preferences, purchasing patterns, and perceptions towards digital and traditional retailing during the pre-pandemic and post-pandemic periods.
5. To examine the impact of digitalization in retailing on consumers' convenience, satisfaction, affordability, and overall quality of life in the post-pandemic period

LITERATURE REVIEWS

Monika Bhatia and Dr. Gajraj Singh Ahirwar, (2022) [7] intends to compile the difficulties that merchants are encountering in the wake of the COVID-19 pandemic. Secondary sources serve as the foundation for data collection. The study demonstrates the relationship between the pandemic-induced internet buying habits, the many tactics used by retailers to get around the limitations, and the ways in which digital technology might act as a link between the two. Retailers must first acknowledge that the epidemic has prompted customers to adopt technology; as a result, they must present offers based on digital tools that are easy to use in accordance with various target groups. Additionally, businesses must modify their business plan to accommodate the shifting consumer attitudes and behaviours. However, some of the businesses were able to function through social commerce, which is marketing through social media and e-commerce.

Dinesh Kumar Mishra and Dr. Pramod Gupta, (2024) [8] The emergence of digital media is revolutionising the marketing landscape across all industries, particularly in the fast-moving consumer goods (FMCG) sector. In order to impact the targeted audience's purchase decisions, every FMCG product campaign has historically relied on the proper marketing mix of the four Ps: product, pricing, place, and promotion. However, modern consumers consider a number of aspects when making their ultimate purchasing decisions, which has prompted the creation of new strategies to influence their preferences. The increasing use of mobile applications, online financial transactions, and direct business-to-business transactions was supported by COVID-19.

George Wilson et al., (2024) [9] The significant effects of digital transformation on marketing tactics in the retail sector are examined in this study. Digital technology have become essential to comprehending and interacting with customers as the retail industry changes. With merchants using consumer data to provide individualised experiences that increase customer pleasure and loyalty, personalisation has become a major trend. It is emphasised that omnichannel marketing techniques, which integrate online and physical channels, are essential for delivering a smooth and consistent consumer experience across several touchpoints.

Yangyang Jiang and Nikolaos Stylos, (2021) [10] This study aims to identify the variables that have caused shifts in people's online consumption behaviours during the COVID-19 pandemic and explore how digital technologies have affected the retail environment during the lockdowns from the perspective of the customers. A methodical mapping of the retail ecosystem's responses to the COVID-19 shock has been outlined by the research. Evidence from the interviews was used to further develop the pertinent themes that underlie each aggregate dimension. The study's conclusions contribute to the body of knowledge on consumer behaviour and online shopping during emergencies and have significant real-world ramifications for enhancing the retail ecosystem's capacity to handle crises using digital technology. Four proposals were taken out of the final product to be used in future studies.

Shiven Gupta, (2023) [11] Indian retail was severely impacted by the COVID-19 pandemic. Government-mandated lockdowns and operational restrictions precipitated business closures, reduced customer visitation, and financial distress for small-scale retailers. E-commerce activity increased as a result of the shift in consumer behaviour towards online buying. Retailers responded to the change by expanding their online presence and implementing contactless delivery. Traditional physical retailers faced challenges and looked into other business methods; such click-and-collect. Additionally, product offerings were diversified to satisfy changing consumer demands. The pandemic accelerated India's transition to digitalisation in the retail sector, impacting market dynamics and consumer purchasing patterns for years to come.

Arpita Khare et al., (2024) [12] The current study looks at the emotional attachment and interpersonal likeability between consumers and retailers in relation to word-of-mouth and, in turn, post-pandemic local store loyalty. Additionally, the mediating effects of information sharing and word-of-mouth on interpersonal likeability, emotional attachment, and local store loyalty were investigated. An online structured questionnaire was used to gather information from consumers who bought goods from neighbourhood shops in northwest India. The data was analysed using covariance-based structural equation modelling (CB-SEM) for moderation, mediation, and confirmatory factor analysis. It was discovered that word-of-mouth somewhat mediated the relationship between local store loyalty, consumer-retailer emotional connection, and interpersonal likeability. Word-of-mouth and local store loyalty ties were significantly moderated by information sharing.

