

Analysis of Factors Affecting Adoption of Technology in Unorganized Retail Sector

Synopsis of the Research Proposal

Submitted for the Registration into the

Ph. D. Programme (Part-Time) in Management

Of

The ICFAI University, Jharkhand, Ranchi

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2 Chapter 1: Introduction

2.1 Background of the study

Retail as a capacity is fundamental in any economy. It consolidates the assorted necessities of shoppers with proficient proposals from makers. These retail capacities are grouping creation, production network of materials, monetary exchanges among retailers and clients, data predominance and additional offices. Ordinarily, retailers of blocks and mortar have performed the majority of these capacities. There are other forms of retail, such as mail order and door-to-door form, but physical fixed retail is the main (Coughlan, 2007). Retail as a function is part of the retail value chain. The most relevant forms of this value chain include the (brand) manufacturer, the institutional retailer, and the consumer, while the institutional retailer is the sole or highest-grossing agent for the performance of retail activities. Fixed retail has the most significant role in institutional retail (The discussion solely centres on the impact of e-commerce on conventional brick-and-mortar retail, encompassing various modes of e-commerce such as mail order or door-to-door mail (e.g. offline stores, home sales) (Reinartz, Wiegand, & Imschloss, 2019). With the increasing percentage of retail shops in the retail fee chain, the superiority of fixed retail is structurally challenged because of its actions throughout online formats, along with natural gaming, online operations of manufacturers, and systems.

Whilst present save labels is participating in this transition thru a multi-channel method, a sizeable component of their sales is pushed by using new gamers, mainly Amazon. (Keyes, 2018). In 2017, Amazon in the U.S. (Thomas, 2017). accounted for about 4% of all retail sales. “The store existed just because the Internet was not invented,” According to the statement made by Oliver Samwer, the Chief Executive Officer of Rocket Internet. The trend of customers opting for the ease of digital shopping and mail-order delivery has decreased store visits for numerous physical retailers (Kapner, 2016).

In India, retail is generally unorganized, with most stores being small, independent, and family-owned. In India, a significant percentage of citizens are dependent on retail trade to make a decent living. The advent of the shopping mall culture in India has significantly impacted traditional grocery stores (mom-and-pop stores). Traditional grocery stores endeavour to compete and increase revenue by better-displaying products, offering finance, offering free home delivery, and building long-term customer relationships. Unorganized retailers strive to compete with organized retailers by reaching out to clients in their immediate vicinity and increasing their service quality. Service quality. (Sangvikar, Kolte, & Pawar, 2019). Digital

transformation, or digitization, refers to a business model based on “changes in the use of digital technology in all aspects of human society” (Stolterman & Fors, 2004). This is usually achieved through digitization. In other words, “the ability to digitalize an existing product or service to provide an advantage over tangible products.” (Gassmann, Frankenberger, & Csik, 2014).

The retail industry has undergone global conversion and expansion in the last ten years. According to eMarketer’s report, the global retail revenue generated from international sales rose from 23.56 trillion USD in 2018 to 24.78 trillion USD in 2019. Despite the adverse impact of COVID-19 on the retail sector in 2020, the revenue is expected to increase further and reach 26.69 trillion USD by 2022. As per recent reports, the collective revenue generated by the top 250 global stores amounted to approximately 4.74 trillion USD in 2018. Notably, nearly 23% of this revenue was derived from the foreign operations of these stores, primarily in emerging markets (Kalish and Eng, 2020). According to the OECD record of 2020, the debts of emerging markets apply to a significant portion of the global population, specifically 6.56 billion individuals, which accounts for approximately 86% of the total populace. Retail sales are projected to boom by 4% annually, reaching \$17.8 billion by using 2030 in developing markets with Brazil, Russia, China, and associated international locations compared to \$9.2 trillion in 2015 (Kalish and Eng 2020). However, emerging markets vary considerably in different dimensions from developed markets, sector heterogeneity, socio-political governance, structural capital shortages and a lack of infrastructure (Sheth 2011). In the U.S., 95% of the retail sector and 5% of non-organized retailers are organized to create comparisons, while in India, 93% of the distributors are organized, and 7% are not organized (Gupta et al. 2021). Rapid technological advances and the exponential rise in e-commerce platforms in emerging markets have significantly changed consumer behaviours. Emerging market users are becoming technologically knowledgeable and expecting personalized and customized services (Sinha 2019). Retail space in emerging markets has been highly competitive, with vendors vying in centralized, unorganized and e-commerce fashion for the same client base. The deep insertion of e-commerce into any category of products also poses a fundamental concern about the survival and viability of brick-and-mortar businesses across the globe (Gupta et al. 2001). Brick-and-mortar retailers should analyze and accomplish their strategic objectives with current business and consumer management strategies to satisfy the dynamic demand and customer requirements. Most emerging market retailers (especially brick-and-mortar) are

product-orientated and focus on controlling and optimizing their marketing and sales efforts by selling profitable products, thus ignoring consumer preferences (Kumar 2020).

Consequently, they take marketing alternatives based totally on the viability of previous customers but do not consider their potential profitability. The consumer-centric approach includes an individual interpretation of the clients, assessment of their ability profitability and edition of marketing and verbal exchange techniques. To transition from a product-centric technique to a customer-focused approach, shops must commit themselves to developing analytical capabilities. Linked customers depart behind digital footprints through social media and virtual stories, allowing entrepreneurs to gain insights into the associated analysis. Analytics permit entrepreneurs to develop expertise in how their clients eat their items and services in the new statistics-rich global, tune their internal income sports and the delivery chain, control their workforce and predict capacity threats across the whole value chain. PwC 2016).

While growth in the retail sector has shown that the related analytics and performative metrics have been used, this trend in emerging markets is not as apparent (Markets2020). While emerging market retailers know about the advantages of analytics, the failure of monetary, technological and human capital constitutes a crucial impediment to implementing and deploying applicable analytics and performance measures (Renner et al., 2020). Adopting consumer focus and success measures across the retail supply chain remains difficult. Most research in this area is abstract and less focused on the emerging market retail literature (Germann et al. 2014; Fiedler et al. 2017; Sides et al. 2019).

2.2 Role of Disruptive Technologies in the Retail Sector

The Indian retail sector is splintered, with local small owner-operated stores accounting for 92 percent of the total and the organized sector accounting for the remaining 8%. Rising disposable income, urbanization, the younger generation's spending power, nuclear families, and the advancement of technologies, particularly in information and communication technology (ICT), all contribute to India's retail prosperity. (Ramanan & Ramanakumar, 2014) The history of retail is also a history of society's relationship with technology. When looking at the evolution of retailing, it's clear that technology has been a critical enabler of progress. The consumer's expectations rise in unison with the advancement of technology. The power has passed from the store to the consumer in this age of fast meals and rapid lives. This

transformation is made possible by the confluence of a few innovative tools. (Tiwari and Jha, 2016).

In the current corporate environment, it is critical to research digital payment systems and their benefits. Small traders' transactions are minimal, and their turnover is very low regarding money worth. However, their livelihood and economic activity allow them to earn money. The challenge of tendering correct changes and returning changes for larger denominations is always present in these lesser-value transactions. For minor traders, it means a loss of business or sales.

Furthermore, due to transactional concerns, buyers avoid shopping with petty traders. Following the demonetization policy, their business was significantly boosted due to the implementation of a digital e-wallet payment. It makes their life good with cashless transactions. (SIVASUBRAMANIAN & RAJENDRA, 2020)

In small businesses, innovation in the business model positively impacts the firm's performance. (Kamboj, 2018) Utilizing technology facilitates a machine to consistently execute tasks capable of being replicated with a predetermined set of directives without experiencing exhaustion, thereby enabling the human intellect to engage in and concentrate on more crucial responsibilities. The application of technology in the retail industry helps teams delight their customers by allowing the team members to focus on the customers' needs. And more business means happier customers. With an unprecedented speed of ground-breaking advancements, technology has significantly improved customers' lives during the previous few decades.

Most were unexpected, changing customers' behaviour and motivating them to seek high-quality goods and services (Gungor, 2018). The critical point is that companies that do not understand the uniqueness of innovative technology are not successful in their market (Dhillon et al., 2001). Managerial emphasis on innovation enables new markets to be created and the tools used to effectively transform creative ideas (Niu et al., 2013). Where retailers have the opportunity to reinvent consistently is one of the essential things to compete effectively Hristov et al., 2015). Past studies have highlighted that innovation capacity can vary in number, and the type of innovation amongst companies operating in the same field may also differ (Cao, 2014). In reality, in the same market, innovators could thrive, depending on their internal capital and strategic direction (Kerin et al., 1992). For example, retailers adopted various innovation strategies, such as the introduction of self-service technology innovation (Evan,

2011) to transfer tasks traditionally executed by employees to an automatic machine that introduces additional technological innovations capable of entertaining and including more consumers through the provision of exciting shopping experiences (Demirkan et al., 2014) or the development of new integration systems (Hristov et al., 2015). Furthermore, the bulk of stores do not have any innovative products. As a result, the new competitive landscape has witnessed a wide heterogeneity of innovative advancements and strategies.

The retail industry is not just the most diverse but also a nuanced, demanding, and challenging sector – with tremendous opportunities – that can help companies maintain their competitive lead based on customer tastes through a consistent plan and positioning (Renko et al., 2014). A critical approach is designing and implementing store technology (Verhoef et al., 2009), but if retailers understand the advantages of technology, the technology implementation could be more successful (Grewal et al., 2018). The main aim of retailers is to lower prices and run effectively (Grewal et al., 2018). When evaluating emerging technologies' introduction, retailers assess return on investment, payback time, net present value, internal rates of return and benefit. Generally, they are implemented without a thorough understanding of how shopping experiences affect shopping, often without using innovations to fulfil customers' needs. In addition, retailers could be better off by differentiating between technology that improves operating performance and innovations that maximize consumer service (Grewal et al., 2018).

Apart from its dedication to fulfilling market requirements for novel and high-quality commodities and amenities, information technology is progressively perceived as enhancing a company's competitiveness (Chen & Tsou, 2012; Pantano & Viassone, 2014). The retail industry has undergone a disruptive innovation process due to extensive research in advanced technology and the subsequent development of new systems for retailers and consumers (Gunday, Ulusoy, Kilic, & Alpkan, 2008; Pantano & Viassone, 2014). This has made a wide range of new information systems accessible to traditional organizations. Furthermore, the novelty of these inventions impacts customer and vendor familiarity and experience, which has implications for their future successful use (Pantano & Viassone, 2014). The significance of information systems requires the creation of novel metrics and assessment techniques, as posited by Grant, Alefantos, Meyer, and Edgar (2013). Service innovation is often characterized by a focus on non-technological progress and a modest allocation of resources towards Research and Development (R&D), as Trigo (2013) noted.

The R&D efforts of the retail industry are primarily concentrated on developing novel products rather than exploring innovative approaches to enhance service delivery. Consequently, retailers frequently adopt technological advancements produced by external manufacturers at an early stage. Due to their limited creative capacity, retailers outsource all research and development endeavours. Notwithstanding the prevailing circumstances, innovative technologies for vending commodities and amenities are rapidly changing. Numerous interactive and innovative systems are accessible to aid both consumers and retailers in acquiring prompt and precise information regarding market trends and the vending process (Bennett & Savani, 2011; Fiorito, Gable, & Conseur, 2010; Pantano & Viassone, 2014; Walter, Battiston, Yildirim, & Schweitzer, 2012). Augmented reality has proven to be a significant success in retail establishments and is expected to continue to be so in the future. Adopting augmented reality has emerged as a noteworthy trend that has recently garnered considerable attention and acceptance across diverse sectors. Implementing computer-generated innovation in retail establishments holds promise for revolutionizing the customer experience, particularly within the fashion retail sector. Consumers in fashion retail stores might be motivated to buy and try on more things thanks to technology, ensuring sustainable profitability in the retail outlets. (Menon, Bhagat, & Iqbal, 2020)

Since its inception, augmented reality has demonstrated that it can make processes more active, productive, and impactful in different countries. The reason for this can be attributed to its advanced technology, which enables users to engage with virtual and real-time applications while also delivering seamless and authentic experiences. Augmented reality technology has the potential to significantly boost the brand's value and image among people, as well as engage them more effectively. (Menon, Bhagat, & Iqbal, 2020) Smart/digital mirrors and virtual fitting rooms have made a significant difference. Intelligent mirrors can create an image of what a customer would look like in a different dress without them having to try it on. The Smart Fitting Room technology is designed to identify the articles of clothing that a customer brings into the fitting room and subsequently displays the available colours, models, and sizes that can be found either in the physical store or online. Strong visual presentations might help buyers find the company or product they want. The information obtained from an augmented reality app can assist shops in learning more about their customers and getting acquainted with their purchasing decisions. (Menon, Bhagat, & Iqbal, 2020)

In recent times, self-service technologies with radio frequency identification (RFID) systems have been introduced by grocery stores, including self-cash desks and informative touch points.

Electronics stores have introduced interactive displays with touch screens, while other stores have introduced digital signage and mobile phone applications, and still, more retail-oriented firms have created e-commerce platforms (Pantano & Viassone, 2014). As a result, various retailers' innovative tactics are consistently heterogeneous. Even though technology-based developments are only in their early stages of adoption in the unorganized retail sector, other sectors have now implemented more mature and complex systems. The gaming industry prioritizes the development of advanced haptic technology and implementations, enriched virtual and augmented reality scenarios, multimodal connectivity, immersive visual storytelling systems, and personalized interfaces to enhance user engagement and enjoyment (Hamam, Eid, & El Saddik, 2013).

