

Statistical Measurements of Technology Adoption Among Unstructured Retailers

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Abstract

Innovations have been made in retail due to the rapid development of digital and automated technologies. Retail technology is leveraging advances and digital technologies in the retail and e-commerce industries to improve the shopping experience. Therefore, we may conclude that the integration of retail technology into a firm has a direct impact on the consumer experience. Now, both brick-and-mortar and online retailers engage in various facets of this technology to match customers' expectations for the shopping experience. The retail industry in India has seen several revolutions and expanded significantly during the past decade. As a result of the epidemic, the retail industry is undergoing significant change. India's retail sector's rapid use of technology contributes to the industry's expansion. As a result, we may conclude that India has the most promising future in retail technology. From 2019 to 2030, Kearney Research anticipates a 9% increase in India's retail industry. By 2030, the retail sector's market will reach \$1.8 trillion. This paper illustrates the measurement of technology adoption distribution among retailers in Kolkata. For this empirical study, 110 retailers were randomly chosen from the suburban markets of Kolkata. **Keywords:** - technology adoption; retail market; retail technology; smart technology; intelligent technology;

1. INTRODUCTION

Global technical advancement has impacted nearly all company sectors and assisted their attempts to reach their ambitious growth targets. Modern technical breakthroughs and rising internet usage have increased company potential across all market areas. The retail sector is not immune to the effects of this technological development; it is reaping enormous benefits (Misra, Dixit, Al-Mallahi, & Bhullar, 2020). The Indian retail industry is a crucial component of the country's commercial environment and one of the fastest-growing in the world. According to Kearney Research, the sector would expand by 9c/o between 2019 and 2030, surpassing \$1.8 trillion by 2030 (Kearney, 2022). In addition to other causes, the sector's rapid expansion may be credited to the speedy adoption of innovative technical solutions.

The Internet of Things (IoT) is being integrated into retail operations; it is a network of billions of devices that share data and communicate in real-time. It may collect enormous data, which shops can use to understand shoppers' preferences and habits better. Personalization of services and a heightened purchasing experience are both possible with this aid. The retail industry may lift customers' moods, increasing foot traffic and sales (Cong, Li, & Zhang, 2021). The

technology also facilitates the staff's communication via wireless devices, which aids in meeting the demands and requirements of customers. RFID tags, which are smart barcodes that enable customers to learn more about a product, are another fascinating application of the technology. These electronic labels may also be checked to see how items in stock are doing and adjusted accordingly (Mouha, 2021).

The introduction of AI-based technology, such as robots and retail assistants, has dramatically increased consumers' ease of use. The retail sector is now fully automated. Consumers may use these gadgets confidently to locate and acquire their chosen goods (Melumad, Hadi, Hildebrand, & Ward, 2020). If a customer has a question, they can be routed to the nearest member of staff who can help them out. However, robots greatly assist retail business owners, including inventory counts, price audits, lost-and-found operations, and more. The devices are a cost-effective way to boost productivity while decreasing expenses. Robotic helpers are now tackling the final leg of a delivery route. Smart speech recognition aides like Google Assistant, Alexa, and Siri, on the other hand, are revolutionizing the retail industry. These AI-enabled solutions have greatly improved the industry's capacity to provide customer care by reducing response times (Martinez, Escobar, & Garcia-Diaz, 2021).

Contactless services have become increasingly popular in recent years. Their popularity has increased thanks to the pandemic's emphasis on personal security. Retail establishments in India are not falling behind in assisting their clientele. To cater to today's health-conscious customers, it has begun testing the concept of cashier-less shops, eliminating the need for long checkout lines. Stores of this type can use automated scanning technology to collect payment from customers' bank accounts for the goods they sell (Shankar, Kalyanam, Setia, & Golmohammadi, 2021). This service has the potential to evolve into a fully functional contactless retail platform. Effectively lowering operating expenses and guaranteeing uninterrupted service to customers is within reach with the help of this technology (Dutta, Choi, Somani, & Butala, 2020). The structure of the paper consists of an introduction section introducing the retail technologies; the background section covers the retail technology adopted in India in the past two years; the methodology section explains the method and nature of the data collected; the result and discussion section illustrate the statistical measurements of the parameters considered in retail technology; the last section of the paper concludes the paper with the recommendation and future scope of the research.

2. BACKGROUND

Now more than ever, technology plays a central role in almost every facet of daily life. These past several years have seen a dramatic expansion in both the availability and interest in technological solutions. Because they make up the greatest demographic of consumers today, tech-savvy millennials have compelled businesses across all industries to adopt cutting-edge, technologically-based offerings. Modern technologies are altering the industry by making customer service, data storage, product distribution, and demand forecasting more efficient (Attaran, 2020). They are efficient in terms of both time and money saved.