RESEARCH METHODOLOGY

The present study adopted a descriptive and analytical research design to examine the impact of digitalization on consumers' retail behaviour by comparing the pre pandemic and post pandemic periods. The study was based on primary data collected through a structured questionnaire from 500 consumers selected from ten districts of Madhya Pradesh, namely Bhopal, Indore, Gwalior, Jabalpur, Rewa, Chhatarpur, Ujjain, Shahdol, Hoshangabad, and Morena, with 50 respondents from each district. The questionnaire consisted of demographic information and 15 statements measuring consumer behaviour and digitalization across the two periods. Responses were recorded on a five-point Likert scale ranging from 1 = Strongly Agree to 5 = Strongly Disagree. The collected data were analysed using frequency, percentage, mean, standard deviation, paired samples correlation, and paired samples t test. The paired samples t test was employed to determine whether a statistically significant difference existed between consumers' overall digital retail behaviour and perceptions in the pre pandemic and post pandemic periods. The study used a significance level of 5% ($p < 0.05$) for hypothesis testing.

Research Component	Description
Research Design	Descriptive and Analytical
Research Approach	Quantitative
Source of Data	Primary Data
Target Population	Consumers
Sample Size	500 Consumers
Study Area	Selected districts of Madhya Pradesh
Districts Covered	Bhopal, Indore, Gwalior, Jabalpur, Rewa, Chhatarpur, Ujjain, Shahdol, Narmadapuram and Morena
Sampling Distribution	50 respondents from each selected district
Data Collection Instrument	Structured Questionnaire
Measurement Scale	Five Point Likert Scale
Scale Coding	1 = Strongly Agree to 5 = Strongly Disagree
Periods Compared	Pre Pandemic (2019 or earlier) and Post Pandemic (2021 onwards)
Questionnaire Statements	15 statements on consumer behaviour and digitalization
Descriptive Techniques	Frequency, Percentage, Mean and Standard Deviation
Inferential Technique	Paired Samples t Test
Correlation Analysis	Paired Samples Correlation
Level of Significance	5% ($p < 0.05$)
Statistical Software	IBM SPSS

HYPOTHESIS OF THE STUDY

H_{01}: There is no significant difference in the overall impact of digitalization on consumers' retail behaviour, adoption, preferences, perceptions, and shopping experience between the pre pandemic and post pandemic periods.

H_{a1}: There is a significant difference in the overall impact of digitalization on consumers' retail behaviour, adoption, preferences, perceptions, and shopping experience between the pre pandemic and post pandemic periods.

DATA ANALYSIS AND INTERPRETATION

The collected data were systematically analysed to examine changes in consumers' retail behaviour, digital adoption, preferences, perceptions, and shopping experience between the pre pandemic and post pandemic periods. The analysis presents the demographic profile of respondents followed by descriptive and inferential statistical findings.

Table 2: Age Group

Age Group					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	<25	117	23.4	23.4	23.4
	25–34	180	36.0	36.0	59.4
	35–44	109	21.8	21.8	81.2
	45–54	65	13.0	13.0	94.2
	55+	29	5.8	5.8	100.0
	Total	500	100.0	100.0	

The age wise distribution of consumers shows that the largest group comprised 360 respondents (36.0%) in the 25–34 years category, followed by 234 (23.4%) aged below 25 years and 218 (21.8%) aged 35–44 years. Further, 130 respondents (13.0%) belonged to the 45–54 years category, while 58 (5.8%) were 55 years and above. The findings indicate that the consumer sample was predominantly composed of young and middle-aged individuals.

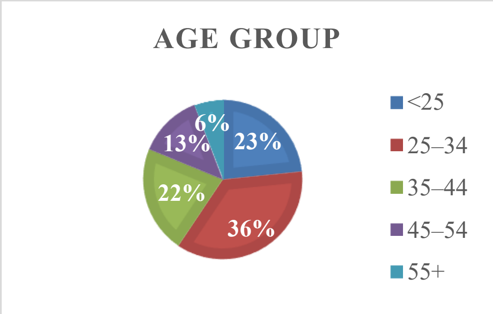

Figure 1: Age Group

Table 3: Gender

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	327	65.4	65.4	65.4
	Female	173	34.6	34.6	100.0
	Total	500	100.0	100.0	

The gender wise distribution of consumers indicates that 654 respondents (65.4%) were male, while 346 respondents (34.6%) were female. This shows that male consumers constituted nearly two thirds of the total sample, whereas female consumers represented slightly more than one third. The findings indicate that the consumer sample was predominantly comprised of male respondents.

