

# Cash Recycling Machine (CRM) & its impact on customer satisfaction: A study on UCB PLC

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## Abstract

**Purpose:** The primary purpose of this research is to explore Cash Recycling Machine (CRM) systems and determine customer satisfaction after using CRM services.

**Research Methodology:** To collect data for this research, a questionnaire was created and a survey was conducted to assess user contentment with the Cash Recycling Machine (CRM) of the United Commercial Bank (UCB) PLC. During the investigation of the Cash Recycling Machine (CRM) system, a secondary data source was utilized.

**Results:** An analysis indicates that Almost 97% of respondents regularly utilized CRM services while continuing to depend on conventional banking methods. Nevertheless, a significant proportion of participants (over 20%) frequently employed CRM systems. Specifically, 47% utilize these systems four to seven times each month. This study demonstrates that banks are implementing novel services to entice a larger clientele, while consumers are allowed to utilize the banks' fundamental services, such as making deposits and withdrawals.

**Limitations:** Banks are restricted from accessing crucial information owing to data privacy concerns. Furthermore, the use of secondary data may not adequately reflect the perspective of UCB PLC, owing to scalability issues. Ultimately, the limited sample size is a result of clients' strong unwillingness to allocate time for research.

**Contribution:** This study and its implications can be used for additional research in emerging economies to comprehensively examine the adoption of new technologies in the banking industry.

**Novelty:** The core reaction of consumers to an emerging technology for rapid economic growth.

**Keywords:** CRM, Banking, Customer Satisfaction

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## 1. Introduction

Cash recycling technology enhances operational efficiency, reduces expenses, and enhances consumer comfort. The financial burden associated with managing physical currency comprises a substantial

portion of the operational expenses incurred by banks concerning Automated Teller Machines (ATMs). Managing cash in ATMs is characterized by a significant investment in time and labor owing to the involvement of several operations, including but not limited to cash counting, sorting, and transportation. These activities occur at multiple points of contact and include the participation of various stakeholders. Cash Recycling Machines (CRMs) allow the recycling of deposited cash for subsequent withdrawals, mitigating the various challenges associated with cash handling by reducing cash circulation. Customer Relationship Management (CRM) systems require a reduced frequency of cash replenishment, resulting in decreased expenses associated with cash-in-transit, cash sorting, and cash handling (Achord et al., 2017).

In addition, the automation of cash deposits enables sellers to allocate their time to tasks that generate money more effectively. The round-the-clock accessibility of cash deposits and withdrawal services enhances client convenience, and is particularly advantageous. Consumer Relationship Management (CRM) systems enhance consumer confidence and credibility through the verification of diverse currency notes and immediate allocation of credit to respective accounts.

Furthermore, these devices are designed to contribute to Digital India efforts by including features such as the Bharat QR code for cardless withdrawal, a soft keyboard for data entry of UPI transactions, and Aadhaar-enabled biometric capability. These enhancements aim to enhance user experience and make the devices more customer-centric. Customer Relationship Management (CRM) systems also offer efficient interoperability, as shown by the capability of depositing cash into a cash recycling machine run by a different financial institution. There is a growing trend of banks integrating into the interoperable cash deposit (ICD) network, indicating the potential future achievement of complete interoperability, similar to that observed with cash withdrawals.

Corporations increasingly embrace cash recycling technology, as they offer the advantage of automating the labor-intensive task of cash counting and sorting. This implementation leads to enhanced efficiency in administrative and cash management procedures. Hitachi was the pioneering entity in the commercialization of this technology. Hitachi Payment Services have played a crucial role in facilitating the deployment of these devices for financial institutions, addressing intricate monetary and business challenges. How do automated cash recycling contribute to cost savings? The process of automatically recirculating deposited cash is of growing interest to the financial industry. While several financial institutions allocate substantial resources to the loading and unloading of cash in ATMs, there is a rising demand for cash-in-transit (CIT) service providers who may struggle to meet this demand. In China, where there are a significant number of transactions, government-owned CIT (Cash-in-Transit) providers have periodic instances of being overwhelmed, leading to delays in their service provision. It has been estimated that each CIT visit requires approximately two hours for cash handling, constituting a substantial portion of the overall costs associated with non-recycling ATMs in China.

By streamlining the cash handling process, the implementation of process-automation units capable of securely and accurately accepting, storing, and recirculating cash can result in reduced resources being allocated to ATM cash supply and alleviate associated challenges. By implementing risk reduction measures, the cash circulation process can be optimized within an automated teller machine (ATM) or a standalone cash-recycling device, ensuring that the currency remains secure.

The cash recycling modules developed by Diebold Nixdorf can examine the deposited currency for indications of counterfeiting autonomously, thereby further mitigating risks (Achord et al., 2017). Furthermore, these modules adhere to all existing legislation in this domain. To obtain further details, kindly contact your designated representative, Diebold Nixdorf. By achieving an optimal equilibrium, implementing automated recycling in financial institutions can result in cost reductions in personnel and security as well as possible losses in interest, interbank loan payments, and cash insurance. This is accomplished by enabling these institutions to load terminals with the necessary amount of cash. In certain nations, automated teller machines (ATMs) have the potential to deplete cash reserves before scheduled replenishments. Financial institutions often maintain cash surpluses that exceed the necessary amount by up to 40%. By collaborating with cash management specialists, these institutions may

optimize load volumes and save expenses (Abdullah, Redzuan, & Daud, 2020). This involves analyzing the average rates of cash withdrawals and deposits across ATM networks.