2.1.Retail Technology

Since the introduction of modern computing methods, the retail industry has seen dramatic changes. It is now possible for merchants to provide services in addition to traditional storefronts using “purchase online, pick up in-store” programs (BOPIS). Thanks to advancements in digital technology, point-of-sale (POS) systems are now part of a wider retail trend that makes it possible for companies to sell their wares to customers in other countries (Li, Cong, & Zhang, 2021). In theory, it might significantly boost sales and profits. Over time, this technology will provide cross-locational synchronization of sales, marketing, and stock. It will improve the usability and quality of the shopping and technological experiences for the average customer.

Augmented reality is another technology that is helping the retail sector in India (AR). This online support helps bridge the gap between traditional retail and online shopping. Several conveniences are made possible by this technological advancement, including a digital try-on service and streamlined store navigation. Incorporating a virtual try-on experience into the shopping process aids consumers in making more informed buying selections in a shorter amount of time (Hwang, Oh, & Scheinbaum, 2020). However, it is beneficial to retailers in a variety of ways. Workers on the ground level benefit from using their imagination to establish the scene before organizing objects to save time and effort. Also, they are adept at spotting problems with the apparatus (Kumar T. S., 2021).

Nowadays, a personalized purchasing journey is more important than ever. To provide this kind of service, extensive knowledge about the customer is necessary. The days of relying solely on a customer’s identification at the point of sale are long gone; modern retailers must have extensive knowledge of their customers even before they set foot in the store. Facial recognition software is a technological advancement that assists stores considerably in this endeavor. A consumer’s unique face print is determined by the software’s analysis of hundreds of facial landmarks. This helps employees anticipate what customers buy and how much they spend. This facilitates identifying the most valuable customers to cater to their needs (Shankar, Kalyanam, Setia, & Golmohammadi, 2021).

The invention of the QR code caused a sea change in every industry while simultaneously improving the lives of all involved parties (Yan, Tan, Loh, & Hew, 2021). Customers can research products without consulting the floor’s counter personnel or sales associates. In a single scan, they can learn everything they need to know. The codes also do away with the requirement for traditional marketing materials like flyers and brochures. Because of this, customers and employees have an easier time throughout the buying process, and the shop benefits from the increased efficiency. Besides being a gateway to online stores, the QR code may be used in various ways to benefit the retail industry. This method also eliminates the potential for mistakes to be made by humans (Mookerjee, Chattopadhyay, Ahmed, & Addepalli, 2022).

Stores are using the two technologies of cameras and sensors to improve the shopping experience for customers. In its Amazon Go convenience store chain, for instance, camera and sensor data is coupled with computer vision and deep learning. The customer may select an

item, pay, and leave the business. Neither face recognition nor product scanning is required, nor is there a requirement to purchase the register (Sarwar, Daraghmi, Liu, & Chi, 2020).

Customers in India always weigh the pros and disadvantages of many shopping options, including online, in-store, and hybrid. They're searching for a streamlined omnichannel service. Consequently, we may expect growth in the convergence of these two channels. Retailers must implement tools and strategies to enhance their value offer and consumer experience (Urevna, 2021).

Customers now anticipate being able to place orders with a single click and get their goods in under 30 minutes, necessitating a more efficient Supply Chain and delivery solution. In addition, consumers want a centralized location to fulfill their needs. Delivery times of many days or more are unacceptable for today's consumers (de Vass, Shee, & Miah, 2021). Therefore, efficient supply chains and delivery solutions are desperately needed. Faster delivery, demand forecasting based on artificial intelligence and machine learning, the Internet of Things for real-time monitoring, and similar technologies are all part of India's retail industry's bright future (Andronie & Lăzăroiu, 2021).

The retail industry is expected to increase its usage of automation and robotics. Robots may one day be able to recognize a customer as soon as they enter a business and provide them a warm welcome. They may also interact with them using touch displays and voice recognition software. Based on the customer's needs, they offer suggestions and may even show them where to find the goods in the store (Mahmoud, Tehseen, & Fuxman, 2020). A customer's photo and purchase history can be stored in a robot's memory for future interactions, such as delivering personalized discounts and other incentives for repeat business.

2.2.Retail Technology in India

Evolution in the retail sector has always had as its primary objective the betterment of the shopping experience for customers when they are physically present in the store. As a result of the global pandemic, digital transformation in the retail sector is speeding up across all sectors and domains (Setiawan, Rani, & Cavaliere, 2020). Now is the time for retailers to ramp up their digital adoption, allowing them to standardize their services and reach the greatest possible number of customers. The most effective answers to contemporary problems may be found using cutting-edge technologies like machine learning, data analytics, computer vision, and augmented reality. In the same way that every sector of India's economy has developed and changed over time, so has the retail sector (Alexander & Kent, 2020).