Retailers are finding it difficult to provide value to their customers. Customers seek "value" not only in terms of pricing, atmosphere and appearance, quality, service, and information but also in terms of choices, convenience, service, and entertainment. Retailers benefit from information technology (I.T.) because it allows them to control expenses and provide better customer value. Technology improves the customer's buying experience by delivering convenience, faster service, and more value. (Ramesh Babu, Ramesh Babu, & Narayana, 2012)

Retail customers exhibit a willingness to adopt technological interventions that address their primary concerns, including but not limited to extended wait times at checkout counters, inadequate product information within stores, challenges in locating products, and instances of stock unavailability. The employment of technology is progressively perceived as a valuable instrument for the establishment and sustenance of relationships. Information technology can impact a company's competitiveness since it can assist in fine-tuning the supply chain to meet customers' needs. To achieve a competitive edge from I.T., the retailer must continually invest long-term and make changes in most areas. (Ramesh Babu, Ramesh Babu, & Narayana, 2012).

Retailers use I.T. to do basic activities, including selling things, receiving sales data item by item, stock control, purchasing, management reporting, customer information, and accounting. Today's merchants must differentiate themselves from their competitors' service offerings and find new ways to serve their customers. The usage of technology aids in information collection and transmission. (Ramesh Babu, Ramesh Babu, & Narayana, 2012)

Retail data can assist in the implementation of a variety of marketing decisions: -

- The utilization of retail data can aid in evaluating the potential success of novel product lines and quantifying their influence on the sales of other products.

- Retailers can also use EPOS (Electronic point of sale) to give accurate and fast information about customer responses to promotional activities conducted in their stores.
- Electronic point of sale (EPOS) systems can produce comprehensive, up-to-date, and precise sales data, which has emerged as a crucial marketing resource for retailers and supplier marketing divisions. Electronic point of sale (EPOS) is a computer-based billing system primarily utilized by retailers with a high volume of regular sales, stock-keeping units, and customers. One of the primary goals of point-of-sale automation is to streamline billing procedures and boost efficiency. A basic EPOS, often a regular P.C. with all its accessories (barcode scanner, weighing scales), processes payments rapidly, updates inventory and generates real-time sales and inventory reports. (Ramesh Babu, Ramesh Babu, & Narayana, 2012)

Mobile payments are commonly defined as payment services conducted through a mobile device and are subject to financial regulations. They are also called mobile money, mobile money transfer, and mobile wallet. Numerous establishments have already obtained applications for money transfer companies and are taking a proactive approach. Some of India's most notable mobile applications include Paytm, Google Pay, Mobikwik, PhonePe, Buddy (SBI), PayZapp, Airtel Money, Jio Money, and Ola Money. (SARAVANAKUMAR, MURUGANANTHAM, & THIRUMALVALAVAN, 2020)

2.3 Technology Adoption by Retail Industry

Retailers adopted novel technology by making assumptions about the extent to which customers would utilize it and the accuracy with which managers would gather data to forecast future demand patterns. Consequently, a crucial area of inquiry has shifted towards the willingness of customers to embrace contemporary technology rather than the successful implementation or adoption of such technology by merchants and the labour force. Davis (1989) conducted a comprehensive investigation of the Technology Acceptance Model (TAM), originally designed to forecast the behaviour of Internet users using four fundamental constructs: perceived ease of use, perceived usefulness, mood, and behavioural intention. The concept of perceived ease of use pertains to how an individual perceives that utilizing a specific system would not necessitate significant exertion. On the other hand, perceived usefulness refers to the extent to which an individual believes that utilizing a particular system would enhance their performance. These constructs significantly influence the attitude that reflects an individual's evaluation of the system and their subsequent behavior (Pantano & Di Pietro,

2012). The Technology Acceptance Model (TAM) is founded on the Theory of Reasoned Action (TRA) as posited by Fishbein and Ajzen (1975) and Tsai et al. (2014).

The TRA asserts that an individual's behavioral intention is influenced by their attitude towards a particular behaviour and subjective norms. The latter refers to the expectations of others regarding the execution of a specific behavior, thereby reflecting the extent to which the opinions of others influence an individual concerning their behavior.

The adoption of certain technologies by consumers, such as self-service technologies (Lee, Fairhurst, & Lee, 2009; Lin & Chang, 2011; Lee & Yang, 2013; Schuster, Drennan, & Lings, 2013) and radio frequency identification (RFID) (Kowatesh & Maass, 2010; Cao & Li, 2018), has been the subject of academic research.

As a result, prior studies have employed the conventional Technology Acceptance Model (TAM) approach, which involves constructing augmented models that incorporate additional variables to more comprehensively elucidate the factors driving technology adoption across various technologies under investigation. Pantano and DiPietro (2012) categorized the extensive array of constructs into four primary classifications, namely technology safety and cost (e.g., privacy concerns), (Lee, 2014), social pressure (e.g., word-of-mouth communication and the number of friends using a specific technology), and the inclination towards utilizing a particular technology and its hedonic value (e.g., perceived enjoyment). Despite retailers acknowledging the significance of customers in the process, the comprehension of their position in the market remains limited (Andreu, Sanchez, & Mele, 2010). Numerous contemporary studies are presently concentrating on optimal techniques to enhance customers' active participation in the co-creation process and to extract their insights from these experiences for the development of novel products/services (Tao and Xu, 2018) while simultaneously utilizing modern internet-based technologies such as social media (Greer & Lei, 2012; Kohler et al., 2011; Sawhney, Verona, & Prandelli, 2005).

2.4 Technology Adoption by Unstructured Retailers

Technology adoption has become increasingly critical for retailers, including unstructured retailers. Adopting technology is influenced by eight key factors, as revealed by a recent study. Notably, the most significant factors are the customers' demand for payment applications and the convenience and cost-saving benefits associated with procurement applications [2]. The adoption of technology in retail has more than doubled since 2017, with artificial intelligence being one of the most commonly adopted technologies [3]. In addition, the COVID-19

pandemic has accelerated the adoption of technology in retail, with IoT technology being one of the technologies that has seen increased adoption [5]. Technology adoption is crucial for unstructured retailers to remain competitive and efficient. One key area of adoption is data monetization, which allows retailers to understand their customers better and create more targeted marketing campaigns [1]. Another area where technology adoption can be beneficial is in supply chain management. Using technologies such as RFID tagging and blockchain can help retailers track their inventory more accurately and efficiently, leading to cost savings and better inventory management [4].

However, technology adoption can also face challenges in unstructured retail environments. One potential barrier to adoption is the lack of technological infrastructure, making implementing new technologies difficult. Another challenge is the cost of technology, which can be a significant investment for retailers. Furthermore, adopting new technology can require significant changes to business processes and employee training, challenging smaller retailers with limited resources [2].

Adopting technology is essential for unstructured retailers to remain competitive and efficient in today's marketplace.

While there are challenges to technology adoption, including the lack of technological infrastructure and the cost of technology, the benefits of adopting new technologies, such as data monetization and supply chain management, can lead to significant cost savings and improved customer experiences. Retailers should consider the factors influencing technology adoption and develop strategies to overcome potential barriers.

2.5 Type of Unstructured Retailers

The retail sector in India is a rapidly expanding business domain and a substantial contributor to the nation's gross domestic product [1]. The retail industry in India was assessed at a monetary worth of \$883 billion in the year 2020 and is anticipated to surge to \$1.3 trillion by 2024 [2]. The retail industry in India can be categorized into two segments - organized and unorganized retail. Small, largely unstructured retailers dominate the unorganized retail sector, primarily family-owned and operated entities [4]. The unorganized retail sector in India can be further categorized into different types based on the nature of the business, the mode of operation, and the product category.

Some common types of unorganized retailers in India include hawkers, street vendors, peddlers, and fixed-shop retailers [6]. Hawkers are small-time retailers who carry their goods

from one place to another and do not have a permanent place of business. They are often seen on busy streets and in public places, selling items such as vegetables, fruits, and household items. On the other hand, street vendors operate from a fixed location on a street or footpath and sell food, clothes, and accessories. Peddlers are mobile retailers operating from a small vehicle or pushcart, selling snacks, ice cream, and soft drinks. Fixed shop retailers operate from a permanent location and do not move from one place to another [7]. Unstructured retail is a significant portion of the retail sector in India, accounting for around 90% of all retail sales. These retailers are small, independent businesses not part of a formal retail chain. They are crucial in providing customers with goods and services in urban and rural areas.

Here are some common types of unstructured retailers in India:

1. **Kirana Stores:** Small, independent grocery stores usually located in residential areas. They offer a variety of household items, including groceries, toiletries, and other essentials. Kirana stores are often owned and operated by families and are an essential part of the local community.
2. **Street vendors** sell goods on the street or in public areas. They often sell fresh produce, snacks, and other inexpensive items. Street vendors are prevalent in urban areas and provide affordable options to customers who may not have access to traditional retail stores.
3. **Mom-and-Pop Stores:** These are small, family-run businesses that sell various products, including groceries, clothing, and other household items. Mom-and-pop stores are prevalent in rural areas and small towns and are often run by families who have been in business for generations.
4. **Convenience Stores:** Convenience stores are typically open 24 hours and sell various products, including snacks, beverages, pharmacy and personal care items. These stores are often located in densely populated urban areas and provide quick and easy access to essential items.
5. **Hawkers** are street vendors who move from place to place, selling their goods to customers on the street. They often sell items like clothes, accessories, and small household items. Hawkens are prevalent in urban areas and are often seen in busy marketplaces and tourist areas.
6. **Pan Shops** are small stores selling tobacco, cigarettes, and other smoking-related products. Pan shops are often located near busy marketplaces and transport hubs.

According to a National Sample Survey Office report, there were approximately 12 million unstructured retail outlets in India in 2019-20. The report also found that unstructured retail sales accounted for around 92% of total retail sales in the country. Kirana stores were the most prevalent type of unstructured retailer, with over 8.5 million operating stores. Research studies show that the unorganized retail sector in India is mainly unstructured and lacks modern technology and supply chain management systems [3]. However, this sector is vital to the Indian economy, as it provides employment opportunities to millions of people and plays a significant role in catering to the needs of consumers, particularly in rural areas [2]. Unstructured retail is a significant part of the retail sector in India, and many different types of retailers serve various customer needs. These small, independent businesses play a vital role in providing goods and services to customers in both urban and rural areas, and they are an essential part of the local community. While this sector lacks modern technology and supply chain management systems, it is vital to the Indian economy and provides employment opportunities to millions of people.

2.6 Types of Retail Technologies

The integration of retail technology has emerged as a crucial component of modern retail enterprises both in India and globally. The domain of retail technology pertains to integrating novel technological advancements and digitalization in brick-and-mortar retail and online commerce. This includes various functionalities such as point-of-sale systems, inventory management, order processing, and in-store customer service. The utilization of retail technology is a crucial factor in augmenting the customer experience and improving operational efficacy. As per a report published by Forrester Research, India's retail sector was projected to have a valuation of US\$ 883 billion in the year 2020, with a significant portion of US\$ 608 billion allocated towards the purchase of groceries. It is projected that by the year 2024, the value is anticipated to attain US\$ 1.8 trillion [2][4]. Therefore, it's not surprising that Indian retailers, both structured and unstructured, have adopted various retail technologies to improve their businesses.

One significant technology retailers adopt in India is mobile point-of-sale (mPOS) systems. These systems allow small retailers to accept payments through mobile devices, making it easier to process transactions and compete with larger retailers. In addition, larger retailers have also started adopting mPOS systems to enhance the in-store shopping experience by enabling customers to pay using mobile devices [1]. Another technology adopted by retailers in India is the use of electronic shelf labels (ESLs). ESLs are digital displays that replace traditional paper

labels and allow retailers to update prices in real time. This technology benefits retailers because it saves time and reduces the risk of errors when manually updating prices. Additionally, using ESL improves the customer experience by ensuring accurate and up-to-date prices [7].

Inventory management systems are another technology adopted by retailers in India. These systems use data analytics and artificial intelligence (A.I.) to help retailers optimize inventory levels, reduce waste, and increase sales. Retailers can use these systems to track inventory levels in real time and automatically reorder products when stock levels are low. Inventory management systems have become increasingly essential for online retailers in India, where they face intense competition and the need to fulfil orders quickly and accurately [1].

Finally, customer relationship management (CRM) systems are another technology retailers adopt in India. These systems help retailers manage customer data, track customer behaviour, and create personalized marketing campaigns. Retailers can use CRM systems to send customers targeted promotions and special offers based on past purchases and preferences. CRM systems are becoming increasingly important for retailers in India as they seek to differentiate themselves in a highly competitive market [5].

Structured and unstructured retailers in India have adopted various retail technologies to improve their businesses. These technologies include mobile point-of-sale systems, electronic shelf labels, inventory management, and customer relationship management systems. These technologies have become increasingly important for retailers in India as they seek to remain competitive in a rapidly evolving retail landscape.

2.7 Technology adoption during the Pandemic

Even though continuous change has long been acknowledged as a fundamental element of retailing, and its current acceleration has been unparalleled, retail innovation remains under-researched. The potential application and deployment of wearable gadgets in experiential retailing have recently generated massive attention in the retail industry. These technologies include virtual reality (V.R.), augmented reality (A.R.), and mixed reality (M.R.). Despite their similar names, these three technologies differ in significant ways. V.R. is an immersive digital experience miming an interactive environment since it generates realistic images, sounds, and other sensations (Dehghani et al., 2020). As a result of this predicament, questions regarding how the effects of digital technology have irreversibly transformed sectors arise.