Most private commercial banks in Bangladesh actively install Cash Recycling Machines (CRMs) to provide rapid deposit and cash withdrawal services to consumers. CRMs give customers greater banking freedom, reduce reliance on branches, and add a new dimension to the banking system. This allows customers to deposit and withdraw bank cash efficiently and quickly (Datta, 2021).

CRMs help banks eliminate the human effort required to provide services by accepting cash, counting bills, authenticating, and depositing money into account in **real time**. Most banks provide the same essential products and services, and many seek alternative approaches to retain consumers (Abbas, 2017). Cash recyclers are considered another instrument for improving customer service by those who have installed them. Banks must embrace CRM to gain a significant share of their industry. CRMs are intended to take on the role of automated teller machines (ATMs), which only enable cash withdrawals and reduce the requirements for cash deposit machines (CDMs), which only accept cash deposits.

### ***1.1. Rationale of The Study***

Research suggests that the PLC of the United Commercial Bank (UCB) has long been a leading bank in China (Fabris, 2019). They implemented CRMs because they had many tangible benefits, including branch staff productivity, additional layers of control, fewer vault trips, and more accurate and effective drawer balancing. Cash recyclers also offer user benefits that are neither tangible nor easy to assess. This study aims to examine customer satisfaction when using a cash recycling machine to withdraw and deposit cash. Therefore, this study is essential, and this report shows how the bank has transformed its services through CRM, which helps to understand and measure customer satisfaction with these automated services.

This document will help students who want to learn more about cash recycling machines (CRM). Studying the effects of currency recycling machines in Bangladesh is crucial because of the country's distinct economic environment and its prevalent reliance on cash for everyday transactions. Bangladesh, like several underdeveloped countries, mainly depends on cash-based transactions. Implementation of currency recycling machines can transform a nation's financial infrastructure. This study aims to assess the potential of these machines to promote financial inclusion, lower transaction expenses, and boost overall economic efficiency in a situation where a considerable segment of the population lacks access to banking services or has limited access. Policymakers and financial institutions must understand the cultural and legal elements that impact the acceptance of currency recycling machines in Bangladesh. This study aims to provide a comprehensive understanding of the unique difficulties and advantages of using this technology in Bangladesh. The findings provide valuable information to guide strategic choices in modernizing the financial sector and fostering sustainable economic development.

### **1.2. Objectives of The Study**

**Broad Objective:** The primary purpose of this study is to explore CRMs and learn more about their features and services. However, the main focus was on understanding how cash recycling machines (CRMs) can improve bank efficiency and profitability by satisfying consumers.

**Specific Objective:**

Table 1. Objectives

Objectives	Sources	Methods	Data Analysis
<b>1. To explore Cash Recycling Machine(CRM) systems</b>	Secondary	Journals, articles, and websites	Descriptive

<b>2. To know how the customer feels after using CRM services.</b>	Primary	Questionnaire, The survey, Face to Face interview	Descriptive Statistics
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Source: Author

## 2. Literature review

Cash recycling is a promising yet underutilized opportunity for global branches. The case of cash recycling is rooted in the potential of financial institutions to realize substantial cost reductions in several aspects of cash management, including cash handling, transportation, security, and overall operational management. Financial institutions are currently replacing cash dispensers with automated deposit terminals. However, it is worth noting that only half of these advanced terminals can currently recycle banknotes. Nevertheless, there was a noticeable shift in this trend. From 2014 to 2015, there was a 30% increase in the installation of cash-recycler terminals in Europe, as banks recognized the potential cost savings associated with this technology. In 2015, approximately 51% of the 1.2 million automated deposit terminals installed recycled ATMs. In 2021, it is projected that approximately 1.7 million automated deposit terminals will be deployed, with 67 percent of these terminals possessing the capability of cash recycling. Japan, renowned for its operational effectiveness, initiated the adoption of cash recycling technology in 1983, subsequently extending its implementation to encompass a significant majority of domestic financial institutions. The anticipated growth of cash-recycling ATMs is likely to be driven by improving business cases and increasing recognition of their benefits (Srouji & Torre, 2022). The significance of transitioning has become increasingly crucial in modern times.

Owing to its widespread use, cash continues to maintain its prominence. Globally, approximately 85 percent of consumer transactions involve cash, necessitating that financial institutions and retail businesses handle it effectively and securely. Despite assertions suggesting the potential displacement of cash by digital payments, it is noteworthy that cash still constitutes 32% of all transactions within the United States (Uddin & Akhi, 2014). Currently, electronic payments account for only 11% of all transactions in the United States. In terms of quantity, American individuals deposit a larger sum of money into automated teller machines (ATMs) compared to physical bank branches, with deposits totaling \$2.7 trillion and withdrawals amounting to \$587 billion. This surplus of deposits in ATMs allows immediate cash recycling (Afifah et al., 2023).