India's economy is being transformed by e-commerce. Online retail development may be attributed to government policies (FDI, GST, digital India drive), technology (cheap smartphones, internet penetration, web analytics, etc.), and new marketing channels. An online retailer must understand and capitalize on success criteria to compete in the market. Online businesses must use several marketing channels to reduce unnecessary advertising and streamline their budget. Since metro cities are saturated, e-tailers must also target clients in tier-2 and tier-3 cities and beyond to prosper. Implementing the supply chain takes meticulous planning. However, demography, growing family incomes, urbanization, foreign players, and

other factors support the long-term growth of online shopping. The online vendor must also be compassionate and follow the terms and conditions to develop trust. The internet store must also follow government rules to stay in business. Finally, the e-tailer must protect clients' data and secure the website from hackers (Kumar & Ayodeji, 2021).

The Confederation of All India Traders (CAIT) opposes integrating e-commerce and kirana shops due to e-commerce businesses' deep-discounting tactics and claimed non-compliance with foreign direct investment regulations. CAIT proposes a nationwide e-commerce marketplace, Bharat E Market, to digitize millions of kirana businesses (Bharti, Huria, Jose, & Pathania, 2022) Six cities participated in a test initiative, and the platform is currently available in over 90 communities nationwide. Kirana stores must continue to use digital technologies for payments, ledger keeping, and inventory management, have an online presence, and embrace the benefits of e-commerce by working with startups, major retailers, and e-commerce enterprises through the phytigal or convergence models. Indeed, current kirana digitalization attempts have shown tremendous benefits. During the pandemic shutdown, the kirana network in rural India let people access online banks and payment systems. The Indian government started the "Suraksha Store" project in the early months of the statewide shutdown to transform kiranans into sanitized retail shops selling basics while following safety standards, partnering with private enterprises to put up many such stores around the country (Kapuria & Nalawade, 2021).

Online merchants and complexity are transforming India's retail economy daily. Technology-savvy consumers' evolving behaviors also threaten shops. According to the report, Indian merchants must outperform their rivals to succeed. Customer service, retail experiences, and new technology may position this company (Malik, 2022) Several studies have indicated that technology adoption gives companies an edge over competitors. However, retail technology adoption has not produced significant competitive benefits. Thus, the study findings can have several implications for organized retailers in India: (a) managers of retail outlets in India can decide whether to implement novel technologies and applications for the business; (b) the government can understand to make smooth and easier regulations regarding technology application adoption and ensure support as much as possible, and (c) technology application developers to identify the target retailer it suggests that Indian retailers are engaged in and cognizant of technology adoption. With government assistance, technology must put them ahead of the competition. Retailers must also realize that every firm can improve. They must examine customer experience and company operations, detect difficulties, and predict future concerns. Retail stores may understand better technological possibilities with tailored adoption and assessment tools, which should improve customer experience and provide them with a competitive edge. Collaboration and technical training can improve technology adoption in organized retail. Government and legal backing can boost this (Sharma & Jhamb, 2020).

2.3. Technology adoption by Unstructured Retailers

The survival of independent shops is in jeopardy due to competition from big box stores and online marketplaces. Small businesses must succeed since so many people rely on them for their income. The only way to remain competitive and grow their profits is to enhance

technology usage. The findings of this research may encourage more independent stores to embrace modern technological systems, boosting their productivity and, ultimately, their ability to compete. Few studies have looked at the rate of technology adoption among small shops, even though they are common in developing nations.

Competition has always played a key role in the retail industry, particularly regarding the popularity of new products and lines of items. Our research shows that stores are aware of their competitors' adoption and usage of technology and that this knowledge, combined with the fear of losing business to rivals, compels many to experiment with new technologies even though they may only provide marginal benefits. In the next section of the paper, descriptive statistics are illustrated to measure the technology adoption among unstructured retailers in Kolkata.

3. METHODOLOGY & RESULT

Over the years, little has challenged how merchants get their items and deliver them. Consequently, due to significant industry consolidation, a select few major corporations today control the majority of sectors. The retail industry is starting to change drastically regarding product distribution and sales. It's becoming clear that the conventional manner of doing business is in danger as micro-brand retail businesses that were formed digitally grow in popularity. Business owners and brands may now easily expand in previously impossibly difficult ways. This research survey is carried out to measure the technology penetration and adoption by small and unstructured retailers in Kolkata. The survey covered local groceries (Kirana), readymade garment stores, non-branded footwear stores, and pharmacy shops, including ayurvedic and homeopathy. The demographic distribution illustrated in Figure 1 shows that 27% of women and 73% of men run the shops.

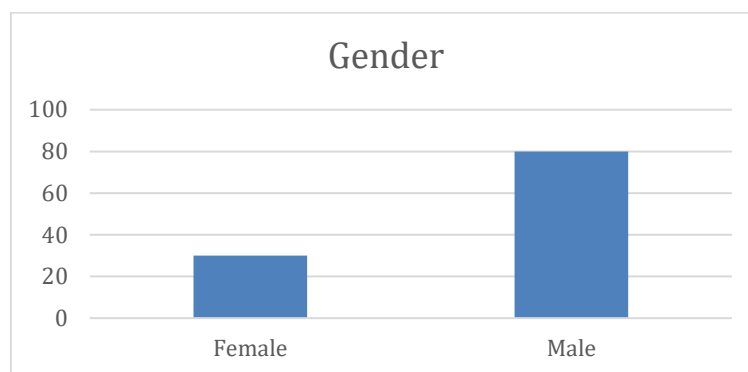


Figure 1: Gender Distribution running unstructured retailer shops

The age distribution illustrated in figure 2 shows that 36% of retailers are between the age group of 18 to 25, 18% are between 26 to 35, 18% are between 36 to 45, 18% are above 45, and 9% are below 18 years of age.

