

# Technology Penetration & Adoption in An Unstructured Retail Market of Kolkata, India

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## Abstract

On 8 November 2016, the Indian government announced demonetization to eradicate black money hoarding, counterfeit notes, and terror financing. Although this initiative did help the country thrive, it did so at the expense of the general population, businesses, the financial markets, and the financial system. Since then, there has been an increase in businesses that do not accept cash and prefer classless online transactions. Small enterprises servicing the public were the worst hit. Though demonetization has changed commercial transactions, most small retailers haven't shifted to e-payment. After a few years of demonetization, the Covid-19 pandemic happened, and the no-contact and social distance protocol motivated many small businesses to adopt a new era of retail technology. The forced transformation was observed evidently in metro cities in India but not that much in suburban and rural India. The paper discusses 110 small retailers' owners in Khidirpur Market, one of the biggest markets in Kolkata, West Bengal, India. The survey was conducted to establish if they use cash or e-payments and identify their marginal gains and services taxes if they paid any. The paper also points out how they finance their business. The demographics are spread interestingly and cover four broadly categorized small retailers: small groceries (Kirana), footwear, and pharmacy stores (ayurvedic, homeopathy, and allopathy medicines). The survey revealed that small retailers like Pharmacy stores have begun adopting mobile payment solutions, printed billing systems, and automatic inventory management. But this technology adoption is not a remarkable transformation.

**Keywords:** Unstructured Retailers; E-payment, Retail Technology; Disruptive Innovation; Indian markets

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## 1. Introduction

Current business models are being transformed by technology. The internet and online business include retail technology such as E-payment, m-payment, billing and vendor systems, and inventory management [1]. It comprises digitally enabled commercial interactions between business to business and between businesses and individuals. In other words, all business transactions, including purchasing and selling products and services and transmitting data and payments, occur electronically over the internet. As technology evolves in the present day, the nature of e-commerce is fast shifting. Retailers also have to consider consumer behavior for adopting retail technology; the studies include when, why, how, and where individuals purchase or do not purchase a product [2]. Hence it is essential to grasp the intricacies of consumer behavior to remain competitive in the market. Retailers must

comprehend why consumers are unsatisfied with the offline, cash-based buying experience [3].

Technology has improved the retail sector as a whole. Using technology, a business may try out a wide variety of new strategies, including interactive displays, in-store services, smart shelves, home delivery, brand optimization choices, supply chain optimization, and logistics automation. Then there are channels like wallets, POS data, and social media, where you can zero in on complaints and praise [4]. The store is responsible for implementing these features into its apps, where customers may try the goods out, ask questions, and ultimately make a purchase. The retail industry's heavy hitters have thrown their weight behind the latest innovations to win over and keep their clients' businesses [5]. While large retailers have been quick to adopt technology to keep up with market shifts and technical advancements, small merchants, especially those in the unorganized sector, have been slower to do so. 80% of the retail sector in India is unorganized [6]; therefore, if that sector adopts technology, it would herald a new age for the retail business and give the Indian economy a boost. The retail industry may look to technology as its white knight, leading it to success and wealth. In 2018, "Experiential Retail" became a buzzword throughout the industry.

Accessibility, in-store features, consumer involvement through animation, and novel fusions of the real and virtual shopping worlds all contributed to its prominence [7]. The paper discusses the retail technology acceptance by small retailers in the Khidirpur market of Kolkata, West Bengal, India. The structures of the paper are covered as follows: Section 1 introduces the retail technologies and the unstructured retailers in India. Section 2 covers an extensive literature review of the status of technology adoption by retailers in India. Section 3 covers the research methodology; section 4 presents the results and hypothesis testing, concluding the paper in section 5.

## **2. Background**

India has two distinct retail markets: the organized and the unorganized. Kirana shops, small-scale department stores, are an unstructured portion of merchants in India and have done well for a long time [8]. The organized sector, projected to treble by 2022, can be further subdivided into niche retail formats such as supermarkets, flea markets, and shopping malls [9]. The fast-moving consumer goods (FMCG) retail sector is the fastest-growing retail sector, whereas the retail sector associated with family unit care, candy store, etc., has declined [10]. When it came to investing in India, the distant retail monsters were at first stymied [11]. However, as of right present, India only permits 51% FDI via unorganized retail stores. Multi-brand stores have progressed beyond their remit. In the same vein as Walmart's entry into India with the help of Bharati Enterprises, a company that franchises its stores, a company can join the market through franchisees. Due to the gaps we've already identified, online shopping has yet to make a positive impression on consumers [12]. Since demonetization and later due to covid-19 no contact protocols, e-commerce businesses have seen mobile commerce as the most promising sector, with mobile wallets as the most popular payment method. With the advent of 4G services in 2015, Internet consumption skyrocketed,

a trend that reached its zenith as Reliance Jio flooded and conquered the telecom industry [13]. As a result, mobile commerce received yet another boost.