Wood et al. (2020) have identified several potential implications, including reduced market entry barriers, disintermediation of established suppliers, access to a potentially global digital labour pool, and consumer empowerment through knowledge and new distribution channels. The utilization of AI-based technologies and techniques, including but not limited to Robots, Chatbots, bots, augmented reality, virtual reality, machine learning, deep learning, computer vision, cognitive conversation commerce, and the Internet of Things, has resulted in significant transformations within both the physical and online retailing space (Pillai et al., 2020). The global spread of the COVID-19 contagion and its immediate impact on our health, the economy, political tendencies, and daily lives cannot be understated (Goodell, 2020). Customers were one response to this “new normal” milieu of social alienation, quarantining, and mask-wearing (Pagano et al. 2021).

The process drastically reduced the number of footfalls; hence, technological change and adoption became crucial in organized and unorganized retail segments. Implementing AI-based technologies and techniques, including Robots, Chatbots, augmented reality, virtual reality, and the Internet of Things, is having a transformative effect on physical and online retailing, as noted by Pillai et al. (2020).

2.8 Factors Bringing Changes in Retail Industry

Compared to their predecessors, contemporary customers exhibit a heightened level of attentiveness towards the procurement process. Retail customers expect a tailored and individualized shopping experience from their respective retailers. (Ramanan & Ramanakumar, 2014)

Retailers must provide a seamless customer experience across all platforms. Retailers use better customer service to increase sales, build loyalty, and project a positive image. Several factors influence the consumer experience: -

- Store proximity and layout.
- Parking facilities, cafeteria, entertainment, children’s play area, restrooms, and so on
- Retailers’ desire to keep engaged with shoppers.
- Quick and prompt service at retail outlets
- Uncomplicated return policy (Ramanan & Ramanakumar, 2014)

The origins of trade and commerce can be traced back to the emergence of human civilization nearly 10,000 years ago. As aforementioned, the concept of retail, also known as organized

retail, has a historical background spanning nearly 150 years. This industry has evolved into a tool for widespread change in how we work and engage in the economy in various sections of society today. The following graph depicts the retail industry’s evaluation:

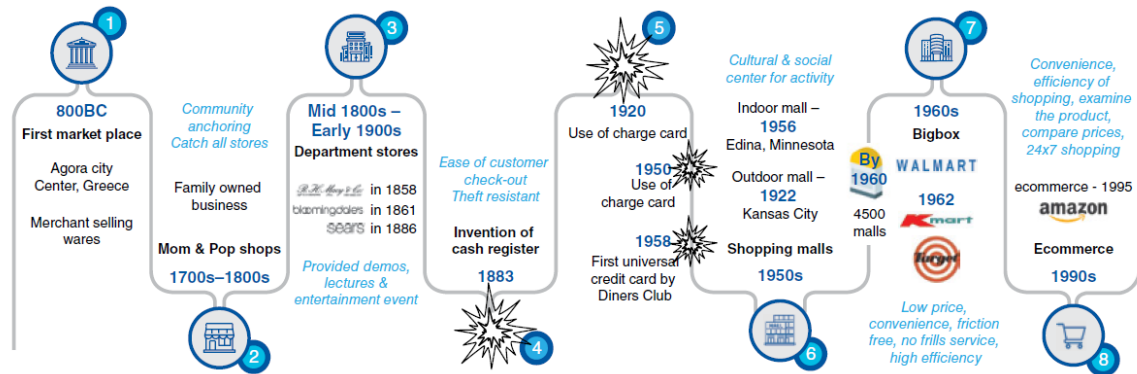


Figure 1. Evaluation of Retail Industry||

Source: macys.com, Bloomingdales, Transform S.R. Brands LLC, Walmart, Target Brands, Inc., and Amazon.com, Inc.

2.8.1 Economic Factor

The correlation between a nation’s economy and the retail industry is evident, having undergone a gradual transformation over various economic fluctuations. Consumption-driven economies have a far stronger association than those centered on production and agriculture. In most nations, retail industry growth or dynamics strongly indicate future growth and present market fiscal liquidity. Many aspects of the retail sector, such as automobiles, apparel, and consumables, are subject to varied slow-down and turnaround times and are a good predictor of the most likely future scenarios. The essential contribution to the decision-making processes of business leaders and legislators in the retail sector regarding investment and action is to understand the economic influence and interconnections with other sectors and marketplaces.

2.8.2 Policy Factor

Government policies have an impact on the retail industry as well. Small local businesses comprise a significant portion of the grocery, pharma, footwear and apparel stores last mile in various locations. The government positively impacts prosperity by developing programmes and resources to assist small businesses. Government policies can either enable or dissuade significant players. Large-format multinational supermarkets, for example, were not authorized in India, one of the world’s most lucrative retail marketplaces. However, the government has liberalized the market in the past ten years. The region has permitted the establishment of

expansive multi-brand retail outlets and has witnessed a surge in foreign direct investment, leading to the establishment of significant global retail chains in the country. Jeff Bezos has recognized India as a critical market and allocated over \$1 billion to enhance infrastructure and expand capacity. The retail industry has emerged as a prominent contributor to the economy, constituting more than 10% of the Gross Domestic Product (GDP) and exhibiting nearly equivalent employment expansion.

2.8.3 Demographic Factor

The demographic composition and changes in various enterprises significantly influence the retail industry, both of which have economic implications. Most developed economies exhibit a demographic trend characterized by an increasing proportion of elderly individuals, whereas most developing economies display a comparatively youthful population. The purchasing behaviours exhibited by various ethnic groups may exhibit a high degree of variability. There exist correlations between demography, economics, and consumer behaviour. In highly industrialized and affluent countries, such as those in which the Millennial Generation, also known as Gen Y, resides, economic growth prioritizes consumerism and retail expenditure over savings.

Nevertheless, the economic ramifications of age distribution within a given society do not provide a comprehensive understanding of its influence, as it entails a significantly more nuanced analysis. The demographic upsurge and expansion of the middle-income bracket significantly influenced the retail sector's economic growth. The prevalence of multigenerational households in markets traditionally dominated by nuclear families has notable implications for the retail industry, as it alters the nature of domestic retail production.

2.8.4 Sustainability Factor

Retailers and governments have emphasized environmental protection throughout the retail value chain in the past six years; however, the degree of care is rising tremendously. (Zaltman, 2003). Several factors motivate retailers to address environmental concerns. Retailers can implement measures at the organizational level, particularly for their facilities. However, they are susceptible to significant environmental impacts that occur remotely from their supply chains, frequently in jurisdictions with uncertain environmental regulations. The cost of conducting business is another contributing factor to this trend. Frequently, the utilization of renewable resources in a more sustainable manner can reduce costs. Several major retailers have leaders and groups dedicated to ensuring sustainability from beginning to end. Data

monitoring and management are crucial to monitoring and maintaining supply chain sustainability.

2.8.5 Pandemic Factor

The onset of the COVID-19 pandemic has had a profound effect on all sectors, with the retail industry experiencing one of the most severe impacts. This disruption is particularly evident among unstructured retailers who faced immediate and significant challenges with the introduction of lockdown measures in March 2020. These measures, while critical to public health, led to a sudden collapse in the conventional retail sector as the footfall in physical stores declined sharply. Unstructured retailers, often limited in their digital presence and technological capabilities, found themselves at a distinct disadvantage. The shift toward social isolation and enforced lockdowns necessitated a pivot to digital platforms that many were unprepared for. As a result, even in the face of high demand, these retailers struggled to compete with more digitally savvy counterparts who could cater to consumers in a contactless, online environment. The longer-term economic effects of the recession brought on by the pandemic are likely to persist, with a sustained impact on consumer spending patterns. Unstructured retailers, therefore, not only have to contend with immediate operational challenges but also with a broader economic climate of reduced consumer spending. This environment demands a strategic reassessment and adoption of technology for unstructured retailers to navigate the ongoing crisis and its aftermath.

2.8.6 Technological Factor

The impact of technological advancements on unorganized retail outlets has become a focal point of discussion within the sector. Historically, these retailers have not been part of the mainstream push towards technologically driven marketing strategies, instead relying on direct customer interactions and conventional methods such as word-of-mouth and physical displays of their products (Zaltman, 2003). The advent of e-commerce has dramatically altered the commercial landscape, necessitating even the smallest unorganized retailers to consider an online presence (Lee, 2001). The rapid shift towards online platforms has left unorganized retailers grappling with a need to either establish a digital footprint or form alliances with larger entities that have already made the transition (Gulati et al., 2000). In this fast-paced market, unorganized retailers face the challenge of adapting to a new set of operational rules defined by technological innovation (Lee, 2000). The transition to e-commerce is not simply about adding an additional sales channel but represents a complete overhaul of their business model.

The shift is not only in how they engage with customers but also in the underlying processes that govern their business operations. The crux of the matter for unorganized retailers is not the replication of successful e-commerce strategies but the fundamental change in how they traditionally conduct business. E-commerce introduces an entirely new paradigm that requires unorganized retailers to adopt innovative technologies or risk becoming obsolete. In scenarios where the unorganized retail sector remains small, embracing technology is not an option but a critical necessity for survival. These retailers may need to consider becoming technologically adept, aligning with larger e-commerce platforms, or transforming into delivery partners to remain viable. This research will focus on the repercussions of retail technologies on the distribution networks of unorganized retail outlets, examining the ways in which these technologies necessitate operational shifts. It will delve into the implications for unorganized retailers who must now navigate a landscape where technological integration can mean the difference between thriving and closing down.

2.9 Statement of the problem

The accelerated embrace of technology in the retail sector has been pivotal in enhancing operational efficiencies and profitability. Yet, disparities in the adoption rates of such technologies are evident across different retail formats and categories. This variance prompts the inquiry into the obstacles unorganized retailers encounter with technology adoption and how these might be overcome. A comprehensive examination of the literature reveals a seismic shift in the retail landscape, with this transformation starkly highlighted during the COVID-19 pandemic's enforced nationwide lockdowns. The unorganized retail sector, characterized by its smaller scale and limited resources, has been particularly challenged in integrating new technological advancements. Despite strides in some areas, such as adopting digital payment systems, these retailers continue to grapple with ensuring efficient delivery of goods and services. Unorganized retailers are noticeably lagging in digital transformation and supply chain optimization when contrasted with their online counterparts. As the market environment advances, it becomes imperative to forge a strong support system tailored to the unique needs of the unorganized retail sector. This involves overcoming significant hurdles related to capital, workforce, infrastructure, and distribution networks, even when resources are constrained. Identifying and resolving the specific issues these retailers face in adopting technology is an immediate and critical step towards enhancing their competitive standing in an increasingly digital marketplace.

2.10 Objectives of the study

1. To study the factors affecting technology adoption by unorganized retailers
2. To study the impact of format and product category on the adoption of technology by unorganized retailers
3. To study the benefits of technology adoption by unorganized retailers

2.11 Research Questions

1. What are the factors affecting (or) against the adoption of retail technologies by unorganized retailers in Kolkata? (Survey Questions under UTAUT2 Model)
2. What are the types (or) nature of retail technologies adopted by unorganized retailers? (Survey Demographic Questions)
3. What is the role of education (or) knowledge in adopting retail technology by unorganized retailers? (Survey Questions under UTAUT-2 model)
4. What is the perception of unorganized retailers towards availability, usability and adoption of retail technology for achieving successful business? (Survey Questions under UTAUT2 model)

2.12 Significance of the study

The proposed research is significant in several ways. Firstly, technology adoption is crucial for the growth and success of any industry, including the retail sector. This research will provide insights into the factors that influence the adoption of new technologies in the retail industry, particularly in the unorganized sector. It will help identify the challenges faced by retailers in adopting new technologies and propose strategies to overcome them. Secondly, while technology adoption is relatively higher in the organized retail sector, there is a lack of uniformity in its adoption across all retail formats. This research will help identify the formats lagging in technology adoption and provide insights into the reasons for this lag. Thirdly, the research will investigate the human behaviour theory accompanying technology adoption. The findings of this research will provide insights into the factors that influence the success and adoption of new technologies in the retail sector. Fourthly, the shift towards embracing technological solutions has become more visible after the onset of the Pandemic due to Covid-19. Therefore, this research is timely and relevant, as it will provide insights into the impact of the Pandemic on technology adoption in the retail sector. Lastly, the research will focus on grocery, pharma, apparel, and footwear retail stores that only sell manufactured goods. This narrow focus will enable the research to provide detailed insights into the challenges retailers

face in these formats and propose strategies to overcome them. The proposed research is significant as it will contribute to the existing knowledge on technology adoption in the retail industry, particularly in the unorganized sector. It will provide valuable insights to retailers, policymakers, and other stakeholders, helping them make informed decisions about technology adoption and its impact on the industry's growth and success.

2.13 Scope of Research

The digital revolution also accelerates globalization. Even small businesses should benefit from global acquisitions and seek new clientele from other countries provided by digital advancements, particularly increased interconnectivity (Lituchy & Rail, 2000; Prasad, Ramamurthy, & Naidu, 2001). For specific retailers, increasing digitalization entails a variety of socially sensitive tasks, such as understanding different internet purchasing behaviour (Mazaheri, Richard, Laroche, & Ueltschy, 2014; Park & Jun, 2003) or adapting online stores to the expectations of socially diverse crowds (Bartikowski & Singh, 2014; Bartikowski, Taieb, & Chandon, 2016; Luna, Peracchio, & de Juan, 2002). Unorganized retailers are being forced to evaluate and adjust set-up procedures due to the increased disruption of plans of action brought about by digital improvements, and they see new opportunities and challenges. As a result, we define digital transformation as the combination of the digitalization of already simple (administration) activities, methodology, credible errands, and administrative cycles to create an incentive for clients, representatives, and various partners, with the ultimate goal of gaining a competitive advantage.