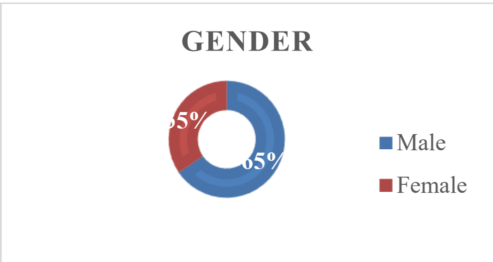

Figure 2: Gender

Table 4: Area of Residence

Area of Residence					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Rural	68	13.6	13.6	13.6
	Semi-Urban	353	70.6	70.6	84.2
	Urban	79	15.8	15.8	100.0
	Total	500	100.0	100.0	

The area wise distribution of consumers reveals that the majority, 706 respondents (70.6%), belonged to semi urban areas, followed by 158 respondents (15.8%) from urban areas and 136 respondents (13.6%) from rural areas. The distribution shows that consumers from semi urban locations formed a substantial proportion of the sample compared to those from rural and urban areas. The findings indicate that the study primarily represents the views of semi urban consumers.

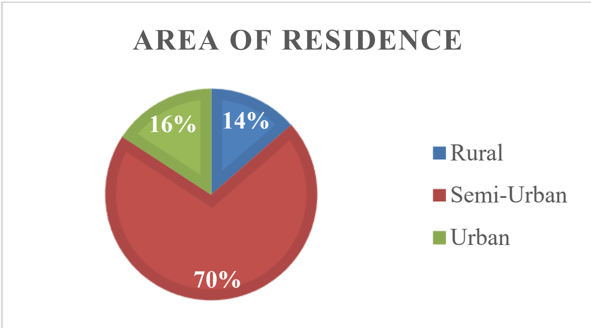

Figure 3: Area of Residence

Table 5: Education Level

Education Level					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Primary	12	2.4	2.4	2.4
	Secondary	36	7.2	7.2	9.6
	Higher Secondary	55	11.0	11.0	20.6
	Graduate	281	56.2	56.2	76.8
	Postgraduate & Above	116	23.2	23.2	100.0
	Total	500	100.0	100.0	

The educational distribution of consumers shows that the largest group comprised 562 respondents (56.2%) who were graduates, followed by 232 respondents (23.2%) with postgraduate and above qualifications. Further, 110 respondents (11.0%) had completed higher secondary education, 72 (7.2%) had secondary education, and 24 (2.4%) had primary education. The findings indicate that the consumer sample was predominantly composed of well-educated individuals, with graduates forming the majority of respondents.

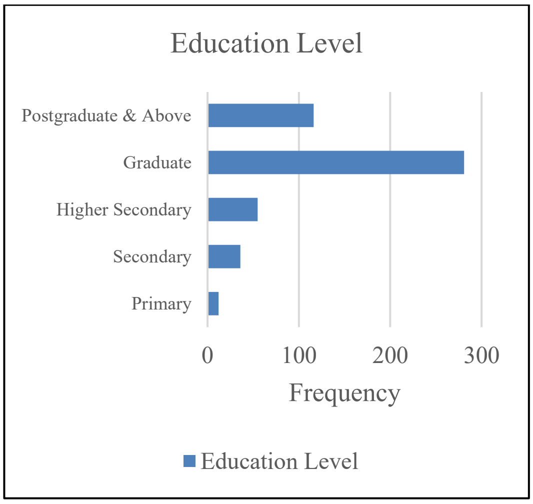

Figure 4: Education Level

Table 6: Occupation

Occupation					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Student	3	1.8	1.8	1.8
	Service	307	61.4	61.4	63.2
	Business	106	21.2	21.2	84.4
	Self-Employed	40	8.0	8.0	92.4
	Homemaker	16	3.2	3.2	95.6
	Other	22	4.4	4.4	100.0
	Total	500	100.0	100.0	

The occupation wise distribution of consumers indicates that the majority of respondents were from the service category, comprising 614 respondents (61.4%), followed by 212 respondents (21.2%) engaged in business activities. Further, 80 respondents (8.0%) were self-employed, 44 (4.4%) belonged to the other category, 32 (3.2%) were homemakers, and 18 (1.8%) were students. The findings indicate that the consumer sample was largely represented by service professionals, followed by individuals involved in business activities.