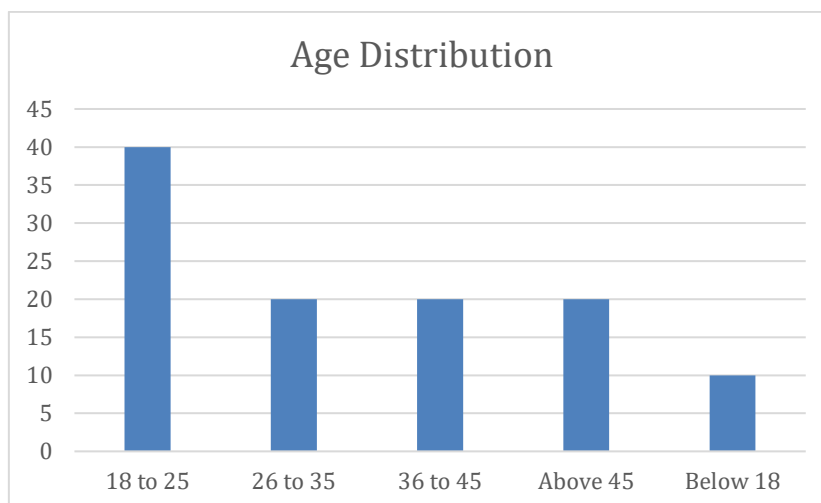


Figure 2: Age Distribution

Figure 3 below illustrates the education levels of the retailers, of which 27% are graduates, 27% have completed their high school (12th grade or diploma), 18% of the retailers have only completed their primary schooling, and another 18% have completed their secondary school (10th grade) and about 9% are uneducated population.

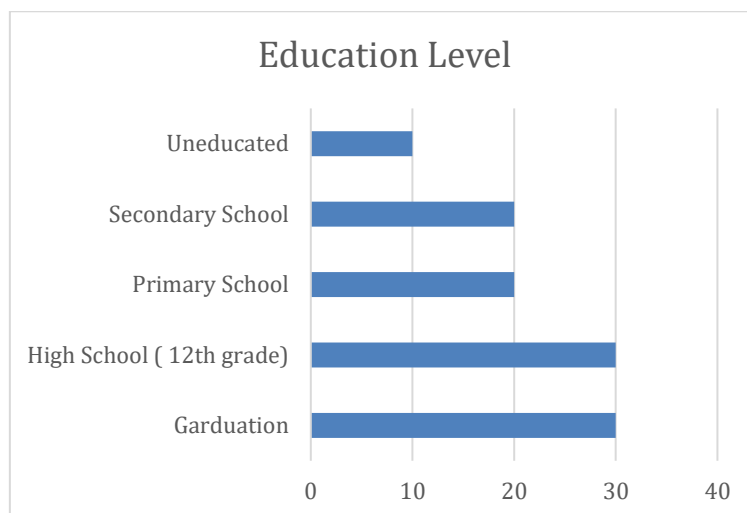


Figure 3: Education Distribution of the Retailers

Figure 4 illustrates the distribution of categories of retailers considered for the research. 18% of the retailers are footwear sellers, 36% are grocery (kirana sellers), 20% are pharmacy stores which also include ayurvedic and homeopathy medicine sellers, and the remaining 30% belong to readymade clothes stores. The geographical demographics

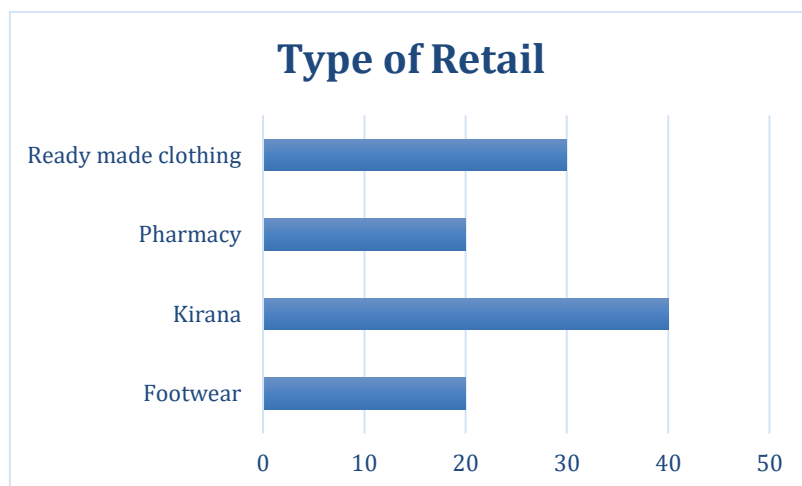


Figure 4: Type of Retailers surveyed

Figure 5 illustrates the distribution of retailers who use what kind of mobile phones. 9% of retailers don't have a phone, 36% still use traditional mobile phones with buttons, and 55% have adopted smartphones.