These days, consumers would rather shop on their phones or computers than at brick-and-mortar stores since they can shop faster, browse a bigger range, and maybe find better deals. Consumers now have a more simplified mobile experience owing to the growth of payment instruments and payment gateways available through mobile wallets, which have improved security by requiring several verification stages [14]. If one looks at the expansion of online shopping in India's retail industry, one can see that this market has grown substantially in recent years [15]. It seems reasonable to assume that the retail industry in India will have better prospects than its Western counterpart. The resurgence of this economy is expected to be financially stable and prosperous [16].

### **2.1. Retail Technology Adaptation By Unstructured Retailers**

A literature study and expert opinion by Singh & Samuel (2018) identified crucial elements. Interpretive structural modeling revealed factor linkages (ISM). There was increased guidance on the fuzzy direct connection matrix. Analysis of the fast-moving consumer goods industry classified variables according to their roles as drivers or dependencies. We developed a unified model with ISM based on the strengths of the SFs we chose, then grouped the results by their drivers and dependencies. The hierarchical structure of the model clearly illustrates the interconnections in SF. Authorities at the highest levels agreed that the retail setting, information and communication technologies, widespread use of new technologies, and human resource management were the areas most in need of improvement [17].

Wu & Lin's (2018) method may motivate further research in e-commerce logistics management and address issues with unstructured big data analytics for e-commerce logistics. Large amounts of unstructured data, such as that generated by e-commerce logistics video, maybe the subject of future study into large-scale unstructured data analytics. [18].

Gawankar, Gunasekaran, and Kamble (2020) Ultimately, this study aids supply-chain integration, making it valuable for company decision-makers. Getting employees on board with the retail sector's 4.0 transition is a major challenge for managers. Supply chains in the retail 4.0 age will need to gather, analyze, and disperse vast volumes of data. Retailers should invest in skilled employees and tools for storing, processing, and sharing customer data. Problems can arise regarding data ownership, data privacy, and integrating new technologies. Managers will use findings to inform BDA investment and solution development. Retailers who invest in retail 4.0 will better serve their consumers and more efficiently manage their inventory by advising them on what to buy when to buy it (by alerting them to sales), and what to do if an item is temporarily out of stock. Data-driven retail 4.0 can positively affect consumers' purchasing and payment behavior [19].

Ahmed and Sathish (2015) review the literature on e-commerce studies published between 2001 and 2014. (Inclusive). A total of 72 pieces of research, published in 48 publications and presented at 4 conference sessions, give an overview of online purchasing concepts. There

exists a discrepancy in the published works. While prior studies have attempted to establish a connection between developed and underdeveloped nations, they have used varying theoretical frameworks and small sample sizes ( $N = 290$ , on average). Both the TAM Model and the Modified TAM Model created by Davis et al. (1989) were frequently utilized in the reviewed literature to define customers' intents while making purchases online, as shown by the research conducted by Bart et al. Existing literature lacks investigation into several important areas, including personality, electronic payment, culture, hedonic, utilitarian, order fulfillment, and service quality [20].

The author elaborates on the retail establishments in emerging markets discussed by Gupta and Ramachandran (2021), the many retail formats that may employ analytics, and the external factors (both internal and external to retail establishments) that may impact these variables. Managers in the retail industry often utilize a strategy matrix to determine the optimal analytics to apply at each stage of the value chain. We also present a preview of upcoming research on the retail industry in developing economies [21].

Nath, Kirca, & Kim's (2021) findings show that new technology doesn't change people's values. Internet users boost their regular activities by using the internet. Nearly 40 years after Marshall McLuhan (1964) invented the phrase "global village," there is more evidence than ever that his idea that technology developments are extensions of ourselves is right. We can do more of what we like and have been doing more efficiently [22].

Kopalle, Gangwar, Kaplan, & Ramachand's (2022) consumer-level research explores ethical and privacy problems as AI systems gather, store, and personal process data globally. The author specializes in human-machine interaction and automated text, audio, picture, and video analysis. They then study the interplay between these two AI characteristics globally to propose research topics for future marketing in this vital field [23].