Furthermore, cash recycling is even more compelling considering its global implications. In the year 2015, there were a total of 99 billion cash withdrawals conducted on a global scale, exhibiting a consistent upward trend in withdrawal volumes across all regions when compared to previous years. Between 2014 and 2015, there was a notable increase in the withdrawal percentage in the Asia-Pacific region, amounting to a 16 percent increase. Similarly, the Middle East and Africa regions had an 8 percent increase in the withdrawal percentage over the same period. This trend reflects the growing global need for cash, prompting banks to seek efficient strategies to meet this demand. Consequently, the number of cash-recycling ATM installations will experience a compound annual growth rate (CAGR) of 10.7% by 2021 (Ravi, 2018). There are 13 justifications for cash recycling. One such justification is the enhancement of client satisfaction. In the banking industry, customers, especially millennials, can swiftly change their financial institutions owing to technological advancements and increased mobility. Therefore, the availability of cash when required could be a determining factor in the decision-making process. Financial institutions have the potential to enhance customer happiness by using automated cash recycling, enabling them to maintain excellent cash availability rates and reduce ATM downtimes. The reason for their ability to do so is their current circumstances. As an unintended consequence, central banks in countries such as China and Indonesia have implemented temporary laws that limit the use of cash-recycling technology. However, removing these limitations can lead to a significant increase in the implementation of currency recycling practices in certain regions.

Globally, financial institutions are increasingly recognizing the benefits associated with adopting currency recycling technology in their automated teller machine (ATM) networks. To enhance their understanding of cash planning procedures, several entities have adopted cash management software either alone or in conjunction with cash recycling programs (Ong & Chong, 2023). When these technologies are employed in conjunction with effective cash management consulting and optimization modeling, their advantages can be further enhanced. The hardware component served as the initial element of the integrated cash recycling system. Cash recyclers play a crucial role in facilitating the attainment of financial institutions' primary goals. These solutions offer straightforward means to boost revenue, reduce expenses, enhance client experience, and bolster security measures. Recyclers optimize the time and resources for financial institutions by automating cash-handling procedures (Lai & Liew, 2021). This results in a reduction in the time and resources allocated to tasks such as cash counting, re-counting, cash transportation, and cash management.

Additionally, recyclers help mitigate the challenges related to inadequate or excessive stocking of ATMs, streamlining the troubleshooting process. Recycling may bring about significant changes for financial institutions, as it enables them to assume direct control over currency circulation in a manner that is safe and complies with relevant rules and directives issued by central banks. The advantages associated with utilizing cash recyclers can be categorized into three distinct areas: enhanced customer experience. Clients have expedited access to withdrawal and deposit services, while corporate clients can efficiently and promptly rebank their funds. The cash recycler effectively enhances clients' flexibility in the temporal, spatial, and modal dimensions of their utilization of financial services. Simultaneously, reducing the time spent replenishing and overseeing ATMs enables branch personnel to allocate more time to actively engaging consumers and enhancing the quality of valuable services. There are further benefits of this study.

The use of cash recycling systems has been shown to effectively decrease cash handling expenses and mitigate dormant cash. Financial institutions derive advantages from reduced operational expenses and interest disbursements. Putting in place Automatic cash recycling systems also reduce the need for cash-in-transit (CiT) services. This means that branch employees can focus on activities that bring in more money and increase sales instead of boring tasks, such as restocking ATMs with cash. Cash recycling plays a crucial role in maintaining the availability of Automated Teller Machines (ATMs) by reducing the frequency at which they must be removed from the cassette refilling service. Implementing enhanced security measures has increased overall safety and protection. The use of heightened security measures in cash management activities substantiates the assertions mentioned above. Reduced human engagement with the actual currency leads to a decrease in the likelihood of errors, whereas infrequent ATM balancing results in a decrease in possible cash reconciliation errors. Furthermore, it is advantageous in mitigating the substantial hazards linked to excessive amounts of physical and unutilized currency, guaranteeing a financially stable future (Fachrudin & Silalahi, 2022). The experience of the NCR indicates that clients that utilize automated cash recyclers reduce their overall operating expenses by approximately 30 %.

Cash recyclers not only enhance operational efficiencies, but also result in immediate cost savings for companies while ensuring a consistent client experience. However, it is essential to note that these technologies also bring about substantial changes to existing procedures and infrastructure, thereby introducing novel challenges owing to their transformational nature. The utilization of cash recyclers presents some considerations about the optimal management of deposit cassettes, maintenance of an appropriate assortment of currencies, and utilization of client demand data. In its capacity as a consulting partner, NCR can provide valuable assistance to deployers in mitigating the potential risks associated with imprudent or unsuitable utilization of cash recyclers, which may inadvertently result in the substitution of one set of costs and risks with another. The cash management software is an integral part of the cash recycling system and serves as the second component. The testimonies of NCR customers corroborate that integrating cash recyclers with effective software may yield even more significant cost reduction. Using cash recyclers within an integrated system often leads to augmented savings of approximately 20 percent for enterprises. A study conducted by industrial observers confirmed the validity of our experience. • PricewaterhouseCoopers reported that the implementation

of cash management software by banks has the potential to reduce their overall cash management expenses by up to 15% (1). • Consultants at Stolle and Heinz have suggested that adopting cash management solutions could result in savings of approximately €1 billion (\$1.24 billion), equivalent to approximately 25% of expenses for German banks (2). Based on the findings of the ATM Industry Association, the adoption of effective cash management strategies has the potential to yield annual cost savings ranging from \$3,000 to \$10,000 per bank branch. Cash management software is capable of analyzing transactions made through ATM and cash recycling networks, thereby offering financial institutions accurate insights into client interactions with cash and the subsequent changes in these interactions over time (Hidayah, Waspada, & Sari, 2023). Consequently, using such software can result in cost savings. Consequently, financial institutions can optimize the cycles of cash replenishment to fulfill these requirements while simultaneously adjusting to evolving consumer expectations. Similarly, financial institutions can leverage data from cash management software to manage the balance between consumer self-service and teller-based support effectively. This allows them to simultaneously profit from the ease of low-touch transactions while fostering valuable human connections. Cash management software aids branches in mitigating avoidable expenses or inefficiencies when implementing a cash recycling network (Sharif & Pal, 2020).