Digital transformation necessitates a re-evaluation of action plans, including determining whether previous cycles, products, or operations are still necessary and whether new digital options and options could supplant or improve them. Despite universal recognition of the importance of digital transformation, the scientific literature on the topic is extraordinarily splintered, with few connections between fields of study. From one point of view, this article presents an overview of studies on digital transformation, focusing on retailing and client-facing aspects of digital advances and their essential consequences for planning. We also include a plan for productive future exploration in the industry, emphasizing complex advancements, developments, and patterns that retail showcasing executives will look at sooner rather than later by spreading the focus beyond retailing. (Evanschitzky et al., 2020).

There is an absolute absence of comprehension of how new multisensory advances may assist with reproducing administration encounters through multisensory portrayal. How clients

respond to digital conditions is muddled as to whether they can improve the general client experience. For instance, while it very well might be fun in the principal case to “contact” items essentially utilizing reverse electro-vibration advances, purchasers may quickly rediscover the estimation of genuine actual encounters, reject the previous, and pick the last whenever the situation allows. Also, it is hazy how digitization and the virtualization of item and administration contributions will change the idea of client brand connections (Evanschitzky et al., 2020). Aside from the more imminent challenges from the research described in this article, digital disruption may have longer-term implications for the retail industry. New commitments to problematic developments and plans of action transformation have examined some of the characteristics that make up interruptions (Müller, Traub, Gantner, & Voigt, 2020). The interruption hypothesis (Christensen, 2013) proposes that disruptors join the market at the low end of the cost and quality spectrum and that the disruption (fundamentally) causes (a few) existing enterprises to be disappointed (Christensen, 2013; Christensen, Raynor, & McDonald, 2015).

Regardless, continual interruptions have occurred without regard for a market’s passing point or the dissatisfaction of officeholders. Another innovation is detrimental if it eventually replaces the officeholder invention and profoundly alters the behaviour of most partners, clients, suppliers, and competitors (Müller et al., 2020). As a result, digital disruption alters how clients interact with enterprises seeking to build trust; disruptors may enter the market at any point regarding cost and quality, and incumbent firms may not quit the market but modify their strategy. Such a plan of action transformation can be fruitful if the redesigned offer is in line with sustained, fundamental changes in client behaviour, the transformation isn’t limited to specific parts of the organization but rather the entire organization, and the representatives are viewed as capable change specialists (Rudolph & Schweizer, 2019).

The research will focus on the district of Kolkata. Only the unstructured retailers in the Kolkata district would be identified.

- The research will be undertaken in the District of Kolkata, a metropolitan city in West Bengal, India,
- The study’s target population is divided into groups based on the types of the basic unorganized retailers:
 - Grocery / Kirana
 - Medicine / Ayurveda / Homeopathy / Yunani
 - Footwear

- Ready-made Garments
- Handicraft and Artisan
- Electronics

The research methodology and design would include the above-mentioned six types of unorganized retailers in the District of Kolkata. Even among these six types of unorganized retailers, only those establishments that deal with manufactured goods (tangible items) would be considered.

2.14 Limitations of the study

The proposed research has some limitations that need to be acknowledged. Firstly, the research will focus only on the below mentioned six categories of unorganised retailers: -

- Grocery / Kirana
- Medicine / Ayurveda / Homeopathy / Yunani
- Footwear
- Ready-made Garments
- Handicraft and Artisan
- Electronics

Therefore, the findings may not be generalizable to other retail formats that sell a more comprehensive range of products. Secondly, the study will be limited to a specific geographical location of Kolkata, and the findings may not be generalizable to other regions or countries. The research will be conducted in the Kolkata District, and the findings may not represent the entire retail sector. Thirdly, the primary research conducted through surveys and interviews may be limited by the sample size and the respondents' biases and location-wise limited to only the city/district of Kolkata in West Bengal, India. The sample size may not be large enough to generalize the findings, and the respondents may have biases that may affect the accuracy of the results.

Lastly, the research will be limited by the data availability and the study's time frame. The research will be conducted within a specific time frame, and data availability may be limited, affecting the depth and accuracy of the research findings. Despite these limitations, the proposed research will provide valuable insights into the challenges faced by retailers in adopting new technologies and propose strategies to overcome these challenges. The findings of this research will be helpful for retailers, policymakers, and other stakeholders in the retail

industry, helping them make informed decisions about technology adoption and its impact on the industry's growth and success.

2.15 Structure of Thesis

1. **Introduction:** The initial chapter provides an overview of the research's fundamental structure, encompassing the study's context, problem statement, research objectives, inquiries, study significance, and scope and constraints. This segment presents a synopsis of the subject matter under investigation and delineates the contextual framework of the study. The statement delineates the primary concerns and presents a broad outline of the research quandary. The problem statement delineates the research issue and its importance. The statement elucidates the precise objectives of the research and the particular concerns that will be examined. The study's objectives refer to the precise and measurable targets the research aims to accomplish. This section delineates the research objectives and their pertinence to the research quandary. Research questions are precise inquiries that a research endeavour endeavours to address. Research objectives typically inform the formulation of research questions, guiding the research design. The study's significance underscores its potential to contribute to academic and practical domains. The text elucidates the significance of the research and the prospective influence of its discoveries. The scope and limitations of the study serve to delimit the research parameters and delineate the constraints of the investigation. The research elucidates the scope of its coverage and non-coverage while also expounding on probable limitations of the research.
2. **Literature Review:** The literature review chapter critically analyses the extant literature pertaining to the research topic. The present chapter provides an outline of the unorganized retail sector in India, emphasizes the significance of technology integration in the retail industry, examines the factors that influence the adoption of technology in the retail sector, and presents a comprehensive analysis of the existing literature on technology adoption in the retail domain.
3. **Research Methodology:** This chapter outlines the research design, sampling technique and sample size, data collection method and tools, and data analysis technique used in the study.
4. **Results and Discussion:** The results and discussion chapter presents the study's findings. It includes descriptive statistics of the respondents and an analysis of the factors affecting technology adoption in the unorganized retail sector. Discussion of the

findings: This section provides an interpretation and discussion of the findings presented in the previous chapter. It discusses the implications of the findings and their significance for the research problem.

5. **Conclusion and Recommendations:** The chapter encapsulates the top discoveries of the investigation and furnishes suggestions grounded on the research aims. The document comprises a concise overview of the research outcomes, a deduction derived from the research objectives, potential consequences, suggestions for future research, and proposals for adopting technology in the disorganized retail industry.

Chapter 2: Review of Literature

2.1 Retail Technology

Retailers, as expected, are faster in adopting technology than entrepreneurs. They are more obsessed with sales tactics, even though advanced technology can aid service delivery. As a result, retailing is seen as a service-oriented industry that is always changing. By incorporating clients' experiences into the list of important resources as main components in the service design, consumer participation in service-related procedures may improve the quality of the service supplied (Chen & Tsou, 2012). As a result, market knowledge of developing technologies in terms of emotion, behavioral purpose, and successful gadget use plays a key role in technology selection and adoption. Retailers can simplify the difficulty of innovating by employing various approaches and tactics. The Concern Breakdown Structure (RBS), for example, is a good way of assessing the risks involved by outlining the potential sources of risks (starting with a root node representing a common risk) and breaking it down into levels of increasing detail (Hillson, 2002; Pantano et al., 2021). Despite being preferred for accurate risk assessment, the chance-impact grid (Ward, 1999) assigns a risk rating based on the possibility of occurrence and the impact. Pantano and colleagues (2013) developed a novel graphic technique for assessing risk interdependences to see if the importance of danger grows as the influence of other risks develops. Technology development and innovation management are inextricably intertwined, with studies concentrating on how to conceive, produce, and deploy an innovation based on technological advancements. The governance of advanced technology in retailing, in particular, is strongly intertwined with the management of advanced technologies introduced in point-of-sale, which improved the mechanism from a variety of perspectives (i.e., customers, vendors, suppliers, etc.) and can be investigated using a variety of approaches (i.e., acceptance models, ethnography, usability, etc.).

Digitalization has influenced retail (Hagberg et al., 2017; Hoyer et al., 2020). Retailers now access various tools to improve logistics and the consumer experience. It has been suggested that retailers who play and invent with these innovations would be the most effective (Grewal et al., 2020). Various technologies that improve the shopping journey and processes in stores have emerged in a recent study (Mosquera et al., 2018; Willems et al., 2017), with their distinguishing trait being that they are transparent and consumer-facing (Mosquera et al., 2018; Willems et al., 2017). Just a few examples encompass fit technologies (Beck and Crie, 2018), artificial reality (Rauschnabel et al., 2019; Reses et al., 2017), self-checkout (Lee, 2015), and retail applications (Pantano and Priporas, 2016; Perry et al., 2019; Watson et al., 2013).

The existing literature on retail technology advancements is divided into three categories: offline and internet, consumer and firm viewpoints. Offline research (Pantano and Priporas, 2016) concentrates on market penetration and recognition of emerging innovations. The study of consumer acceptance of online applications focuses on mobile devices and software. These studies usually use the technology acceptance model (TAM) (Davis, 1989) or TAM paired with one or more other theories of adoption to investigate consumers' perceived ease of use, utility, and attitude toward the technologies (Yadav and Pavlou, 2020). The second line of inquiry focuses on retail management strategies for integrating online and offline technology to determine their disruptive impact on retail, especially omnichannel retailing (e.g., Hagberg et al., 2017; Savastano et al., 2019; Willems et al., 2017). Even though technical advancement and market demands are continually changing, they do focus on a few emerging and future new inventions (Hoyer et al., 2020). Nonetheless, there are differing perspectives on the pace of in-store technology adoption by fashion Tracking technology diffusion retailers, with some researchers hailing them as innovators (Mosquera et al., 2018; Pantano and Vannucci, 2019), while industry sources blame them for being late to adopt in-store technologies (McKinsey, 2017; Thomson, 2020). Given the sector's issues, such as changing customer attitudes toward technology and the rapid rate of technological advancement, it's vital to maintain track of retail innovation diffusion progress.

2.2 Advantages of Retail Technology

- Retailers benefit greatly from the automation of processes. It decreases expenses, improves precision, shortens processing times, enables prompt decisions, and accelerates customer service.
- Individual shoppers' purchases are analyzed. Analysis of shopping trends informs product expansions and promotions. Loyalty card databases contain client

demographics. Retail Technology provides transaction data for the loyalty card. These data can profile customers. It allows for targeted client offerings. All loyalty cardholders from the previous year may get a mail-order catalog. Internet and e-commerce businesses leverage prior purchases to customize their website for each customer by presenting comparable products. They welcome site visitors by name.

- Retail Technology allows consolidated data analysis which determines the impact of promotions, pricing, new items, and packaging changes. Retailers might examine shop layout or merchandising modifications based on category sales, competitive brands, gross profit, and store sales. Innovative product concepts may be tested in the market. The automation data analysis assists the organization in; promotion evaluation, core and seasonal product price response, forecasting the impact of new policies, and promotional plans.
- Retailers can communicate well with vendors. Purchase orders, inventories, and sales information are sent across third-party networks. E-commerce is fast and cheap. Retailers can place orders one or two days in advance vs. seven days for paper-based purchases. Store computers provide automation data daily to the back office. So, the retailers can examine each sale and product group. Auto-replenishment occurs. The automated technology collects daily data from each sale, so the following day's supply needs are known. The technology automatically updates the inventory. The products which are low in stock can be immediately re-stocked. Effective communication reduces the delay between placing an order and getting the product.
- With advanced software, retailers can plan, budget, predict, find the best location, and oversee their business. Retailers can use model decision-making, sales forecasting, and data mining techniques. Retailers can utilize GIS. Sociodemographic data, firm transaction data, and analytical methods are utilized to anticipate shop sales.
- IT-assisted transactions are faster, more accurate, and more convenient than traditional retailing.

Online retailing has proven to be a game changer for retailers and customers. Electronic sales include food, clothes, footwear, music, books, films, cameras, photographic products, computer hardware and software, pharmaceutical items, etc. Banking, insurance, financial services, real estate, stocks and shares, tourism, flowers, entertainment tickets, virtual education, information services, etc. Thus, retail technology is changing goods, processes,

organizations, industries, and competition. Today, retail technology has remarkably reached globally.

2.3 Limitations of Retail Technology

- Retailers utilized Retail Technology to automate finance, payroll, and management accounts. Only a few department retailers can afford electronic POS. The retail industry is greatly fragmented. Retailers spend a lot on technology equipment installation.
- There are a wide variety of things that may be sold in retail. A vast number of product lines necessitate the use of a complicated system.
- Routine automation process investments are quite expensive.
- Retailers have an unacceptably high failure rate when implementing new IT systems.
- Rather than focusing on transformative changes, many merchants, says Prof. John Sawson, are focused on operational ones. It hasn't delivered on its promise of financial gain. Small sums of money are spent on IT by retailers.
- It may take longer to get the full benefits of retail technology. The new mechanisms should be exploited to the fullest extent possible by retailers. Investing in well-known retail systems is common, but just a handful effectively leverage consumer data. Stock replenishment systems based on IT could only be developed by retailers that had made significant investments and had gained valuable knowledge.
- The retail business has not seen a performance boost from a software point of view alone. There is a pressing need for hardware upgrades as well.

2.4 Retail Technology Adoption in India

The pandemic prompted shopping centers to develop new strategies and turn to online shopping, accelerating the pace at which they could deliver value to customers. "B2B (Business-to-Business) e-commerce businesses like Udaan & ShopX are depending on these lower tier cities accounting for 60% of retail spend," said Anurag Mathur, partner & head - consumer & retail Business, Strategy8, part of the PwC network. Tier 2 and 3 cities had a triple-digit increase in online sales, while metro areas saw less than 2% growth. According to what Mathur said at the Phygital Retail Convention 2021 in Mumbai, tier 2 and tier 3 cities have drawn five times more investments in retail infrastructure than metro cities. Social commerce in India is expected to grow to \$18 billion by 2025, contributing to a total of \$104 billion in online retail sales in India.