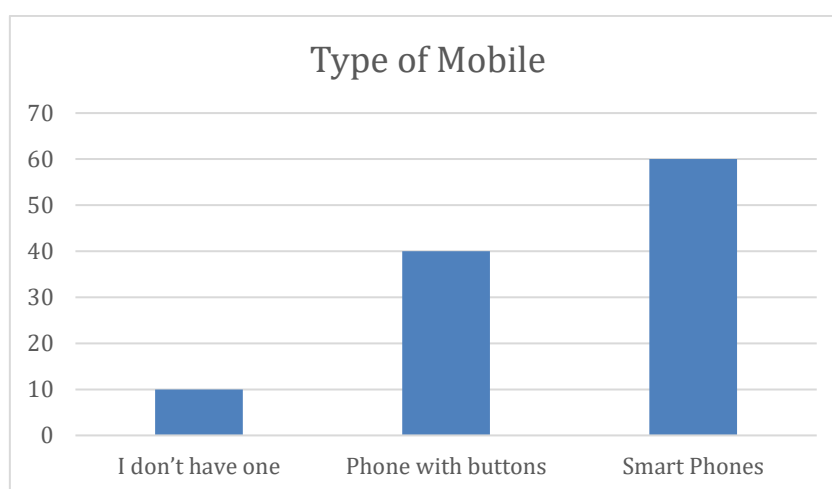


Figure 5: Type of Mobile Phones used by retailers

Figure 6 illustrates the use of the internet among retailers. 55% of retailers use the internet for entertainment, business, and payment purposes. 27% of the retailers use the internet for business and payment, and the remaining 27% use the internet on their phones for entertainment.

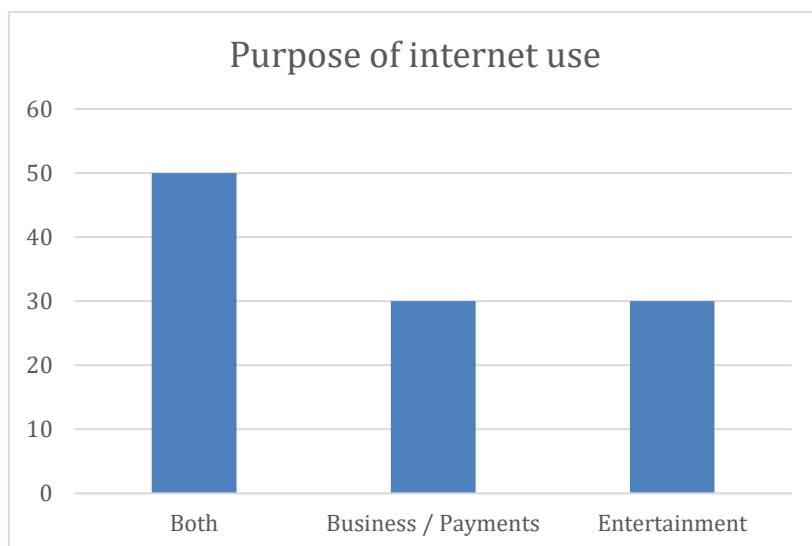


Figure 6: Purpose of Internet Use among Retailers

Figure 7 illustrates the distribution of modes of payments adopted by retailers. 73% of the retailers still use cash as a mode of payment they accept from their customers, and 27% of the retailers also take E-Payments.

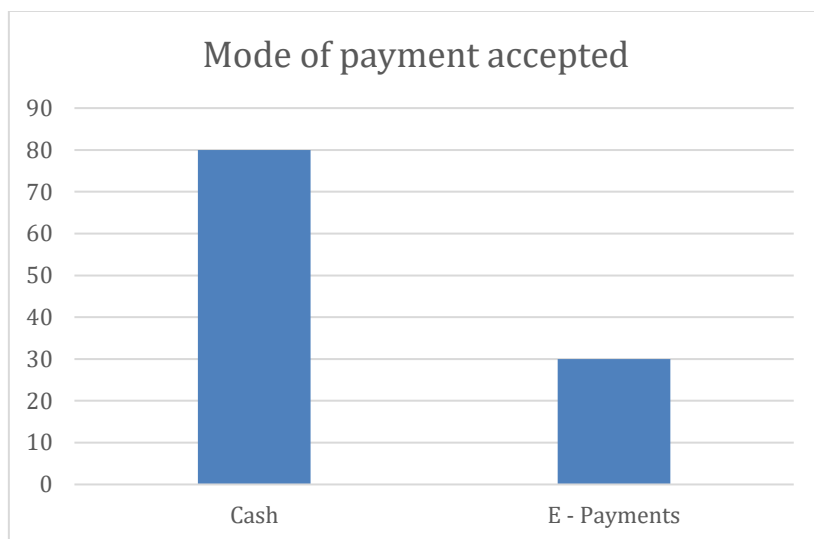


Figure 7: Mode of payments adopted by retailers

Figure 8 illustrates retailers' distribution using automatic and electronic billing systems. 64% of the unstructured retailers do not use any billing system, and 36% use electronic billing systems. During the survey, it was observed that most pharmacy stores adopted an electronic billing system during the pandemic.