The Cash Recycling Excellence Team at NCR offers integrated consulting services to financial institutions and ATM deployers to enhance the efficiency and effectiveness of their ATM network. This firm pioneered a proactive approach to cash recycling, distinguishing itself as the first type. By adopting this approach, clients can access data and insights without relying on service disruptions, thereby enhancing processes and workflows. In contrast, a group of specialists in cash recycling collaborates closely with financial institutions (FIs) and independent ATM deployers (IADs) to offer advanced data analysis. This analysis aids deployers in effectively overseeing and optimizing the worth of their automated teller machine (ATM) network. Many financial institutions understand the potential of enhancing their cash management operations. However, we often need more clarity regarding the specific areas and methods via which such improvements can be achieved.

Cash management life cycle consultancy offers financial organizations a holistic perspective on strategies for efficient and economical cash distribution and supply (Fabris, 2019). Cash management consultancy is a crucial factor for effectively addressing these frequently divergent difficulties. Financial institutions have the potential to enhance cost reduction and operational efficiency by using best practices, thereby reengineering their cash management operations. Acknowledging the significance of strategic alignment throughout the cash management value chain, end-to-end cash optimization involves a comprehensive evaluation of the entire organization and creation of a flexible cash management solution capable of adjusting to fluctuations in cash component expenses. A comprehensive optimization solution can be developed by focusing on the entire cash lifecycle within an enterprise. This solution aims to balance cash inventories and available capital for investment, while considering staff alignment and opportunities for leveraging resources (Mahmod, 2022).

In addition, the solution involves the development of forecasting algorithms that effectively distribute cash demand across various cash-point types. Furthermore, the solution analyzes the complex forecasting functionality across enterprises, considering historical trends. Finally, the solution optimizes the transportation scheduling, cost of cash, and logistics costs. The optimization process progresses from the channel to the enterprise level, resulting in exponential efficiency. This was achieved by integrating consulting services and implementing an enterprise-wide solution design. Additionally, the treatment of cash distribution channels as cohesive and interconnected systems is facilitated by a dynamic array of complementary solutions (Nirmalasari & Minai, 2023).

Consumers now have access to a broader range of alternatives than ever before, and there has been a noticeable increase in their inclination to utilize these possibilities. Undoubtedly, an individual is seeking a banking institution that may be trusted. Nevertheless, individuals remain reluctant to compromise on their usefulness, availability, and convenience. Consumers need their financial institutions to exhibit attentiveness to their monetary requirements, particularly expeditious cash accessibility. The optimization of the ATM network is crucial to efficiently address the need for cash

availability in financial institutions, which consistently face the challenge of doing more with limited resources. The possibility of effective cash management is facilitated by the NCR's integrated solution, which encompasses hardware and software components, complemented by associated services. The proposed solution establishes a streamlined, effective, and adaptable cash management system. This aids financial institutions and their branches in developing a tailored approach that effectively meets the unique requirements of their respective customer bases. The consequences include elevated client happiness, enhanced operational security, and greater profitability.

### **2.1. Customer Satisfaction**

The dictionary defines satisfaction as an act of enjoyment or fulfillment. The act of being satisfied, contentment, the basis for or method by which one is satisfied, or the acceptance of something as adequate, reliable, truthful, etc. It refers to making up for an incorrect or receiving recompense for damage. It is a chance to remedy a mistake, such as through a duel. Customer satisfaction measures customers' satisfaction when doing business with a firm.

Understanding a person's degree of satisfaction is determined by how they feel after comparing their performance or perceived outcomes with their expectations. Definition: The value of one's feelings—satisfying or disappointing—is determined through a procedure that contrasts the existence or appearance of a desirable object with the anticipated qualities.

Kotler and Keller wrote: "Comparing perceived performance (or results) of products to expectations." Customer satisfaction by Jahanshahi et al., "Cost is an airline's perceived level of satisfaction with fares and customer acquisition costs," "Customer satisfaction is the ultimate line of customer value achieved in a transaction or relationship." On the other hand, "customer pride is a concept that influences repeat purchase intentions and behaviors that lead to a company's sales and profitability." Consumer pride refers to the post-purchase evaluation of a service or product that meets customer expectations. Is. Consumer pride is determined by measuring how well a service or product performs against customer expectations and desires. Satisfied customers believe that a product or service performs on par, leading them to make more purchases. The dissatisfied consumer persuades other customers to avoid making a second purchase, leading them to switch to competing brands.