Many recent technological developments have brought about profound changes in the retail sector. As the new economy has emerged and expanded, it has unleashed enormous forces that successfully and rapidly alter the retail sector. Retailers in the modern day must provide a consistent and convenient purchasing experience across all channels or risk losing customers. The entire ecosystem of modern retail is technologically advanced. 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 the places where complaints and praise may be focused directly: wallets, point-of-sale data, and social networking. The merchant is responsible for all the apps customers use to try on the goods, learn more about them, and ultimately make a purchase.

The retail industry's heavy hitters have welcomed new technologies with open arms, using them to their full potential to attract and retain consumers and grow their businesses. Small merchants, especially those in the unorganized sector, have been slower to embrace technology to keep up with the rapid pace of industry shifts and technological advances. Eighty percent of the retail business in India is unorganized, so if that sector adopts technology, it would herald a new age for the retail industry and provide the Indian economy with a much-needed boost. Technology is the white knight that will lead the retail industry to victory.

In 2018, the term "Experiential Retail" became a buzzword. It became the code of the moment, delivered via easy access, in-store features, consumer involvement via ATL and BTL animation, or creative blending of the physical and digital purchasing universes.

Consumers' attention is being captured by technology in both physical and virtual retail settings. In the past, retail meant merely a storefront; now, thanks to technological advancements, consumers can shop multi-channel around the clock, comparing items and pricing online, posting reviews on social media, and even connecting online. People have developed strong attachments to their electronic devices.

Customer service and in-store transactions are simplified by technological advancements, leading to operational excellence. Our company's success is predicated on the loyalty of our customers, and because of improvements in the speed with which merchants can respond to consumer comments and resolve customer questions, we can better nurture and keep these vital relationships.

Online and offline stores now offer nearly identical customer service thanks to technological advances. SPAR India has implemented several technological solutions throughout our retail locations to serve our customers better.

Multi-Channel: We've set up systems to allow for the sale of offline items via online marketplaces. Since stores can't expect customers to stroll in daily, many are now using online and physical methods to offer the same things. Everyone benefits, from merchants to customers.

2.5 Retail Technology Adoption by Unstructured retailers

The difference in the digital divide between structured retailers and unstructured retailers needs to embrace digital tools and e-commerce strategies; small-format stores may attract a larger consumer base. As a result of the increased usage of point-of-sale (POS) terminals, digital payments, and debit and credit card payments, their creditworthiness has improved thanks to digitalization. [34] The digitization of unstructured retail stores will involve digital/online payment methods, applications to manage business processes (inventory, billing, financing), and an eventual merging with the e-commerce industry. [35],[36],[37],[38],[39],[40],[41]

Unstructured retail stores like Kirana, footwear, readymade garment shops, and small pharmacy stores are cash-based, tiny convenience businesses in residential areas. A purchase at a store is considered "risk-free" since the buyer gets the opportunity to examine the merchandise and the service before committing to either. [42] Unstructured retailers' continued success may be attributed partly to the fact that they are conveniently located for residents and frequently provide additional services, such as credit, home delivery, and a more personalized shopping experience, to their clientele[43]. [44]

Unstructured retail shops, which are specific businesses that are often family-run and satisfy emergency, fill-in, and stock-up requirements [19], account for roughly 90% of India's food retail industry. [20] More than 12 million unstructured retailers are open for business right now. [21] However, most Indians still shop at unstructured retailers, considered the "heart of hyper-local," rather than supermarkets and hypermarkets or online food retailers like BigBasket and Grofers. [22] Unstructured retailers may face competition from supermarkets and other organized food retailers as their market expands. From a low point of roughly 8% in 2013[23], organized retail was predicted to reach 20% of India's total retail by the end of 2020, while traditional retail, as represented by unstructured retailers, was forecast to fall to around 80% during the next year or so. [24] In 2020, the online grocery sector in India was predicted to

generate sales of INR 22,500 crore (US\$3.19 billion), up 76% from 2019 levels,[25] which may significantly impact the livelihood of millions of small size shops across the country. [26] During the COVID-19 shutdown, unstructured retailers played a crucial role as the “new supermarket” [27], transforming from their previous forms. [28] Even though more people shopped online due to the lockdown and coronavirus mitigation methods, e-commerce was impacted hard since it was not considered an essential service (and so could not transport goods)[29] and because of other problems, such as last-mile logistics. At least 20 percent of Indian merchants went out of business due to COVID-19, and the sector suffered huge losses of over INR 5.50 lakh crore (roughly US\$75 billion). [30] Over 600,000 unstructured retail shops are predicted to have closed during the first two months of the shutdown in 2020. [31] Independent merchants may protect themselves against cybercriminals by moving their sales and activities online. [32] Getting more customers who are tech savvy is difficult for unstructured retail stores since they are typically not equipped to handle internet orders. [33] Specifically, this study addresses how local merchants might be enticed to embrace digital tools and become part of the burgeoning e-commerce sector. It delves into unstructured retailers and other unorganized retailers’ dominant role in India’s retail industry and worries about the widespread adoption of new technologies. It also analyses how public and commercial organizations have contributed to the digitalization of unstructured retail shops. Last but not least, the report suggests that unstructured retailers adopt digital strategies by adopting either the ‘phygital’ (combining the physical with the digital; where brick-and-mortar stores accept digital payments, manage store operations digitally, and have an online presence) or the convergence (collaborations between large retailers, unstructured retailers, and e-commerce platforms) models.

2.6 Technology Adoption Models

For decades, retailing has been marked by constant transition, which has aroused scholarly attention with the development of various hypotheses that seek to model and forecast retail change. Fundamental studies on the evolution of institutional change in retailing, such as the “wheel of retailing” and the “retail accordion” (Brown, 1987; Hollander, 1969), have sparked research into the drivers and patterns of retail model innovation (Pinto et al., 2017). Understanding whether or not technologies are implemented is important for innovation theory and practice. The theory of reasoned action (TRA) (Ajzen and Fishbein, 1980), TAM (Davis, 1989; Venkatesh and Davis, 2000), the technology readiness index (TRI) (Parasuraman, 2000, Natarajan et al. (2017), and the unified theory of acceptance and use of technology (UTAUT) have all been influenced by DOI theory (Rogers, 1995). (Venkatesh et al., 2003, 2012). DOI

defines an invention as “a thought, method, or item that is judged novel by a person or another unit of adoption” (Rogers, 1995) and diffusion as “the mechanism by which an innovation is embraced by persons, communities, or organizations throughout time” (Rogers, 1995). (Rogers, 1995). (Grover et al., 2021). According to McVaugh and Schiavone (2010), there are three types of emerging technology adoption: macro, domain, and market/industry. The interactions that shape the social system in which prospective adopters are situated form a second meso domain, and the human (micro) domain is the third level of study. Many research experiments concentrate on determining the causes and probability of customer acceptance of emerging technical technologies (MacVaugh and Schiavone, 2010).

2.7 Innovation adoption in retailing: Theories

Retailers embraced new technology by guessing how much customers would use it and how managers would acquire precise data for projecting future demand patterns. As a result, one important line of investigation focused on customers’ acceptance of modern technology rather than merchants’ and workforce’ effective deployment or adoption. Innovation is a serious difficulty (Hamel 2002); it is increasingly important for growth and viability (Tidd 2001), although it is difficult for organizations to identify what is necessary for effective innovation (Christensen 2003). There are two ways in which firms adopt innovation: either as a way to anticipate changes in the environment or as a way to respond to changes in the environment. (Damanpour 1991; Higgins 1995). An organization’s character can be entirely altered (Damanpour, 1996), and new practices or operational ideas can be implemented from an IS perspective (Annukka 2008; Lind & Zmud 1991). Retail Technology may impact company productivity (Caldeira & Ward, 2003; Oliveira & Martins, 2011), and new technologies are continually being developed (Wang et al., 2011; Shiels, 2003; Alam & Noor, 2009).

Innovation technology includes new ideas, products, plans, behaviors, or effects of new products to the public or the industry (Abernathy & Clark 1985; Christensen 1992a, 1992b).

This chapter focused on the applied diffusion of innovation theory, covering the factors and steps that can disclose the adoption outcomes (Fichman 1992; Lyytinen & Damsgaard 2001; Prescott & Conger 1995). It is explored how shops and customers adapt to new technologies. These many forms of innovation pertain mostly to process innovation. By aggregation level, innovation may be classified. Innovation can occur at various levels, including the individual level (improvement), the functional level (process improvement or adaptation), the company level as an entire value chain (product and service innovation, new business models), and the industry level (technology breakthroughs) as innovation systems (Edquist 1997). The dissemination of innovations (Rogers, 2003), which relies upon sociology and psychology,

investigates the acceptance and implementation of new inventions (AlQaisi 2009). According to IT/IS innovation adoption research, implementing new technology is difficult (Jeyaraj et al., 2006; Korpelainen, 2011).

The most well-known and commonly applied theories and models of technological adoption. These theories were established to examine the adoption of technology by humans and to demonstrate their capacity to adapt new technology based on the notions of the behavioral sciences in psychology and sociology, as well as their implications on technology usage. These hypotheses have evolved throughout the years and have grown out of one another. Following is an overview of the 14 most significant and widely-known theories: The Theory of Reasoned Action (TRA) (Ajzen and Fishbein, 1980), which was expanded to the Theory of Planned Behaviour (TPB) (Ajzen, 1985) and further developed to the Decomposed Theory of Planned Behaviour (DTPB) (Taylor and Todd, 1995c). Information systems contributed to the development of the Technology Acceptance Model (TAM) (Davis, 1986), which is an extension of the Technology Readiness Assessment (TRA); TAM has a further extension, TAM2 (Venkatesh and Davis, 2000). In addition to the combined form of TAM and TPB (C-TAM-TPB), we also provide TAM and TPB separately (Taylor and Todd, 1995a). UTAUT is the extension of TAM and further extended to UTAUT-2 (Venkatesh et. al. 2003) (Venkatesh et. al. 2012). The Model of PC Utilization (MPCU) (Triandis, 1979), the Innovation Diffusion Theory (IDT) (Rogers, 1983), the Motivational Model (MM) (Deci and Ryan, 1985), and the Social Cognitive Theory (SCT) (Bandura, 1986) have been produced in a variety of scientific and social domains and are also reviewed.

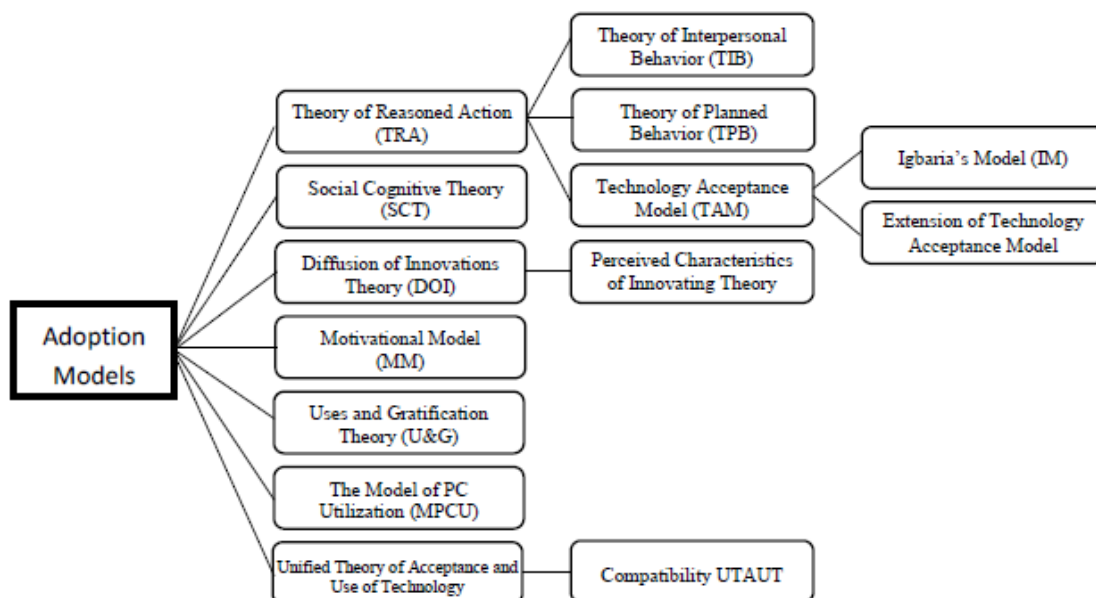


Figure: Overview of Adoption Models

2.8 Theory of UTAUT - Unified Theory of Acceptance and use of Technology

Venkatesh and others developed the **unified theory of acceptance and use of technology (UTAUT)** as a technology acceptance model in “User acceptance of information technology: Toward a unified vision.” The UTAUT seeks to explain how users intend to use an information system and how they engage it. The theory holds four key constructs: 1) performance expectancy, 2) effort expectancy, 3) social influence, and 4) facilitating conditions. The first three are direct determinants of usage intention and behavior, and the fourth is a direct determinant of user behavior. Gender, age, experience, and voluntariness of use are posited to moderate the impact of the four key constructs on usage intention and behavior. The theory was developed through a review and consolidation of the constructs of eight models that earlier research had employed to explain information systems usage behavior (theory of reasoned action, technology acceptance model, motivational Model, theory of planned behavior, a combined theory of planned behavior/technology acceptance model, Model of personal computer use, diffusion of innovations theory, and social cognitive theory).