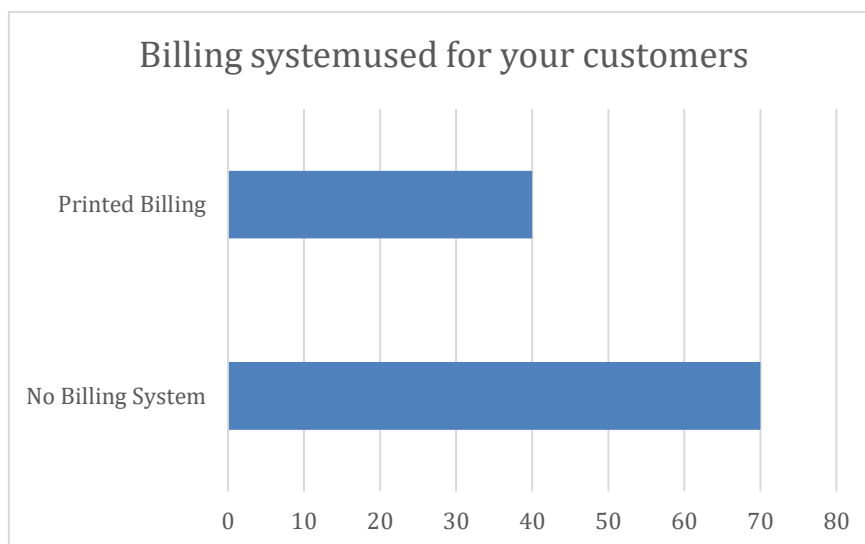


Figure 8: Billing system used by retailers

Figure 9 illustrates the distribution of purchase sources of the retailers. 45% of the retailers purchase directly from the producers, 18% purchase their products from other big retailers such as structured retailers like Big Bazar, Reliance fresh Mart, etc., and 36% purchase from the wholesalers in the local market.

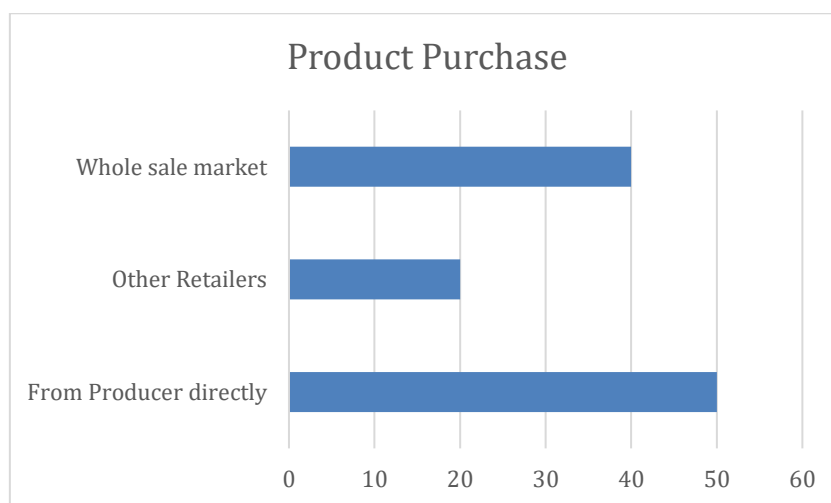


Figure 9: Purchase Sources

Figure 10 illustrates the retailers' distribution and how they pay their sellers when they buy their products. 55% of the unstructured retailers still pay using cash which means there is a higher chance of avoiding any taxes. 36% of the retailers pay using E-payment systems to their vendors. 9% of the retailers take their products on credit from their vendors/wholesalers, which is paid after the sales happened by the retailers.