According to Kotler and Keller, consumer expectations of the performance of purchased items are compared to customer satisfaction, which is a human feeling. Customer reactions to assessments of the perceived gaps between expectations and performance are called customer satisfaction. According to Olivier, customer satisfaction is a post-purchase assessment of the perceived value (Arif et al., 2023). According to Lovelock (2012), customer pleasure is an emotional state; anger, frustration, annoyance, joy, and neutrality are all possible buying reactions. Customer satisfaction directly correlates with client retention, revenue, and market share. Customers are more likely to be loyal to goods and services if they are satisfied with the value they receive.

### **2.2. Cash Recycle Machine (CrM)**

Cash Recycling Machines (CRMs) are ATM-like devices designed for cash deposit transactions, and can be used for online payments and transfers. They required a card to accept a minimum deposit of a specified amount for 24 h. CRMs are part of digital banking services that allow customers to use them independently, without involving bank employees. They resemble standard ATMs but have a deposit hole or drawer on the front. To deposit cash, customers must use an ATM card and a PIN similar to those used in standard ATMs. ATMs that accept deposits 24/7 allow customers to deposit cash at any given time.

### **2.3. Features of CRM**

More options are available to consumers, who are more eager to make decisions. Every customer needs a bank that is dependable, trustworthy, handy, approachable, and simple to use. They require a universal bank with quick and simple access to cash and knowledge of their financial needs. However, in terms of operations, financial institutions should follow the adage "less is more." It has always been difficult for them to accommodate the rising demand for access to cash by diversifying their networks and

optimizing ATM usage. Recyclers are an essential part of the entire cash management strategy. This enables banks to increase their geographic reach while lowering their operational expenses. These physical endpoints, when combined with efficient cash management tools, may produce incredibly lucrative businesses, highly secure operations, and delighted customers.

#### 2.4. How Do CRMs Work?

Real-time cash withdrawals and deposits are performed in CRM, and transactions are instantly reflected in the bank account. When cash is deposited, the cash recycler counts the bills and displays the total amount entered into the deposit as well as the amount for each denomination. After the amount is displayed, the consumer must confirm that it is correct before completing the transaction. Consumers are given receipts that demonstrate their final account balance. CRM accepts banknotes of 100, 500, and 1,000 taka and returns torn, glued, or damaged banknotes. Additionally, we look for counterfeit bills when depositing or withdrawing cash. The money is withdrawn from subsequent transactions. Real-time withdrawals and deposits are made and the customer's account is updated immediately. This is cost-effective for banks because ATM operating costs represent a significant portion of cash processing costs (Chen, Chen, & Leung, 2023).

#### 2.5. Cash Recycling Machines (CRMs) in Bangladesh

Technology has had a significant impact on the banking revolution, and banking is now widespread. Although many banks have gone online in Bangladesh, a radically different concept, technology-based banking, is gaining popularity as a recent trend. Last year, the number of Cash Recycling Machines (CRMs) installed by Bangladeshi banks to help customers make quick deposits, withdrawals, and money transfers almost quadrupled. According to Bangladesh Bank, the bank will install 917 of these machines during 2021-2022 bringing the total to 1,821, an increase of approximately 99% from the previous year. Users prefer companies that offer excellent online banking services. The latest technology was introduced in Bangladesh in 2017. The first Cash Recycling Machine (CRM) in Bangladesh was installed by the United Commercial Bank (UCB) PLC. Banks must compete for consumers' hearts and minds. Recent figures show that when it comes to installing CRM booths, the UCB PLC, CITY, and IBBL are at the forefront. Almost all private commercial banks in Bangladesh have at least one CRM booth. The following six large banks provide these financial services.

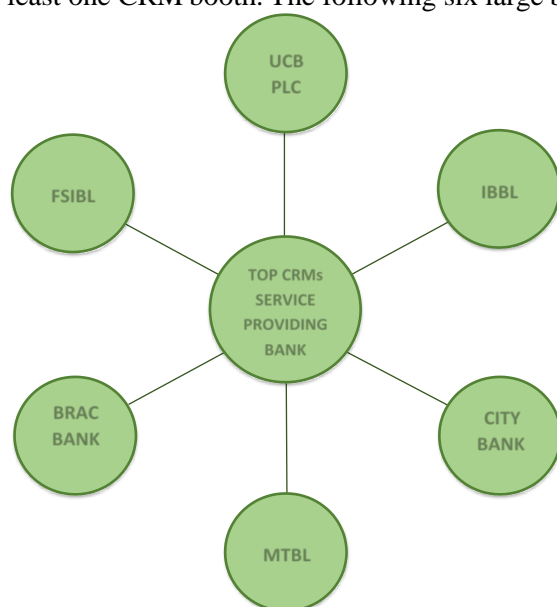


Figure 4: Top CRM Service Providing Bank

#### 2.6. UCB PLC at a glance

The PLC is a leading first-generation private commercial bank in Bangladesh, operating in various financial industries such as retail banking, SMR banking, corporate banking, offshore banking, and



remittances. Established in 1983, the bank offers various retail deposits and lending products, import and export credits, and helps Bangladesh's financial situation by increasing its foreign currency earnings. With licensed capital of Tk 35.5 million, UCB PLC began operations in 1983 with a focus on customer service and satisfaction. With a significant network of 215 branches, the bank competes fiercely through personalized services, state-of-the-art procedures, and effective management. In 2006, it launched a consumer card, which has since become a success, with 40,000 cardholders. In 2017, UCB launched CRM, a real-time cash deposit machine, in Bangladesh.