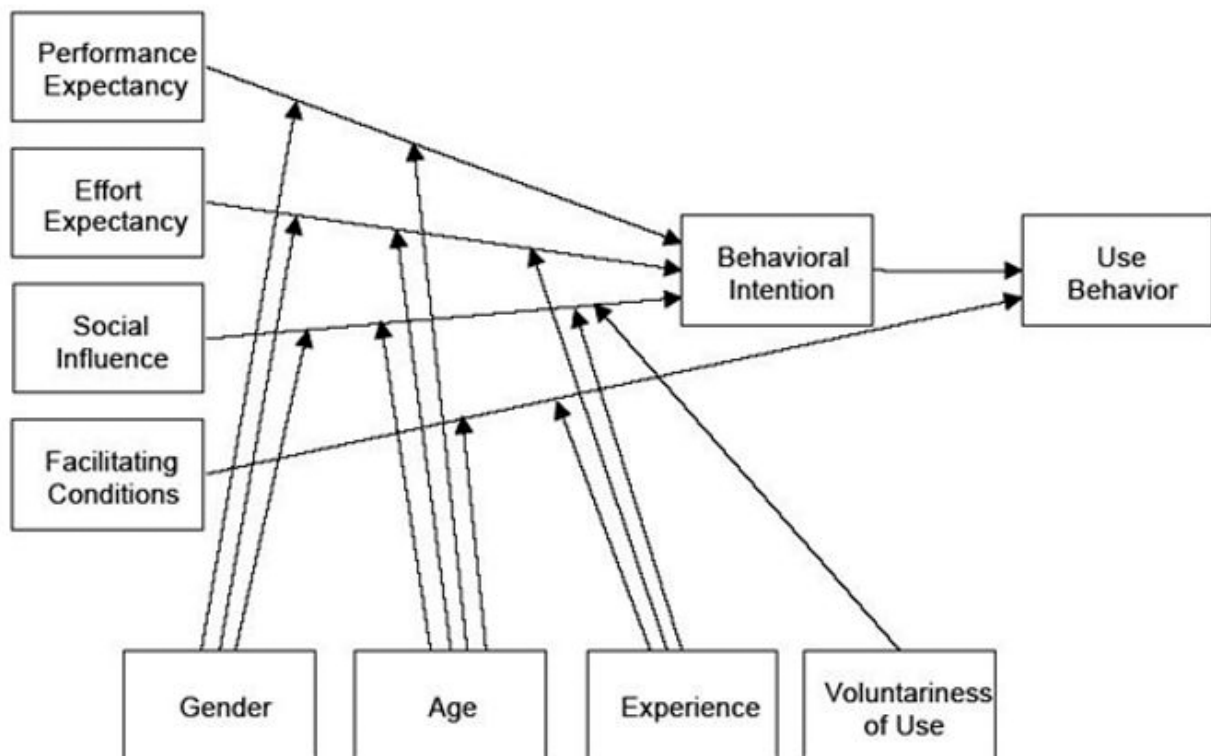


Figure 2-1: Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, Morris, Davis, and Davis, 2003)

2.9 Theory of UTAUT2

UTAUT2 posits that, in addition to the UTAUT constructs, the intention to use the technology is influenced by hedonic motivation (i.e., the degree to which the technology is perceived to be enjoyable), price value (i.e., the cognitive trade-off between perceived benefits and monetary costs of technology usage) and habit (i.e., defined as the passage of time from the initial technology usage) (Venkatesh, Thong & Xu, 2012). Studies have shown that the UTAUT2 constructs performance and effort expectancy, social influence, facilitating conditions, and hedonic motivation are correlated with behavioral intention (Kaur and Rampersad, 2018, Madigan et al., 2016, Madigan et al., 2017). The evidence supports a significant influence of perceived ease of use on perceived usefulness. (Herrenkind et al., 2019, Nordhoff, Madigan, Van Arem, Merat, & Happee, 2020; Zhang et al., 2019), In Nordhoff et al. (2020), There is insufficient knowledge about the relationship between adaptation options, performance, effort expectancy, and hedonic motivation, according to the report. The more positive sentiments, perceived utility ratings, and social norms are, the better. (Rahman et al., 2019, Rice and Winter, 2019). The study found positive effects of facilitating conditions on effort expectancy and hedonic motivation, but facilitating conditions were unrelated to performance expectancy.

Table 2-1: Pro & Cons summary of Technology Adoption Models

No.	Theories	Citation	Pro	Con
1	Theory of Reasoned Action (TRA)	(Ajzen and Fishbein, 1980)	Explains Attitude & Behavioral	Behavior performances are not considered
2	Theory of Planned Behaviour (TPB)	(Ajzen, 1985)	Recommended forecast model	Fails to identify gaps between behavior and intension
3	Diffusion of Innovation (DOI)	Rogers (1995)	Focuses on Individual elements like product or innovation	Neglects social and socio-economic; Behavioral elements
4	Decomposed Theory of Planned Behaviour (DTPB)	(Taylor and Todd, 1995c)	Focuses on Beliefs and factors identification; Recommended for e-commerce solutions	Strictly need hardware and software infrastructure
5	Technology Acceptance Model (TAM)	(Davis, 1986)	Focuses on attitude towards adoption of technology	Lacks consideration of social and subjective elements
6	TAM -2	Venkatesh, V. and Davis, F. D. (2000)	Extends inclusion of social and external factors	With so many variables, it is quite difficult to understand.

No.	Theories	Citation	Pro	Con
7	TAM – 3	Venkatesh, V., & Bala, H. (2008).	Combination of TAM 1 & 2 Covers internal and external factors	With so many variables, it is quite difficult to understand.
8	C-TAM-TPB	(Taylor and Todd, 1995a)	Predicts behavioral control & social norms for both experienced and non-experienced users	External factors are not considered
9	Technology Readiness Assessment (TRA)	Mankins, J. C. (2009)	Evaluates individual character and decision-making abilities	Needs support of TAM to prove adaptability
10	Model of PC Utilization (MPCU)	(Triandis, 1979)	Predicts Technology Utilization behavior	Uncertainties are excepted
11	Innovation Diffusion Theory (IDT)	(Rogers, 1983)	Focuses on Ethical elements of technology diffusion and adoption	Social and Political influence is neglected
12	Motivational Model (MM)	(Deci and Ryan, 1985)	intrinsic and extrinsic motivation to adopt technology	Change of Motivation is not considered
13	Social Cognitive Theory (SCT)	(Bandura, 1986)	Focused on Self-learning for technology adoption	Self-regulation and self-efficacy cannot be regulated
14	UTAUT	(Venkatesh, Davis, and Davis 2003)	Focuses on intention and behavior evolution	Lacks consideration of external factors
15	UTAUT -2	(Venkatesh, 2012)	Combination of eight recommended models covering all acceptance levels	Lacks consideration of external factors

Recognizing that these models make numerous assumptions about the factors influencing user behavior is essential. In addition, the predictive value of these models varies with relevant strengths and weaknesses. This analysis demonstrated that the prevalent theoretical models were selected based on their parsimonious and justifiable theoretical structure (e.g., TAM) or explanatory power (e.g., UTAUT). The alternate strategy balances the two perspectives (e.g., UTAUT2).

According to the review, applying and expanding UTAUT2, the most recent Model in the study of technology adoption, will be a significant contribution even if it is not extensively used in the field. This may be attributed to its strong predictive power (it accounts for 74% of the variance in usage behavioral intention), its resilience, and the fact that it is based on a large body of theory (nine IT acceptance models). Including the pertinent variables of the settings may be used in a wide range of IT usage scenarios (including those involving different technologies and nations). The thesis herein posits that UTAUT2 will be useful in the future for figuring out how to quantify people’s reactions to cutting-edge technologies. Traditional acceptance theoretical models are limited in their ability to explain the phenomenon under study, but a complete and dynamic theoretical model that considers cultural, social, technical, and other relevant behavioral variables would be a great aid.

Theories	Citation	Pro	Con
Theory of Reasoned Action (TRA)	(Ajzen and Fishbein, 1980)	Explains Attitude & Behavioral	Behavior performances are not considered
Theory of Planned Behaviour (TPB)	(Ajzen, 1985)	Recommended forecast model	Fails to identify gaps between behavior and intension
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Decomposed Theory of Planned Behaviour (DTPB)	(Taylor and Todd, 1995c)	Focuses on Beliefs and factors identification; Recommended for e-commerce solutions	Strictly need hardware and software infrastructure
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UTAUT -2	(Venkatesh, 2012)	Combination of eight recommended models covering all acceptance levels	Lacks consideration of external factors

2.10 Summary of the Review of Literature

Sr. No.	Authors	Research Design	Context	The gap in the Literature
1	Pantano and Vannucci (2019)	Cross-sectional, qualitative, observations	Technology adoption and diffusion across a range of retailers in a shopping street.	Focused on organized retail only
2	Andreu, Sanchez, & Mele, 2010	Review of Literature	Market understanding of their position in the process is still minimal, even though retailers recognize the importance of customers in the process	Consumer perception toward the adoption of new technology is ignored
3	Adhiarna et al. (2011)	Literature review	RFID adoption and diffusion in developing countries	Firm-level analysis
4	Tsai et al. (2010)	Cross-sectional, Quantitative	Effects of innovation, organization and supply chain integration on RFID retail adoption in Taiwan	Firm-level analysis
5	Cao and Li (2018)	Longitudinal, (8 years), Quantitative	Retailer cross-channel integration from the perspective of innovation diffusion	Firm-level analysis
6	Tao and Xu (2018)	Cross-sectional, Qualitative	Consumers' perceptions and adoption intentions of fashion subscription service retailing	Customer-centric analysis
7	Natarajan et al. (2017)	Cross-sectional, Quantitative	Uses TAM and DOI theory to propose a new model orientated to the intention to	Customer-centric analysis

Sr. No.	Authors	Research Design	Context	The gap in the Literature
			use mobile apps for shopping	
8	Jahanmir and Cavadas (2018)	Cross-sectional, Quantitative	Determinants of late adoption of digital innovations by consumers	Customer Level
9	Lee (2014)	Cross-sectional, quantitative	Factors influencing early adopter smartphone adoption	Customer level analysis
10	Goodell, 2020	Cross-sectional, quantitative	Studied the impact of the new normal business environment	Customer level study
11	Dehghani et al. 2020	Cross-sectional, Quantitative	Studied the impact of AI on retail business	Farm level study
12	Wood et al. 2020	Cross-sectional, Quantitative	Studies of the new normal distribution channel	Farm level study
13	Pagano et al. 2021	Cross-sectional, Quantitative	How far does social distancing affect the physical shopping	Customer level study
14	Mishra, Walsh, & Srivastava, (2021)	Semi-Structural Qualitative interview	Unstructured retailers' technology adoption in India results in non-adoption	Types of Unstructured retailers are not explored
15	Adhikary, Diatha, Borah, & Sharma, (2021)	Literature Review	Financial gain with the adoption of POS technology in unstructured retailers	Other retail technologies not explored
16	Ram & Selvabaskar, (2022)	Cross-Sectional Quantitative	E-Payment adoption in Unstructured retailers in India	Need for low-cost retail technologies for small retailers
17	Tabeck, Jain, & Sharma, (2022)	Literature Review	Technology adoption for unstructured retail business transformation in India	Only Kirana stores are considered, and other small retailers are neglected

Sr. No.	Authors	Research Design	Context	The gap in the Literature
18	Kumar & Mathur, (2022)	Cross-Sectional Quantitative	E-payment systems adopted by Unstructured retailers in India using the TAM model	Vulnerabilities, risk, and security training towards technology adoption not addressed
19	Kapurja, P., & Nalawade, H. S. (2021).	Qualitative Literature Review	Technology Adoption in small business Kirana stores vs. online grocery stores explored on the bases of TAM	Only one sector small retailers explored
20	Choudhary & Aithal, (2022)	Qualitative Research with Thematic Analysis	Mapping the emergence of Low-Cost e-commerce technology adopted by small Kirana stores in India	Non-E-commerce low-cost retail technology not explored
21	Kakar, H. (2021)	Descriptive Statistics	Comparison of Small Kirana stores vs. other small businesses offering E-payment systems during pandemic lockdown across 4 major cities in India	Only POS systems were explored; Small towns and small rural retailers not considered
22	Koul, S., Jasrotia, S. S., & Mishra, H. G. (2021)	Cross-Sectional Quantitative research analyzed using SEM	Adoption of M-commerce in Indian Suburban small retailers using the UTAUT model	Only M-commerce was explored, and other retail technologies neglected
23	Kannan, V (2021)	Literature Review	M-commerce adoption in Structured vs. Unstructured retailers in India, Unstructured fall behind	No other retail technologies were considered for comparison
24	Gupta, S., & Ramachandran, D. (2021).	Literature Review	Structured vs. unstructured retailers' technology transformation based on customer response and product-centric	Practical approach not considered, which may change the outcome of the paper

Sr. No.	Authors	Research Design	Context	The gap in the Literature
25	Khaled, Amgad SD, et al. (2021)	Cross-Sectional Quantitative	The fast transition of technology adoption for operational purposes in the Indian retail industry	Retailers' perspectives are not considered; only metro cities are considered; Sub Urban and rural retailers not considered
26	Rajesh K. Aithal, Vikram Choudhary, Harshit Mathur (2022)	qualitative	Increased technology adoption among small retailers could increase small retailers' competitiveness.	Identified 8 factors influencing technology adoption among small retailers.
27	M. K. Ram, S. Arjun, Rajarathi Karunakaran, R. Guhan (2022)	survey based	Automation technologies in retail are very useful and effective for unorganized retailers.	The text does not mention any specific gaps in the literature.
28	M. K. Ram, S. Selvabaskar (2022)	survey based	The unorganized retailer's payment platforms, aggregators and digital marketing applications should develop more technologies that facilitate them to manage their inventory, vendor management and assist them to build a brand image among their consumers.	Focuses on payment platforms, online marketplaces, and social media usage among unorganized retailers.
29	Pooja Sehgal Tabeck, Vinamra Jain, Ashok Sharma (2022)	a case study	Local stores now empowered by technology can serve their consumers better than before.	What is the market share of unorganized retailers in the overall retail sector?
30	M. K. Ram, S. Selvabaskar, K. Rajarathi, R. Guhan (2023)	survey based	Unorganized retailers adopt mobile applications relevant to their business.	The text proposes a new framework for mobile application adoption by unorganized retailers.