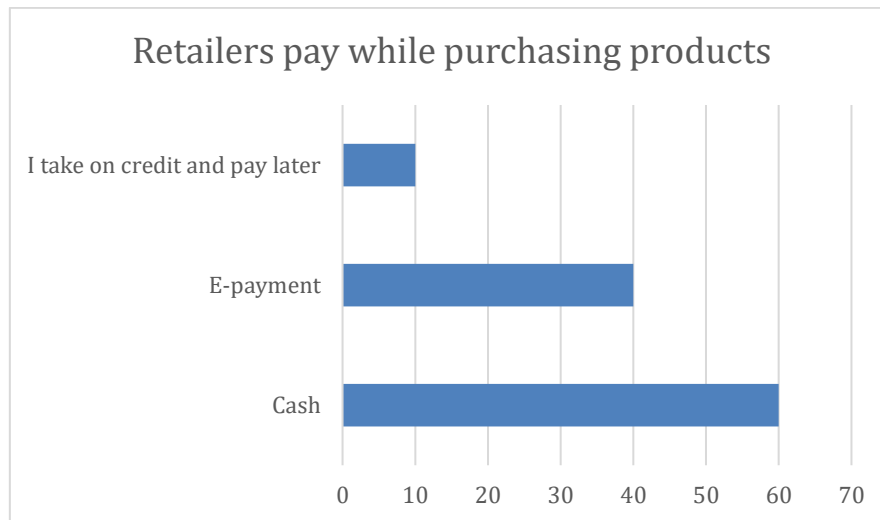


Figure 10: Payment methods to vendors

Figure 11 illustrates the distribution of the unstructured retailers' financial sources. Unstructured retailers are small retailers that run out of homes or small shops that do not have a streamlined business model. 45% of the retailers take cooperation loans, hand loans from other people, group loans, and non-nationalized banks, i.e., cooperative banks. 27% of the unstructured retailers run the business by investing their savings and rotating the same amount, and the remaining 27% percent of the retailers run their business on credit bases from vendors suspected of getting into debt when unforeseen circumstances hit.

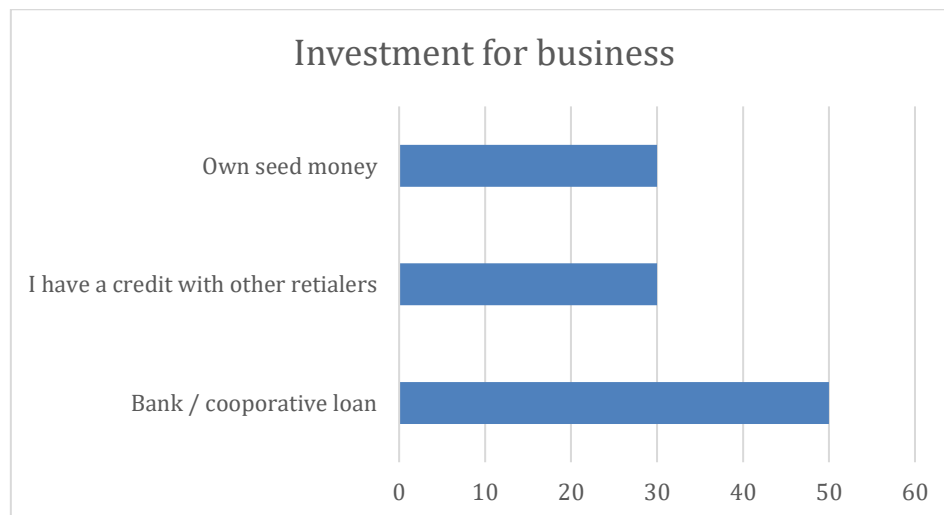


Figure 11: Investments in the retail business

Figure 12 illustrates the knowledge and adoption of licenses and taxes while buying and selling the products. Most of the unstructured do not pay income taxes or possess licenses to run their retail business.

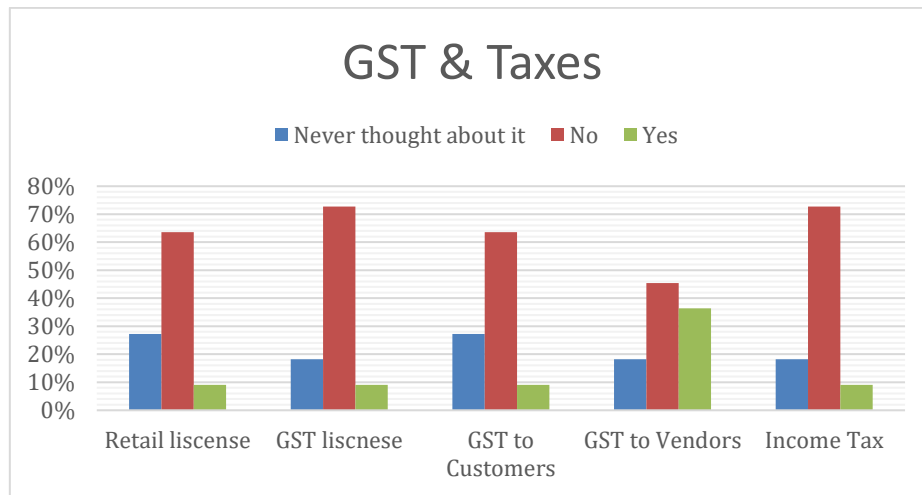


Figure 12: Taxes, GST, and Licenses knowledge and adoption

With no record keeping of taxes and no streamlined payment methods, the losses and profits of the business result in huge uncertainty.