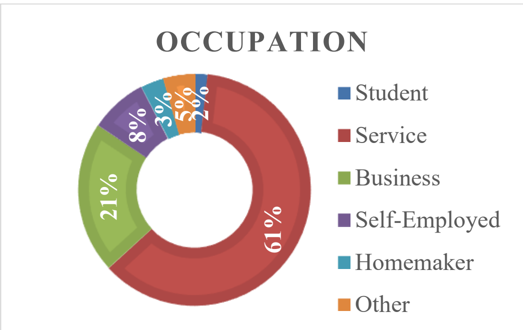

Figure 5: Occupation

Table 7: Monthly Income

Monthly Income					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Below Rs 10,000	25	5.0	5.0	5.0
	Rs 10,001–Rs 25,000	87	17.4	17.4	22.4
	Rs 25,001–Rs 50,000	141	28.2	28.2	50.6
	Rs 50,001–Rs 1,00,000	157	31.4	31.4	82.0
	Above Rs 1,00,000	90	18.0	18.0	100.0
	Total	500	100.0	100.0	

The monthly income distribution of consumers reveals that the largest group comprised 314 respondents (31.4%) with an income of Rs 50,001–Rs 1,00,000, followed by 282 respondents (28.2%) earning Rs 25,001–Rs 50,000. Further, 180 respondents (18.0%) had a monthly income of above Rs 1,00,000, 174 (17.4%) earned Rs 10,001–Rs 25,000, and 50 (5.0%) had an income of below Rs 10,000. The findings indicate that the consumer sample was mainly represented by middle- and higher-income groups.

Figure 6: Monthly Income

Table 8: District

District					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bhopal	50	10.0	10.0	10.0
	Indore	50	10.0	10.0	20.0
	Gwalior	50	10.0	10.0	30.0
	Jabalpur	50	10.0	10.0	40.0
	Rewa	50	10.0	10.0	50.0
	Chhatarpur	50	10.0	10.0	60.0
	Ujjain	50	10.0	10.0	70.0
	Shahdol	50	10.0	10.0	80.0
	Hoshangabad	50	10.0	10.0	90.0
	Morena	50	10.0	10.0	100.0
	Total	500	100.0	100.0	

The district wise distribution of consumers shows an equal representation from all selected districts of Madhya Pradesh. Each district, including Bhopal, Indore, Gwalior, Jabalpur, Rewa, Chhatarpur, Ujjain, Shahdol, Hoshangabad, and Morena, contributed 100 respondents (10.0%) to the study. This balanced distribution ensured that consumer responses were collected uniformly from all identified geographical areas. The findings indicate that the consumer sample maintained equal participation across the selected districts of Madhya Pradesh.

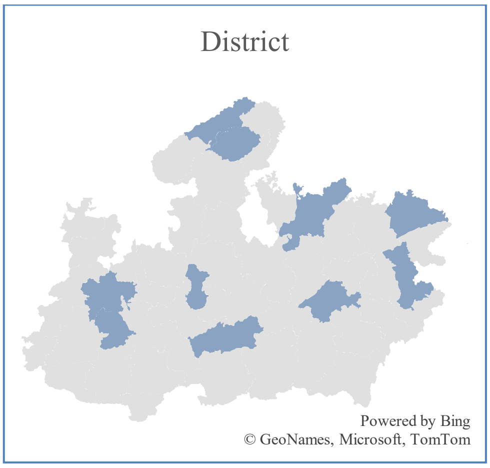

Figure 7: District

Descriptive statistics

Descriptive statistics were used to assess consumers' responses to the 15 statements related to consumer behaviour and digitalization for both periods. Mean and standard deviation were calculated to identify changes in the level of agreement and variation in responses between the pre pandemic and post pandemic periods.

Descriptive Statistics				
	Mean	S.D.	Mean	S.D.
	Pre-Pandemic		Post-Pandemic	
You find online shopping convenient for purchasing retail products.	3.23	1.159	2.34	1.171
You feel comfortable making payments through digital modes while shopping.	3.16	1.151	2.24	1.168
You use mobile apps to check product availability before making purchases.	3.07	1.128	2.15	1.101
You trust online reviews and ratings while selecting retail products.	3.21	1.109	2.28	1.188
You regularly make purchases through online retail platforms.	3.15	1.097	2.26	1.141
You find contactless and QR based payment options convenient for retail transactions.	3.05	1.050	2.12	1.070
You compare products and prices across multiple online platforms before finalizing a purchase.	3.18	1.145	2.35	1.168
You find home delivery options convenient while making retail purchases.	3.04	1.135	2.16	1.139
You use mobile wallets or UPI for making retail payments.	3.15	1.169	2.30	1.191
You explore new online shopping platforms and applications for retail purchases.	2.97	1.086	2.10	1.094
You use digital communication such as apps and messages to support your shopping decisions.	3.19	1.121	2.30	1.163
You find digital shopping platforms easy to use for retail transactions.	3.24	1.054	2.30	1.147
You are aware of discounts and promotional offers available through digital retail platforms.	3.08	1.108	2.19	1.142
You find digital payments faster and easier for completing retail transactions.	3.06	1.048	2.14	1.105