It is observed that diminishing margins, the expansion of e-commerce, falling mall visitation, the success of low-cost merchants, and changing consumer behavior/needs. As if that weren't enough, the COVID-19 situation, which arose after this piece was initially released, is still developing. For ideas and conclusions on the additional problems that will be important in the future years of that crisis, see our essay on the acceleration of data-driven retail from a holistic perspective. While many once-leading stores have perished and more brands are in trouble, frequently before the epidemic, others have survived and even thrived.

### **3. Research Motivation**

Researchers have used quantitative approaches to compile and examine vast volumes of numerical data using mathematical, statistical, or computer techniques to better comprehend a phenomenon. As part of the data-gathering process for a quantitative research study, interviews, polls, surveys, and other inquiries are conducted with existing and potential clients. The findings are presented with numerical representations. You may look into the future of a product and figure out how to make it better with the help of these facts.

### 3.1. Scope of Research

Cash transactions are deeply ingrained in most cash-based small companies which come in various forms. These retailers need a little initial capital investment and have relatively short operating cycles since their goods and services are intended for instant consumption. Because there is no physical layout for making payments and because retailers are run in an ad hoc manner, the sellers cannot afford to spend any time getting customers to pay them online because, most of the time, customers cannot afford to wait, and there is no physical layout that exists for making payments. Due to the factors mentioned earlier, sellers and service providers are now required to realize the money immediately; as a result, cash-based transactions occur in most small enterprises, and billing is not done [24]. Still, in one night, demonetization brought about profound changes, and covid-19 brought a massive transition in small retailers in practically every Indian's life [25]. After then, people's habits about making payments began to shift [26]. It is now necessary to determine the amount of the shift that has taken place among the small retailers because they are vulnerable to the threat of extinction.

### 3.2. Objective

Unstructured retailers are a key part of society and contribute significantly to the economy's unorganized sector. Finding out how unstructured retailers operate and the influence that non-payment of taxes by unstructured retailers has on government income and the economy is the goal of this research project—examining and understanding the unstructured retailers' technology methods of operations. The Indian government has revealed several national programs whose primary goals are to improve the quality of life of Indian residents in various contexts. The “Digital India” program has helped implement and adopt POS systems in various national regions. On the other hand, small traders had difficulties operating their retailers due to the transaction involved. In light of this information, the following goals have been conceptualized.

- To research the socioeconomic characteristics of the small retailers' owners in the Khidirpur market in Kolkata, West Bengal, India.
- To ascertain whether or not owners of small retailers make use of mobile phones for professional reasons
- To investigate the utilization of mobile phones for e-payment transactions connected to commercial enterprises

### 3.3. Dataset & Analysis

Unstructured retailers from Khidirpur market, Kolkata, West Bengal, India, have been asked to participate in a survey, with a sample size of 110 people, to obtain data for future investigation. As a further constraint, the study had a limited sample size of 110 respondents due to the time crunch and dispersed nature of their activities. A bigger sample size would have yielded more inclusive and complete results. Respondents were asked for sensitive data like the number of bribes they paid to local authorities for their operation, but their answers may have been manipulated because of how unstructured the vendors' operations were.

A quantitative survey is carried out by creating a questionnaire using a Likert five-point scaling system [27] to learn the usability of e-payment technology by unstructured retailers. Descriptive statistical analysis [28] is applied for meta-analysis. Cronbach alpha estimations are computed for systematic or internal consistent variation in test scores [29]. Correlation Coefficients (Spearman's rho [30] ) are carried out to understand the variable relationships [31]. By applying Kruskal-Wallis Tests [32] data analysis is carried out to test the Hypothesis.

The most popular way to quantify a survey's internal consistency (also known as "reliability") is with Cronbach's alpha. Most of the time, it is utilised in situations where a survey or questionnaire has many Likert questions that collectively constitute a scale, and the user wants to ascertain whether or not the scale can be trusted. Since all the questions are worded in the same direction (i.e., positive wording), there is no need for reverse coding. Cronbach's alpha test conducted in SPSS produces the following results. Case Processing Summary shows each category's sample size (or question). All 110 are reported as valid cases, i.e., no missing data.

Table 1: Dataset Processing

		N	%
Cases	Valid	110	100.0
	Excluded	0	.0
	Total	110	100.0
a. Listwise deletion based on all variables in the procedure.			