### ***2.7. Cash Recycling Machine (CRM) & It's Impact on Customer Satisfaction***

Cash Recycling Machines (CRMs) have become revolutionary instruments in Bangladesh's banking industry, altering the financial service environment and substantially impacting client contentment. In a nation where a significant segment of the population depends on cash transactions, Cash Recycling Machines (CRMs) address enduring difficulties associated with accessibility, ease, and effectiveness in managing tangible currency. CRMs have a complex influence on customer satisfaction in Bangladesh, affecting several areas that reshape the banking experience of people and enterprises.

CRMs contribute significantly to increased customer satisfaction by providing improved convenience. Due to its varied demographic and geographic features, Bangladesh frequently requires help from people seeking financial services. CRMs address this disparity by offering an extensive network of automated devices that allow clients to conveniently deposit and withdraw cash. This convenience is especially vital in rural locations where the availability of traditional bank branches may be restricted. Enabling clients to conduct transactions outside regular banking hours provides them with increased flexibility, substantially contributing to their overall happiness with the banking experience.

CRMs provide ease and play a crucial role in minimizing transaction duration, thereby improving customer satisfaction. Conventional cash transactions at bank counters sometimes require lengthy lineups, resulting in time inefficiencies and consumer exasperations. CRMs optimize this procedure, enabling users to finalize transactions promptly and effectively. Automating cash processing increases the transaction speed and reduces the likelihood of mistakes, resulting in a more seamless and dependable client experience. The time-saving component is especially significant in densely populated areas, where the speed of life is rapid and customers highly prioritize efficient services (Tanha et al., 2022).

Furthermore, customer relationship management systems (CRMs) enhance consumer happiness by promoting financial inclusivity. Bangladesh has a substantial proportion of its population that needs access to banking services because of geographical limitations or low availability of formal financial institutions. Strategically positioned CRMs offer previously marginalized persons a chance to participate in banking operations, enabling their inclusion in the traditional financial system. By adopting this inclusive strategy, banks broaden their client base and empower individuals by providing them access to contemporary financial services. Customer satisfaction is influenced by the ease of CRMs and their significant impact on socioeconomic dynamics, allowing for the economic empowerment of formerly marginalized community elements.

The security and transparency provided by CRMs enhances client satisfaction by resolving concerns regarding the safety of cash transactions. Conventional approaches to managing physical currency may subject clients to hazards, such as theft or the circulation of counterfeit money. CRMs, equipped with sophisticated security mechanisms, offer a safe setting for monetary transactions. Employing state-of-the-art authentication technology and providing instantaneous marketing updates foster a feeling of assurance and reliance among clients. Customers are more inclined to interact routinely with CRMs when they know that their transactions are secure and transparent. This, in turn, improves overall satisfaction with the financial services offered.

The ability of CRMs to handle different types of money is also a critical factor for ensuring customer happiness. Bangladesh, similar to several other nations, possesses a wide array of currency notes in circulation. CRMs that can effectively manage various currencies provide clients with a convenient

experience, removing the requirement to organize or separate cash before transactions. This adaptability accommodates the heterogeneous financial needs of consumers, regardless of whether they deposit or withdraw different sums of money. The intuitive interface of CRMs and their capacity to support several currencies guarantee a smooth and effortless experience for clients, enhancing their overall happiness.

Moreover, the ecological consequences of CRMs can significantly influence customer happiness in nations, such as Bangladesh, where the importance of sustainability is increasing. The recycling feature of these machines, which allows for the reuse of banknotes, aligns with worldwide initiatives to decrease the environmental impact of monetary manufacturing. Environmentally aware customers may find joy in utilizing CRMs because they help create a circular economy, which reduces the need for new banknotes and minimizes the environmental effects of money circulation.

In summary, Cash Recycling Machines have a substantial and wide-ranging effect on consumer satisfaction in Bangladesh. CRMs provide improved ease, efficiency, security, and financial inclusion by addressing the distinct difficulties of the local banking industry. CRMs offer a range of advantages that enhance consumers' banking experience, leading to a satisfying and transforming experience beyond individual transactions. The increasing prevalence of these machines worldwide is expected to significantly impact consumer satisfaction. Thus, it is crucial to determine the future of banking in Bangladesh. Cash Recycling Machines (CRMs) have become revolutionary instruments in Bangladesh's banking industry, altering the financial service environment and substantially impacting client contentment. In a nation where a significant segment of the population depends on cash transactions, Cash Recycling Machines (CRMs) address enduring difficulties associated with accessibility, ease, and effectiveness in managing tangible currency. CRMs have a complex influence on customer satisfaction in Bangladesh, affecting several areas that reshape the banking experience of people and enterprises.

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Furthermore, customer relationship management systems (CRMs) enhance consumer happiness by promoting financial inclusivity. Bangladesh has a substantial proportion of its population that needs access to banking services because of geographical limitations or low availability of formal financial institutions. Strategically positioned CRMs offer previously marginalized persons a chance to participate in banking operations, enabling their inclusion in the traditional financial system. By adopting this inclusive strategy, banks broaden their client base and empower individuals by providing them access to contemporary financial services. Customer satisfaction is influenced by the ease of CRMs and their more significant impact on socioeconomic dynamics, allowing for the economic empowerment of formerly marginalized community elements.