Digitalization enhances your overall convenience and satisfaction in retail shopping.	3.25	1.073	2.28	1.134
Valid N (listwise)	500			

The descriptive statistics for 500 consumers indicate a clear improvement in digitalized retail behaviour and perceptions from the pre pandemic to the post pandemic period. Since the scale is coded as 1 = Strongly Agree, 2 = Agree, 3 = Neutral, 4 = Disagree, and 5 = Strongly Disagree, the reduction in mean scores across all 15 statements indicates greater agreement with the positive statements after the pandemic. In the pre pandemic period, the mean scores ranged from 2.97 to 3.25, indicating responses around the neutral level, whereas in the post pandemic period, the mean scores declined to 2.10 to 2.35, indicating a shift towards agreement. The greatest improvement was observed for the use of mobile apps to check product availability, with the mean declining from 3.07 to 2.15, followed by the use of contactless and QR based payments from 3.05 to 2.12 and the exploration of new online shopping platforms from 2.97 to 2.10. Similarly, notable improvements were observed in comfort with digital payments, online shopping convenience, online purchasing, home delivery, mobile wallets or UPI, digital communication, awareness of digital offers, and the overall convenience and satisfaction associated with digitalization. The standard deviations, ranging approximately from 1.05 to 1.19, indicate moderate variation in consumers' responses. Overall, the findings suggest that consumers demonstrated greater acceptance, adoption, convenience, and positive perception of digitalized retail practices in the post pandemic period compared with the pre pandemic period.

Hypothesis testing

H_0: There is no significant difference in the overall impact of digitalization on consumers' retail behaviour, adoption, preferences, perceptions, and shopping experience between the pre pandemic and post pandemic periods.

H_a: There is a significant difference in the overall impact of digitalization on consumers' retail behaviour, adoption, preferences, perceptions, and shopping experience between the pre pandemic and post pandemic periods.

To evaluate the hypothesis (H_0), a paired samples t-test was conducted to examine differences in the overall impact of digitalization on consumers' retail behaviour, adoption, preferences, perceptions, and shopping experience between the pre-pandemic and post-pandemic periods.

Paired Samples Statistics

		Mean	N	S.D.	SEM
Pair 1	Digitalization on consumers' retail behaviour, adoption, preferences, perceptions, and shopping experience (Pre-Pandemic)	45.61	500	4.443	.199
	Digitalization on consumers' retail behaviour, adoption, preferences, perceptions, and shopping experience (Post-Pandemic)	33.51	500	8.772	.392

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Digitalization on consumers' retail behaviour, adoption, preferences, perceptions, and shopping experience (Post-Pandemic)	500	.423	.000

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	S.D.	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Digitalization on consumers' retail behaviour, adoption, preferences, perceptions, and shopping experience (Pre-Pandemic) - Digitalization on consumers' retail behaviour, adoption, preferences, perceptions, and shopping experience (Post-Pandemic)	12.106	7.980	.357	11.405	12.807	33.910	499	.000

Mathematical Calculation and Statistical Analysis

Sample Size (N): 500

Degrees of Freedom (df): N - 1 = 500 - 1 = 499

Mean of Paired Differences ($\bar{d}$): 12.106

Standard Deviation of Differences (SD): 7.980

Standard Error of the Mean Difference ($SE_{\bar{d}}$): $\frac{SD}{\sqrt{N}} = \frac{7.980}{\sqrt{500}} = 0.357$

Calculated t-Statistic: $t = \frac{\bar{d}}{SE_{\bar{d}}} = \frac{12.106}{0.357} = 33.910$

The analysis revealed a decrease in the mean score from 45.61 (SD = 4.443) in the pre-pandemic period to 33.51 (SD = 8.772) post-pandemic, with a sample size of N = 500. A moderate positive correlation was observed between the two periods ($r = 0.423$, $p < 0.001$). The paired samples test yielded a mean difference of 12.106 (SD = 7.980, SE = 0.357), with a 95% confidence interval ranging from 11.405 to 12.807. Utilizing the calculated degrees of freedom (df = 499), the resulting t-statistic was 33.910 with a significance value of 0.000 ($p < 0.05$).