2. In the table of reliability statistics that shows the actual number for Cronbach's alpha, as shown below, we can see that the result for Cronbach's alpha is 0.907, which indicates a good level of internal consistency for our scale when applied to this particular sample.

Table 2: Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.855	.907	12

Cronbach's alpha was utilized to investigate the 12-item GST scale's internal dependability. According to the findings, the overall level of reliability, or alpha, was found to be 0.907. The examination of the data pertaining to individual items revealed that removing any item would not affect the increase of the scale's dependability. A Cronbach's alpha score of 0.907 demonstrates that our scale has a high level of internal consistency concerning this particular sample.

#### 4. Result & Discussion

An interview with a sample size of 110 small retailers from Khidirpur market, Kolkata, West Bengal, India, in July 2022 was conducted to ascertain if the respondents were cash-based or credit-based, and data was collected. A total of 110 respondents completed the survey and provided their thoughts on the topics. A few people were hesitant to provide their demographic information and did not reply to the survey. Answers provided by survey participants who were not educated have been used to populate the questions. Khairpur Market in Kolkata, where this research was conducted, is a hub for many unorganized small retailers that cater to local needs like groceries, footwear, readymade clothing, and pharmacy. This section summarizes the findings of the survey's data analysis and hypothesis testing below:

**H<sub>1</sub>:** There is no correlation between the age of the small retailers and the type of mobile phone they have

Table 3: Correlation between the age of the Unstructured Retailers

Spearman's rho		Age	Type
Age	Correlation Coefficient	1.000	.144
	Sig. (2-tailed)	.	.132
	N	110	110
Type of Mobile Phones	Correlation Coefficient	.144	1.000
	Sig. (2-tailed)	.132	.
	N	110	110

There is no significant correlation between the age of the Unstructured Retailers and the type of mobile phone they have. Since the correlation coefficient is 0.144 and the Sig (2 tailed) p-value is 0.132, which is  $> 0.05$ .

**H<sub>2</sub>:** There is a correlation between the education of the Unstructured Retailers and ownership of a retail license

Table 4: Correlation between the education of the Unstructured Retailers and ownership of a retail license

Spearman's rho		Edu	License
Edu	Correlation Coefficient	1.000	-.284**
	Sig. (2-tailed)	.	.003
	N	110	110
Retail License	Correlation Coefficient	-.284**	1.000
	Sig. (2-tailed)	.003	.
	N	110	110

There is a negative correlation between the education of Unstructured Retailers and ownership of a retail license. The Spearman's correlation coefficient is -0.284, and the significant value is 0.003, which is  $<0.05$ (alpha). Therefore, more educated people are more likely to claim a retail license.

**H<sub>3</sub>:** There is a correlation between the type of mobile the vendors own and the purpose of using the mobile phone

Table 5: correlation between the type of mobile the vendors own and the purpose of using the mobile phone

Spearman's rho		Type	Purpose
Type of Mobile Phones	Correlation Coefficient	1.000	.873**
	Sig. (2-tailed)	.	.000
	N	110	110
Purpose of use of internet	Correlation Coefficient	.873**	1.000
	Sig. (2-tailed)	.000	.
	N	110	110

There is a significant positive correlation between the type of mobile the vendors own and the purpose of using the mobile phone. The correlation coefficient is 0.873, and the p-value is  $0.000 < 0.05$ . Therefore, people with no phones or phones with physical keypads are more likely to deal in cash, and those with smartphones use phones for retailers' purposes.

**H<sub>4</sub>:** There is no significant correlation between the income of unstructured retailers and the fact that they pay GST

Table 6: correlation between the income of unstructured retailers and the fact that they pay GST

Spearman's rho		Inc	GST
Inc	Correlation Coefficient	1.000	-.274**
	Sig. (2-tailed)	.	.004
	N	110	110
GST when you purchase your products	Correlation Coefficient	-.274**	1.000
	Sig. (2-tailed)	.004	.
	N	110	110

There is a significant negative correlation between the income of unstructured retailers and the fact that they pay GST. The correlation coefficient is -0.274, and the p-value is  $0.004 < 0.005$ (alpha). Therefore, people with more income are more likely to pay GST than people with less income.