The security and transparency provided by CRMs enhances client satisfaction by resolving concerns regarding the safety of cash transactions. Conventional approaches to managing physical currency may

subject clients to hazards, such as theft or the circulation of counterfeit money. CRMs, equipped with sophisticated security mechanisms, offer a safe setting for monetary transactions. Employing state-of-the-art authentication technology and providing instantaneous marketing updates foster a feeling of assurance and reliance among clients. Customers are more inclined to interact routinely with CRMs when they know that their transactions are secure and transparent. This, in turn, improves overall satisfaction with the financial services offered.

The ability of CRMs to handle different types of money is also a critical factor for ensuring customer happiness. Bangladesh, similar to several other nations, possesses a wide array of currency notes in circulation. CRMs that can effectively manage various currencies provide clients with a convenient experience, removing the requirement to organize or separate cash before transactions. This adaptability accommodates the heterogeneous financial needs of consumers, regardless of whether they deposit or withdraw different sums of money. The intuitive interface of CRMs and their capacity to support several currencies guarantee a smooth and effortless experience for clients, enhancing their overall happiness. Moreover, the ecological consequences of CRMs can significantly influence customer happiness in nations, such as Bangladesh, where the importance of sustainability is increasing. The recycling feature of these machines, which allows for the reuse of banknotes, aligns with worldwide initiatives to decrease the environmental impact of monetary manufacturing. Environmentally aware customers may find joy in utilizing CRMs because they help create a circular economy, which reduces the need for new banknotes and minimizes the environmental effects of money circulation.

In summary, Cash Recycling Machines have a substantial and wide-ranging effect on consumer satisfaction in Bangladesh. CRMs provide improved ease, efficiency, security, and financial inclusion by addressing the distinct difficulties of the local banking industry. CRMs offer a range of advantages that enhance consumers' banking experience, leading to a satisfying and transforming experience beyond individual transactions. The increasing prevalence of these machines worldwide is expected to significantly impact consumer satisfaction. Thus, it is crucial to determine the future of banking in Bangladesh.

### **3. Research methodology**

This study used a quantitative method to collect data through surveys and interviews. A questionnaire was developed to measure user satisfaction with the UCB PLC's Cash Recycling Machine (CRM). A sample size of 300 people was used as the primary dataset, obtained through a simple random sampling method. Secondary data, including closed questions, were obtained from a secondary data source. The survey results were analyzed to summarize what has been learned from the study. Based on the analysis results, the survey data were presented at the end. This study aims to understand the reality of UCB PLC CRM and its impact on customer satisfaction.

A questionnaire was developed to gather information for this study, and a survey was conducted to measure user satisfaction with the United Commercial Bank (UCB) PLC's Cash Recycling Machine (CRM). Therefore, this study uses a quantitative technique.

#### **3.1. Primary Data**

A questionnaire was created to collect the primary data. This Research prepared a survey of UCB PLC CRM users. This study used a simple random sampling method. This study included a sample size of 300 participants. Primary data were also obtained using the following techniques:

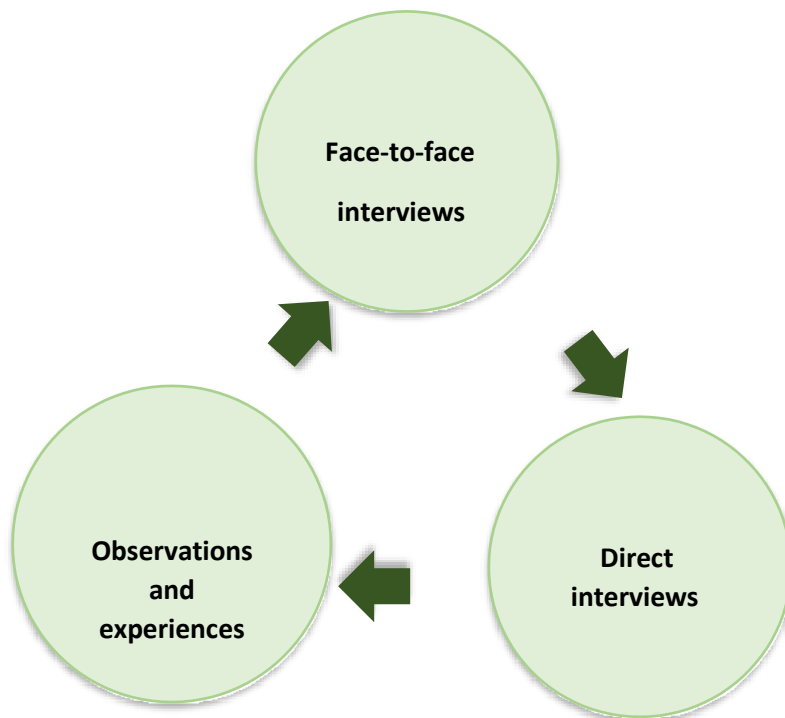
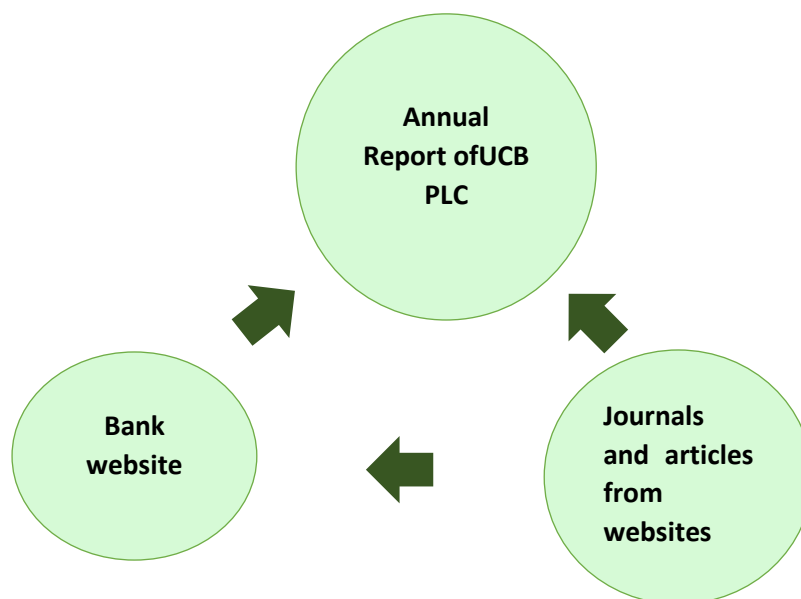