To summarize the review table, India's retail industry has undergone a massive transformation during the pandemic lockdown. The retailer's technology adoption experiences are minimal, with few real-world practical surveys or interview approaches. Challenges faced by small retailers in suburban and rural India are not explored compared to the speed of technology adoption in the metro and some big cities.

2.11 Research Gap

Technology adoption is an inextricable aspect of any industry, and its growth relies on it. Technology adoption is not new and can be seen in both organized and very limited extent in the unorganized retail sector. Although technology adoption is greater in the organized retail sector, it is not uniform across all retail formats. According to the abovementioned theory, new technology adoption is accompanied by a human behavior theory that considers various factors influencing the success and adoption of new technologies. The shift to embrace technological solutions became more visible after the onset of the pandemic due to Covid-19. As a result of the significant Digital Transformations happening around us, the proposed research would investigate existing theories in the retail industry. This research will concentrate on grocery, pharma, apparel, and footwear retail stores, that only sell manufactured goods.

2.12 Research Questions

1. What are the factors affecting (or) against the adoption of retail technologies by unorganized retailers in Kolkata? (Survey Questions under UTAUT2 Model)?
2. What are the types (or) nature of retail technologies adopted by unorganized retailers? (Survey Demographic Questions)?
3. What is the role of education (or) knowledge in adopting retail technology by unorganized retailers? (Survey Questions under UTAUT2 model)?
4. What is the perception of unorganized retailers towards availability, usability, and adoption of retail technology for achieving successful business? (Survey Questions under UTAUT2 model)?

2.13 Development of Constructs

Constructs Based on UTAT Model

The UTAUT aims to explain user intentions to use an information system and subsequent usage behaviour.

The theory is based on four key constructs:

- Performance expectancy
- Effort expectancy
- Social influence
- Facilitating conditions

Gender, age, experience, and voluntariness of use are theorized to attenuate the impact of the four core characteristics on usage intention and behavior, according to the theory. As a result, a more thorough study of the literature will be conducted to investigate these abating factors.

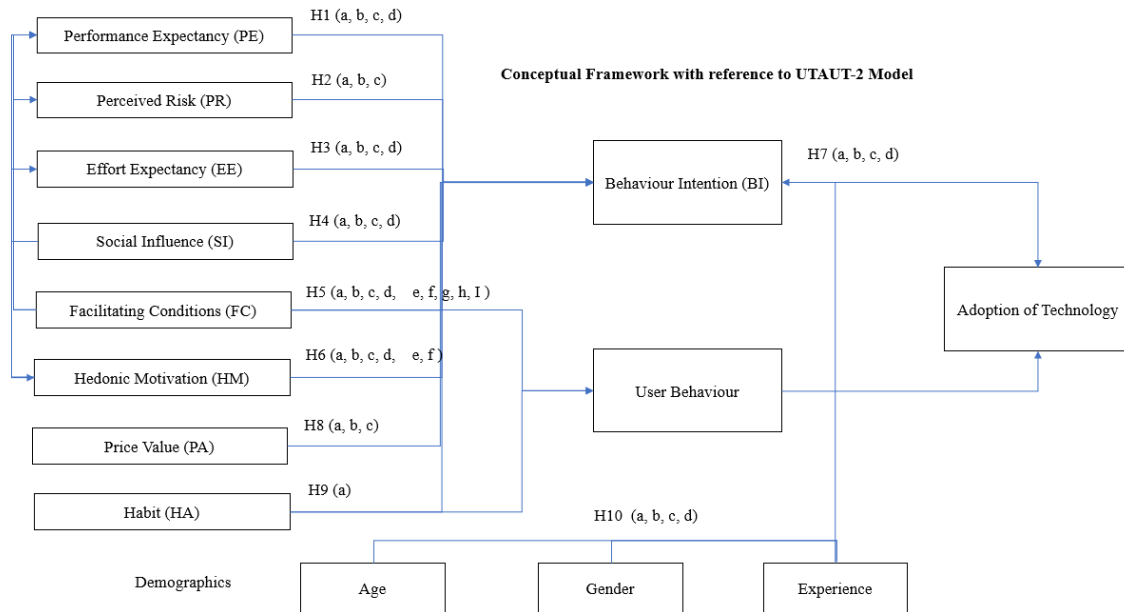
Constructs Based on UTAT2 Model

UTAT2 model adds some more constructs in addition to what is already there under UTAT model. The constructs are as follows:

- the intention to use the technology is influenced by hedonic motivation (i.e., degree to which the technology is perceived to be enjoyable)
- price value (i.e., cognitive trade-off between perceived benefits and monetary costs of technology usage) and
- and habit (i.e., defined as the passage of time from the initial technology usage) (Venkatesh, Thong & Xu, 2012).

2.14 Conceptual Framework

The conceptual framework is based on the Unified Theory of Acceptance and Use of Technology 2 (UTAUT-2), which explains the factors that influence the adoption of new technology by individuals. The framework consists of several constructs or variables that are thought to affect technology adoption. These constructs are Performance Expectancy (PE), Perceived Risk (PR), Effort Expectancy (EE), Social Influence (SI), and Facilitating Conditions (FC), Hedonic Motivation (HM), and Behavioural Intention (BI). The conceptual diagram depicts how these variables are interconnected and how they impact the adoption of technology by retailers. The diagram shows that PE, PR, EE, SI, and FC directly impact BI, which in turn impacts the actual usage behaviour of the retailers. Additionally, HM is shown to impact the adoption of technology and BI.



Chapter 3: Research Methodology

3.1 Types of Research

Research, in its broadest sense, can be categorized based on its methodology, purpose, or the nature of the information it seeks. The primary types of research are:

1. **Descriptive Research:** As the name suggests, this research describes the characteristics of various phenomena or the state of affairs. It portrays an accurate profile of persons, events, or situations. This type can answer questions such as "What is?"
2. **Exploratory Research:** This type aims to explore new areas or phenomena where little is known. It is the preliminary study of an unfamiliar problem about which the researcher has little or no knowledge.
3. **Explanatory Research:** This research seeks to explain patterns or phenomena in the data and to identify factors leading to the occurrence of certain situations. It answers the question of "Why?"
4. **Action Research:** Undertaken by individuals or groups to address a specific problem in their practice. It's a reflective process of progressive problem-solving to improve the way they address issues.

Based on the nature of the data involved, research can be further divided into:

1. **Qualitative Research:** This method focuses on understanding human behaviour and the reasons that govern such behaviour. It is exploratory and seeks to delve deep into topics, often through interviews, open-ended questions, or observation.

2. **Quantitative Research:** A structured method that deals with numerical data. It seeks to understand patterns and establish relationships between variables through statistical analysis.

Given the nature of the research on unstructured retailers in Kolkata, the researcher has chosen to employ a **Quantitative Research** approach. The objective is to obtain numerical data regarding the technology adoption patterns, preferences, and challenges among these unorganised retailers. This approach allows for a more structured and statistical analysis of the data, providing objective and generalizable results. Using quantitative research, we aim to produce statistically significant findings which can be used to infer patterns across the larger population of unstructured retailers in Kolkata.

3.2 Research Design

Research designs are methods and procedures selected by the researcher to form the framework of their study plan. To ensure that investigations are successful, the design enables scientists to focus on approaches most suited to the subject matter at hand. An experimental, survey, correlational, semi-experimental, and review form of research is defined by the topic's design (experimental design, research problem, descriptive case study) (Salkind, 2010) (Wilson, 2011). Research designs fall into three categories: data collection, measurement, and analysis. The research problem a company is trying to solve will dictate the study strategy, not the other way around. Designing research lays the groundwork for the tools to employ and how they should be used. If you're conducting high-quality research, you're likely to have less bias in your data and a greater belief in its integrity. It is typically desirable to have a design with the smallest variability in experimental research (Mitchell & Jolley, 2010). This research concludes with a conclusive process based on the results achieved by conducting statistical analysis.

Endogenous Dependent Variable	- Adoption of Technology Slade, E., Williams, M., & Dwivedi, Y. (2013); Tamilmani, Kuttimani, et al. (2018); Tamilmani, K., Rana, N. P., & Dwivedi, Y. K. (2018) Aswani, Reema, et al. (2018); Slade, E. L., Williams, M. D., & Dwivedi, Y. K. (2014); Kang, Myunghee, et al. (2015); Baabdullah, A., Dwivedi, Y., & Williams, M. (2014).; Castanha, J., & Pillai, S. K. B. (2021) Alghatrifi, I., & Khalid, H. (2019); Bendary, N., & Al-Sahouly, I. (2018) Singh, M., & Matsui, Y. (2017)
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Exogenous - Independent Variables	
Variables	Literature Review
Performance Expectancy (PE)	Venkatesh et al., 2003] [Pascual-Miguel, Agudo-Peregrina, Chaparro-Peláez, [2015]
Perceived Risk (PR)	Herhausen, Binder, Schoegel and Herrmann [2015]
Effort Expectancy (EE)	[Venkatesh, Thong, Xu, 2012]
Social Influence (SI)	[Venkatesh et al. 2003] [Venkatesh, Thong, Xu, 2012]
Facilitating Conditions (FC)	[Brown, Venkatesh, 2005; Venkatesh et al., 2003] [Hew, Lee, Ooi, 2015]
Hedonic Motivation (HM)	[Brown, Venkatesh, 2005; Venkatesh, Thong, Xu, 2012] [Juaneda-Ayensa, Mosquera, Murillo, 2016]
Behavioural Intention (BI)	[Venkatesh et al., 2003; Escobar-Rodríguez and Carvajal-Trujillo, 2014]
Price Value (PV)	[Herrenkind et al., 2019, Nordhoff, Madigan, Van Arem, Merat, & Happee, 2020; Zhang et al., 2019], [Nordhoff et al., 2020] [Rahman et al., 2019, Rice and Winter, 2019]
Habit (HA)	[Herrenkind et al., 2019, Nordhoff, Madigan, Van Arem, Merat, & Happee, 2020; Zhang et al., 2019], [Nordhoff et al., 2020] [Rahman et al., 2019, Rice and Winter, 2019]

3.3 Research Process

Many steps are required to carry out a successful research project, including understanding the research problem and reviewing prior literature to gain insight into the topic and identify the research gap, developing an appropriate research design, collecting data, analysing responses from the collected data, and finally interpreting and reporting the results. The figure below illustrates the steps involved in the research process (Khalid, Abdullah, & Kumar, 2012) (Gunter, 2013).

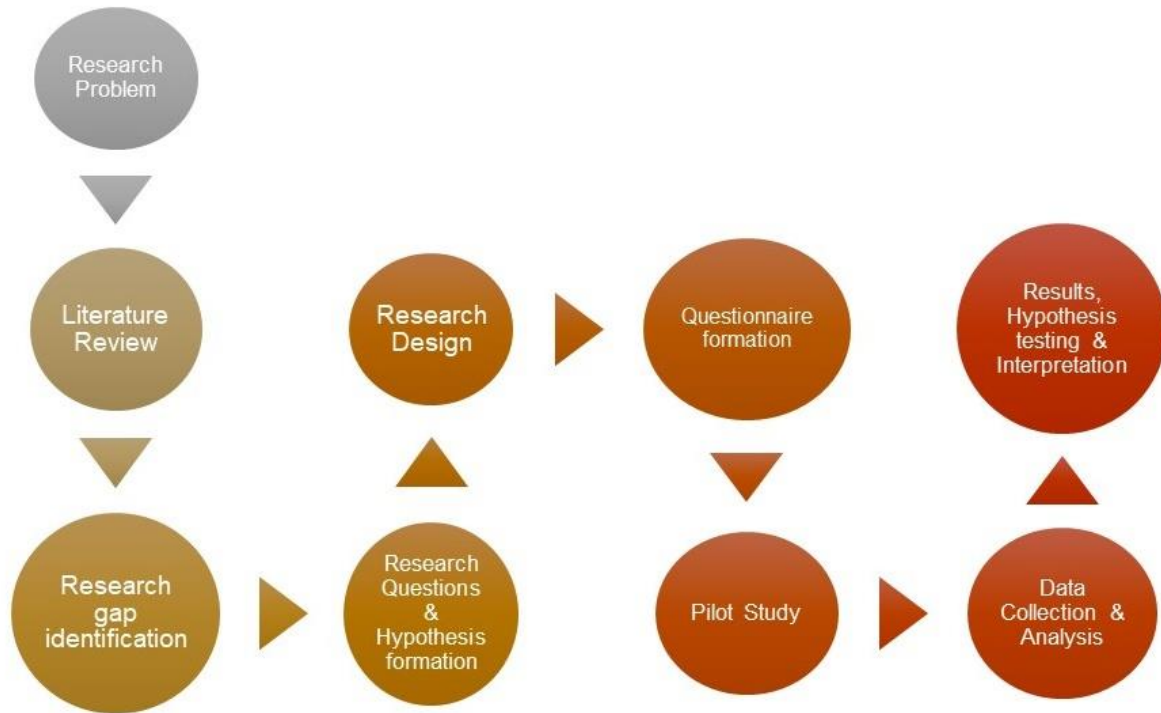


Figure 2: Research Process Stages: Author Created

Descriptive Research	Data Collection Method	Statistical Tools
<p>The researcher plans to use Quantitative Research approach. The objective is to obtain numerical data regarding the technology adoption patterns, preferences, and challenges among these unorganised retailers. This approach allows for a more structured and statistical analysis of the data, providing objective and generalizable results. Using quantitative research, we aim to produce statistically significant findings which can be used to infer patterns across the larger population of unstructured retailers in Kolkata.</p>	<p>The primary data will be collected with the help of a structured questionnaire using 5-point Likert Scale, used via Google Forms.</p>	<p>Appropriate statistical tools will be decided in due course and the same will be applied and analyzed using SPSS software and PLS SEM (SmartPLS) software.</p>

3.4 Research Approach

Numerous academics in the field of information studies have attempted to evaluate and organize various methods of investigation. Quantitative and Qualitative Approaches to research may be divided into two main categories. A quantitative research technique is the best bet when a set of well specified variables must be evaluated. When doing quantitative studies, you'll require a quantitative research strategy (Amaratunga, Baldry, Sarshar, & Newton, 2002). Qualitative research aims to learn more about how individuals feel about a certain study topic. This method can easily identify intangible aspects such as social influence, economic standing, gender roles, city, and religion (Fossey, Harvey, McDermott, & Davidson, 2002). Mixed research method has been developed to incorporate qualitative and quantitative data collection methods (Borrego, Douglas, & Amelink, 2009). The focus of quantitative research is on acquiring data that can be represented numerically. According to Creswell, to get at the research topic and establish a theory or hypotheses, quantitative research must first do a literature evaluation (Creswell & Creswell, 1994). Quantitative research relies heavily on surveys as a primary source of data. To conduct this study, researchers used the quantitative technique. We reviewed the literature to come up with this set of factors. A paper-based questionnaire was chosen as the survey method for gathering primary data. To examine all of the data, a statistical test was used.