**H<sub>5</sub>:** There is a significant difference in whether unstructured retailers charge GST or not based on the type of retail they own

Table 7: A significant difference in whether an unstructured retailer charges GST

Test	Sig.	Decision
Independent Samples Kruskal – Wallis Test	0.000	Reject the null Hypothesis

According to the Kruskal Wallis H Test, there is a greater likelihood that grocery stores and pharmacies do not charge GST or are unaware of its existence. The Kruskal-Wallis test showed significant evidence (p 0.001) of a difference in the mean ranks of at least one pair of groups. [Case in point:] The five different combinations of groups were each subjected to a Dunn's pairwise test. There was substantial evidence (p less than 0.001 after the Bonferroni correction was used).

**H<sub>6</sub>:** There is a significance between different types of retailers in terms of owning a GST license

Table 8: significance between different types of retailers in terms of owning a GST license

Test	Sig.	Decision
Independent Samples Kruskal-Wallis's test	0.000	Reject Null Hypothesis

The Kruskal-Wallis test showed significant evidence (p 0.001) of a difference in the mean ranks of at least one pair of groups. [Case in point:] It has been shown that merchants in the grocery and pharmacy industries are more likely to be operating without a valid GST license. The five combinations of groups were each subjected to Dunn's pairwise test. There was substantial evidence (p less than 0.001 after the Bonferroni correction was used).

**H<sub>7</sub>:** There is a significant difference in if unstructured retailers pay income tax or not based on their educational background.

Table 9: significant difference in if an unstructured retailer pays income tax or not based on their educational background.

Test	Sig.	Decision
Independent Samples Kruskal- Wallis Test	0.000	Reject Null Hypothesis

A Kruskal-Wallis test revealed conclusive proof (p 0.001) that there is a distinction in the mean ranks of at least one pair of groups. It has been noted that shoe retailers have a better

understanding of income taxes and that they file their returns regularly. Dunn's pairwise tests were executed for each of the five possible combinations of groups. There was significant evidence ( $p$  less than 0.001 after the Bonferroni adjustment).

**H<sub>8</sub>:** There is a significant difference in owning a retail license based on the type of investments vendors have made

Table 10: significant difference in owning a retail license based on the type of investments vendors

Test	Sig.	Decision
Independent Samples Kruskal Wallis Test	0.000	Reject Null Hypothesis

The Kruskal-Wallis test showed significant evidence ( $p$  0.001) of a difference in the mean ranks of at least one pair of groups. [Case in point:] It has been noticed that retailers who have obtained a retail license are more likely to be those vendors who have obtained a bank loan or utilized their own seed money. The five combinations of groups were each subjected to Dunn's pairwise test. There was strong evidence of a difference between the groups shown below ( $p$  0.001, corrected using the Bonferroni correction).

Table 11: Difference Between the Groups: SPSS Result Screenshot

Sample1-Sample2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj.Sig.
Bank loan-Own seed money	24.667	6.256	3.943	.000	.000
Bank loan-I have a credit with other retailers	-41.333	6.256	-6.606	.000	.000
Own seed money-I have a credit with other retailers	-16.667	6.995	-2.383	.017	.052

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is .05.

The survey and the feedback analysis identify several dependencies on technology adoption. The adoption of E-payment systems is related to the type of mobile devices used by small retailers. There have also been significant dependencies on retailers that may or may not charge GST taxes to their customers. The unstructured retailers who self-fund their business are more likely to understand the service taxes, licensing, and GST systems during buying from wholesalers and apply the same taxes to their customers. Education of the small retailers also impacts the choice and decision to adopt retail technology and understand the tax structures.

## 5. Conclusion

The study aimed to map the extent of electronic commercial transactions among unstructured retailers in Khidirpur Market, Kolkata, West Bengal, India, during the post-pandemic period. The study's findings show a sluggish transition from cash-based to e-payment-based retail practices. In Kolkata, there is a large amount of lower-end mobile phone penetration, which has proven to be quite handy in routine commercial transactions. The vast majority of male traders have access to the internet via their smart mobile phones, which they utilize for retailers. Female retail owners have been shown only to use their smartphones for personal communication while connected to the internet on their low-end smartphones. When conducting retailers, they were less inclined to use them. This study might be improved by looking at how well-versed small retail owners in India are in electronic payment technology. The popular belief that unstructured retailers are impoverished and don't make enough money is false, but the use of retail technologies is relatively low and dependent on various factors impacting the adoption decisions. The future scope of the research is to extend the survey to another one or two big markets in Kolkata and include the consumer perspective. The future scope of the research is expected to identify the distribution and compare and contrast the findings between small retailers' and consumers' adoption of retail technology.

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