Since the p-value is below the alpha threshold, the null hypothesis (H_0) is rejected and the alternative hypothesis (H_a) is accepted. Thus, there is a statistically significant difference in the overall impact of digitalization on consumers' retail behaviour, adoption, preferences, perceptions, and shopping experience between the pre-pandemic and post-pandemic periods.

DISCUSSION

The findings of the study demonstrate a clear change in consumers' interaction with digitalized retailing between the pre pandemic and post pandemic periods. The descriptive and inferential results collectively indicate greater acceptance of online shopping, digital payments, mobile applications, digital information, and technology enabled retail services after the pandemic. The significant difference observed through the paired samples t test further supports the overall change in consumer behaviour and perceptions.

i. **Consumer Profile:** The sample of 500 consumers was predominantly represented by the 25–34 years age group (36.0%), followed by those below 25 years (23.4%). Male consumers constituted 65.4%, while semi urban consumers accounted for 70.6%. Graduates represented 56.2% of the sample, indicating that the findings largely reflect the perceptions of young, educated and semi urban consumers.

ii. **Adoption of Digital Retailing:** A noticeable shift towards digital retail practices was observed after the pandemic. The mean score for online shopping convenience declined from 3.23 to 2.34, while comfort with digital payments declined from 3.16 to 2.24. Since lower scores indicate stronger agreement, these findings demonstrate greater acceptance of online shopping and digital payment methods in the post pandemic period.

iii. **Use of Digital Platforms and Payments:** Consumers showed greater use of technology for retail transactions after the pandemic. The mean for using mobile apps to check product availability declined from 3.07 to 2.15, while the mean for contactless and QR based payments declined from 3.05 to 2.12. Similarly, the use of mobile wallets and UPI improved from 3.15 to 2.30, indicating increased adoption of digital payment facilities.

iv. **Digital Purchasing Decisions:** Digital information became more important in consumers' purchasing decisions. The mean score for trusting online reviews and ratings declined from 3.21 to 2.28, while comparison of products and prices across online platforms declined from 3.18 to 2.35. The mean for exploring new online shopping platforms also declined from 2.97 to 2.10, indicating greater engagement with digital retail options.

v. **Convenience and Shopping Experience:** The findings indicate improvement in the overall digital shopping experience. The mean for finding digital shopping platforms easy to use declined from 3.24 to 2.30, while the mean for faster and easier digital payments declined from 3.06 to 2.14. The overall convenience and satisfaction associated with digitalization also improved, with the mean declining from 3.25 to 2.28.

vi. **Hypothesis Result:** The paired samples test confirms that the observed changes were statistically significant. The overall mean score declined from 45.61 (SD = 4.443) in the pre pandemic period to 33.51 (SD = 8.772) in the post pandemic period, with a mean difference of 12.106. The result was significant at t = 33.910, df = 999, p = 0.000, leading to rejection of H_0 and acceptance of H_a. Thus, a significant difference exists in consumers' overall retail behaviour, adoption, preferences, perceptions, and shopping experience between the two periods.

CONCLUSION

The study concludes that digitalization has brought a significant transformation in consumers' retail behaviour, adoption patterns, preferences, perceptions, and shopping experiences between the pre pandemic and post pandemic periods. The findings indicate that consumers increasingly accepted online shopping, digital retail platforms, mobile applications, home delivery services, and digital payment methods after the pandemic. The mean scores across all 15 statements declined from the pre pandemic to the post pandemic period, reflecting stronger agreement with positive digital retail practices. Consumers demonstrated greater use of mobile applications for checking product availability, online reviews and ratings, price comparison, digital communication, QR based payments, mobile wallets, and UPI. The findings also indicate that digitalization influenced consumers' preferences and purchasing patterns by providing greater access to online platforms, promotional offers, and convenient transaction facilities, while traditional retailing continued to remain relevant within the broader retail experience. The study further identifies that ease of using digital platforms, faster payments, home delivery, and access to digital offers contributed positively to consumers' convenience and satisfaction. The paired samples t test confirmed a statistically significant difference between the two periods, with the overall mean declining from 45.61 to 33.51 and producing a t value of 33.910 at $p = 0.000$. Thus, the null hypothesis was rejected and the alternative hypothesis was accepted. Overall, the study establishes that the post pandemic period witnessed stronger integration of digitalization into consumer retail transactions, resulting in substantial changes in purchasing behaviour, digital adoption, preferences, perceptions, convenience, satisfaction, and the overall retail shopping experience.

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