3.5 Research Method

The terms "research technique" and "research method" are sometimes used interchangeably. Various methods of researching a subject or issue are included in the research technique. There are three types of research methods: data collection methods, statistical techniques for analyzing the data, and methods for evaluating the results' correctness. Surveys and case studies are the most utilized methodologies in research, with interviews and experiments coming in a close second. The research approach in this study was a survey (Williams, 2007) (Johnson & Onwuegbuzie, 2004).

In descriptive research, surveys are a common approach. According to the definition, sample population data may be obtained by well-structured questionnaires. Quantitative and qualitative approaches to research both involve surveys. Survey data is often accurate since replies are limited to the options provided in the survey. Face-to-face interviewing, telephone interviewing, mail interviewing, and electronic interviewing can all collect data for a survey. The survey approach has been used extensively by researchers in retail technology. Several

retail technologies and disruptive innovations have used a survey approach by retail domain researchers, such as (Shankar & et .al., 2021), (Hole, Pawar, & Khedkar, 2019), (Palmié, Wincent, Parida, & Caglar, 2020), (Cheah, Ho, & Li, 2018). To gather data for the pilot and main study, this research will use Google Forms to collect Primary Data.

3.6 Statement of Problem

Technology has propelled Indian society recently, and the usage of mobile phones and their services by Indians has expanded (Iyengar, Upadhyaya, Vaishya, & Jain, 2020). There has been an increase in retail technology systems in India since the demonetization of the currency and the outbreak of the Covid-19 epidemic (Agarwal, Poddar, & Karnavat, 2020). However, this expansion has not been as significant as projected (Siby & George, 2021) (Rejeb, Rejeb, & Treiblmaier, 2021), (Gawankar, Gunasekaran, & Kamble, 2020), (Khaled, Ahmed, Yahya, & Farhan, 2020). As a result, a new study is needed to determine why retail technology solutions are not widely used in India. As a result, it is critical to analyze the digital difference between supermarkets and other merchants. Perceived usefulness, ease of use, and social impact are just a few aspects past researchers have explored in their studies. These characteristics are significant in predicting adoption intention; however, additional variables for payment research must be studied. So, this study adds additional factors by considering the retailers' knowledge and aptitude to learn.

For the retail technology system to succeed, it is imperative that unstructured retailers adopt it extensively. These retailers are responsible for implementing technical payment, billing, pricing, and tagging systems within their operations. Retail technology providers, including mobile networks, banks, and third-party service providers, must ensure that the unstructured retailers they aim to serve adopt the technologies in tandem to maximize efficiency and benefits (Dapp, Slomka, & Hoffmann, 2015), (Reinartz, Wiegand, & Imschloss, 2019). As a result, this research examines how retailers utilize retail technology systems.

It was also discovered that retail technology studies in India are restricted to a few metro areas and are done from the consumer point of view (Bhattacharjee & Raheja, 2020) (Balasudarsun, Sathish, & Sharma, 2020). **The unstructured retail sector in the Kolkata region has virtually no research done. Furthermore, no research has been done on the retail technology digital divide in different places. Hence the researcher plans to deep dive and understand the intricacies of unorganised retailers in the district of Kolkata.**

3.7 Sampling Frame

A sample design is detailed strategy researchers employ to choose a representative sample of the target population (Tambay & Catlin, 1995), (Majid, 2018).

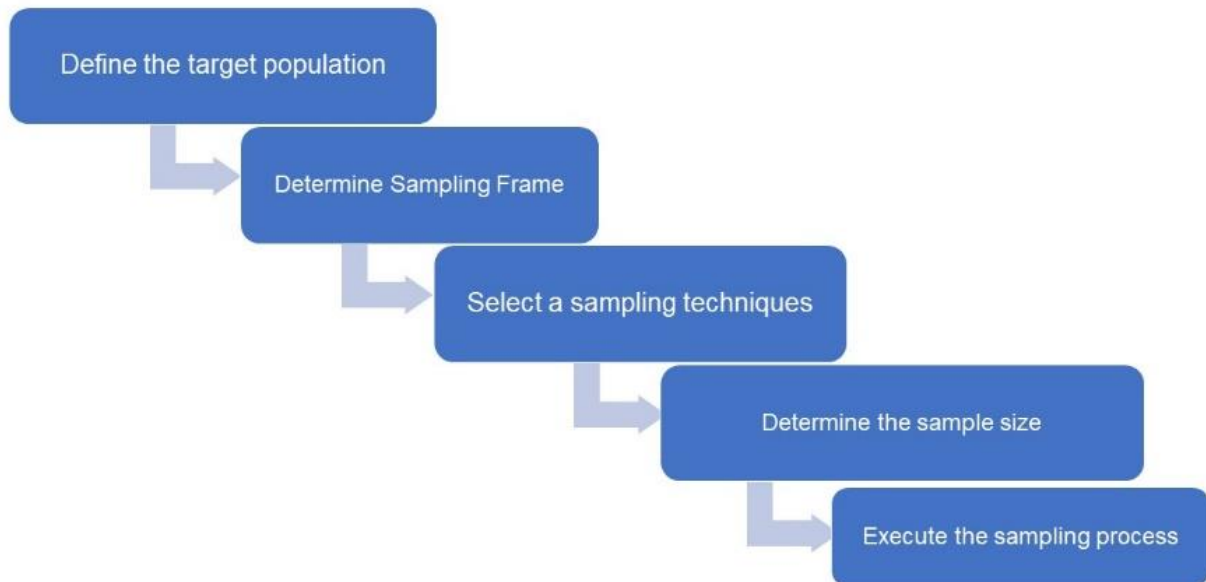


Figure 3: Sampling Design Steps: Author Created

The study's target population is divided into groups based on the types of the basic unstructured retailers:

1. Grocery / Kirana
2. Medicine / Ayurveda / Homeopathy / Yunani
3. Footwear
4. Ready-made Garments
5. Handicraft and Artisan
6. Electronics

3.8 Sampling unit and Frame

In the context of sampling, a sampling frame serves as a representation of the target population of unstructured retailers. People above the age of 18 were eligible to participate in this study. Kolkata's unstructured merchants are the study's sample units (Majid, 2018).

Brief Summary

- ✓ **Type of Research-** Quantitative Research
- ✓ **Population:** The population for the present study will comprise the unorganized retailers (and related customers) in Kolkata, West Bengal.
- ✓ **Sampling Frame:** The sampling frame for the present study will be unorganized retailers (and related customers) in Kolkata, West Bengal.
- ✓ **Sampling Unit:** Individual Unorganized Retailer (and related customer), in Kolkata.
- ✓ **Sample Size:** Already mentioned in an earlier slide.
- ✓ **Sampling Technique: Stratified sampling method**
- ✓ **Data Collection:** Primary (Google Forms and Interviews), and Secondary-articles like thesis, scholarly papers, books, reports, etc.

3.9 Sampling Technique

The researcher plans to travel across the length and breadth of the entire Kolkata District and interview retailers from completely diverse localities. The researcher plans to use Stratified Sampling method to obtain the data from completely diverse localities across the Kolkata District. (Barreiro & Albandoz, 2001), (Alvi, 2016).

3.10 Sample size

The researcher will use Slovin's formula for determining the sample size. Accordingly, the researcher will arrive at the sample size of n subjects by applying Slovin's formula (Isip). The equation is as follows:

$$n = N / \{1 + N(e)^2\}$$

Here, n= sample size

N= total population

e= margin of error

3.11 Data Collection

It's important to collect data from all relevant sources to find answers to research questions, test the hypothesis using a deductive strategy, and assess the results (Bar-Ilan, 2001).

3.12 Methods of Data Collection

There are two types of primary data: data gathered for the first time and data that has never been collected before. Secondary data: data that has already been analyzed and gathered by someone else and has already been through the statistical process. Data may be obtained from scratch or repurposed from other sources to generate new insights. To achieve the study's goals, both primary and secondary data sources will be collected. It is possible to acquire a better understanding of the elements that influence the acceptability of mobile payments and the methods employed in the study of mobile payments. The study hypothesis will be then tested using information gleaned from primary data.

3.13 Questionnaire Designing Process

Understanding the dynamics of technology adoption within the unorganized retail sector is imperative. As these retailers form the backbone of the commerce ecosystem in many regions, their alignment with technological trends significantly impacts the broader market. The researcher plans to meticulously craft an effective questionnaire to uncover the multi-faceted nuances of how technology is perceived, adopted, or resisted by the unorganised retailers in the District of Kolkata. is crucial segment. A structured questionnaire will be developed to collect the relevant information from the target respondents. The questionnaire will have two parts. Part A will cover the demographic information and general information about the respondents and the organized and unorganized retails respectively. Part B will cover the research variables. Each of the research variables will be converted into a statement and the respondents will be asked to give their opinion based on these statements in a scale of 1 to 5 where 1 means strongly disagree with the statement and 5 means strongly agree with the statement. Further research will be conducted to develop the appropriate scale for this research.

3.14 Statistical Tools

Appropriate statistical tools will be applied at a later stage once, the hypothesis formation is done. The researcher intends to use the SPSS software and also the PLS-SEM (SmartPLS) software for analysing and interpreting the data collected from the unorganized retailers in the Kolkata District.

4. Relevance of Projected Findings

IT will be critical in managing the supply chain and distribution network of the unorganized retail sectors, which are grappling with significant financial distress. On the other hand, online businesses offer more options and a more user-friendly distribution network. Considering this,

current research examines the potential for disruptive technology-driven business models in the unorganized retail sector vs internet retailers. This research has never been done previously in the literature; therefore, it may open up new possibilities if the researcher can grasp the attitudes of the industry's stakeholders.

5. Challenges

Research based on primary data is generally difficult. Despite all efforts to collect data appropriately to reduce the chance of sampling and non-sampling errors, bias may still occur. Even though terms "technical advancement" and "application of cutting-edge technologies" are likely to be familiar to the target respondents, disruptive technology may not. As a result, it's vital to use aided recall when creating the questionnaire. Respondents will be aided in accurately answering the question by some advice or questions about disruptive technologies.

6. Proposed Time Frame for Completing the Major Milestones

Sl. No.	Activities	Time Frame
1	Submission of Synopsis to the University	12 th July 2021
2	Reviewing Literature (for upgrading the Synopsis and Preparing for Defence)	5 th November to 15 th November 2021
3	Developing Methodology	June 2022
4	Questionnaire Designing	September 2022
5	Pilot Survey	November 2022
6	Revising the questionnaire	December 2022
7	Data Collection	January 2023 to March 2023
8	Data Interpretation	April 2023 to August 2023
9	Preparing first draft of Thesis and Second round of data collection	September 2023 to December 2023
10	Preparing second draft of Thesis	January 2024 to March 2024
11	Preparing final draft of thesis based on feedback of my supervisors and University authorities	May 2024 to June 2024
12	Submission of Thesis	July 2024

7. Help Required, If Any, From the University

Since my entrance to the Ph.D. programme, I have been overwhelmed by the assistance provided by our prestigious university. I look forward to the huge proficiency and massive

knowledgebase of the esteemed faculties of the University. Every step of the research journey would necessitate guidance from my respected faculty members, in addition to blessings and moral support.

8. Acknowledgements

I would like to express my gratitude to my Research Supervisor and our esteemed Vice-Chancellor, Prof. O.R.S. Rao. I shall be forever indebted to Respected Prof. O.R.S. Rao, for his valuable inputs and guidance, without which I would not have achieved this. His advice and critical inputs on Research have been priceless. I am indebted to my supervisor for introducing me to the intricacies of the research in a very lucid way that gives me confidence to achieve my goal in an effective way.

I would also like to thank Prof. Dr. Rajkumar, Prof. Dr. Sudipta Majumdar, Prof. Dr. Satyendra Kishore, Prof. Dr. Hariharan, Prof. Dr. Bhagabat Barik, and Prof. Dr. Rumna Bhattacharya for their contribution and continuous support to me.

A special thanks to my Family. Words cannot express how grateful I am to my Parents, my wife (Sharmila) and my daughter (Ria) for all the sacrifices that they have been making on my behalf. I would also like to thank to all those people who directly or indirectly supported me to continue the journey of Ph.D.

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