4. DISCUSSION

The advancements in digital technology, especially the meteoric increase in online shopping, are a driving force behind the creative changes in the retail industry. The arrival of the coronavirus pandemic not only altered social interactions but also prompted an increase in internet shopping. One of the many ways to join the digital revolution of business is to open an online store or adopt online payment systems and other retail technology. This section of the paper focuses on a statistical illustration of choices, decisions, and what influences the decision of retailers and more, as explained below:

The figure 13 below illustrates the investment in the business, its returns/even break, and the gain/loss. From the total population, 18% of the retailers invest below 25,000 INR monthly in their business. All of them seem to have even broken or gained profits from their business, but a surplus of 9% population has attained losses in their business. The range of 26-35k INR, where 27% of the population invested in a range of which 18% have even broken, but 9% are in loss which complies with the surplus from the 25k INR investment group. The investment range of 36-45k INR consists of investors of 9%, all of them have even broken with a surplus of 9% population. In the range of 46-55k INR, 27% invest in this range, 9% have an even break, but 18% of the population is lost. The investment of more than 55k INR consists of 18% of the population; all of them have even breaks and a surplus of 9% who made profits from other range of investments.

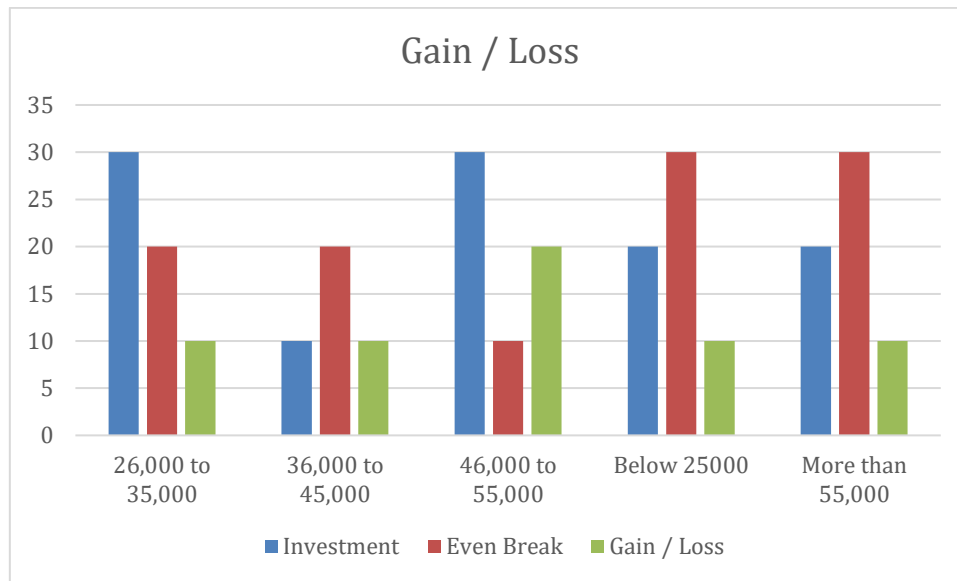


Figure 13: Investment. Loss and Gain statistics

The retail sector in India is one of the fastest expanding in the world, and technological advancements have been a boon to the sector. To appeal to today's consumers, stores are increasingly utilizing digital tools, marking a shift in retail strategy from focusing on products to one that places customers first. Over time, technological advancements in retail have gone from a nice-to-have to a must-have, creating a standard interface between the shopper and the product or service offered. Retailers in India have spent the last decade on their heels as they have had to adapt to widespread industry-wide shifts that have, without a doubt, benefited customers. To be the most competitive in the world, today's merchants don't compete with other stores; they compete with new technology interventions. The retail industry is becoming increasingly competitive, making it more important than ever for stores to adopt new ideas and technology to meet the needs of today's sophisticated shoppers. Every store has to know what's new in technology and how to use it to its advantage if they want to succeed in today's cutthroat retail industry.

5. CONCLUSION

The retail sector of the economy is responsible for reselling products and providing services to consumers. Technology in the retail sector facilitates the integration of suppliers, retailers, products, and consumers. Supermarkets, shops, and bookshops are examples of retail establishments that heavily employ retail technology. You need to use technology that can deliver value, efficiency, and convenience after you've learned how consumers' preferences are shifting. Retail technology is the application of appropriate instruments and technology to expand the limits of the retail experience and innovation. This paper focused on the measurements of technology adoption among retailers in Kolkata. Recent research indicates that India is a great location for retail investments. There has been a significant change in India's retail sector during the past few years. There will be a dramatic shift in the retail industry in the next years. Technological advancements will fuel innovation. The future scope of the research is the carry out an extensive ground survey covering urban and suburban locations of

Kolkata to study the technology divide geographically and based on the category of unstructured retailers. The research also intends to focus on the technology adoption measurements between unstructured retailers and consumers from their respective locations and markets in Kolkata.

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