Figure 5: Primary Data Sources

### 3.2. Secondary Data

A secondary data source was used to investigate a Cash Recycling Machine (CRM) system. The secondary data sources were as follows:



## 4. Results and discussions

### 4.1. Analysis

First, I created ten survey questions to rate existing customers of the United Commercial Bank PLC on a scale of 1 to 5. This helps to determine the satisfaction of customers using the CRMs of the United Commercial Bank Limited. The survey was based on the responses of 300 bank customers. The ranking criteria are as follows:

Table 2. The standards of the rating

1	Strongly Agree
2	Agree
3	Neutral
4	Disagree
5	Strongly Disagree

This research also used some closed questions to obtain possible responses of Yes or No. After the survey, the results are analyzed, and a summary of what has been learned from the study of the data is provided. The survey results are presented at the end, depending on the results of the analysis of survey data.

#### 4.1.1. Analysis of Survey Data

Surveys are based on several factors that directly or indirectly affect customer satisfaction. To understand the reality of UCB PLC's CRM, we surveyed customers and employees of the UCB PLC. The analysis of the survey data is as follows:

##### 1. Number of customers who have a Debit Card of UCB PLC

Table 3. Number of Debit Card Holders

Remark	Number of Respondents	Percentage
Yes	29	97%
No	1	3%

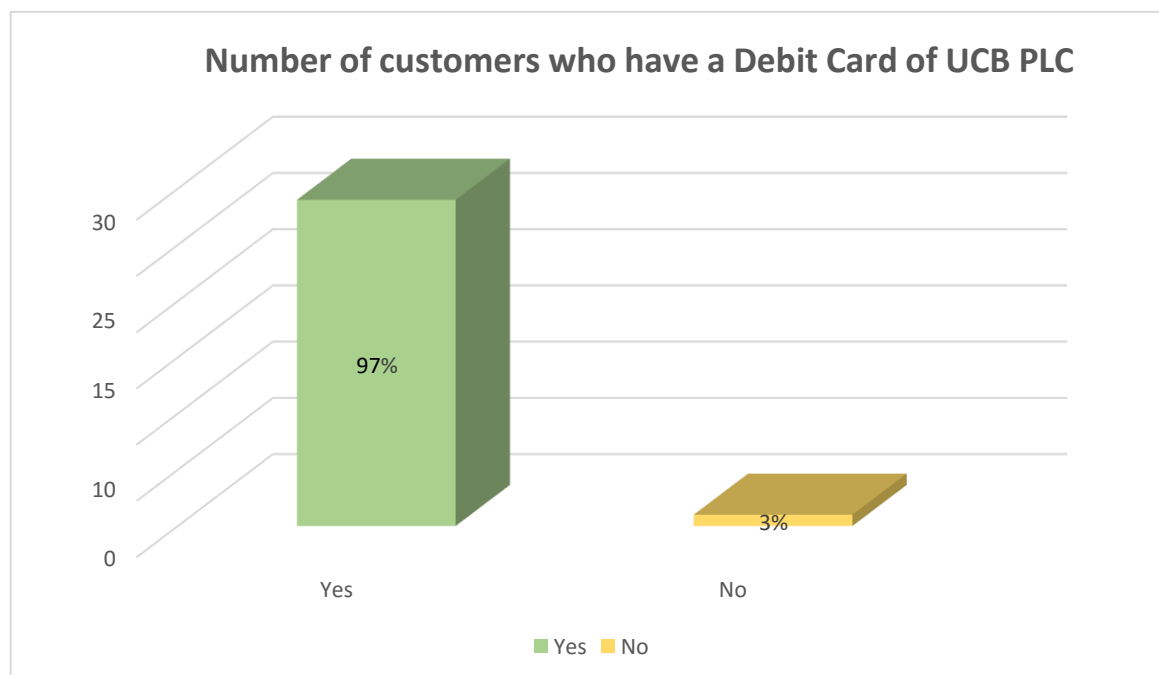


Figure 5: Number of Debit Card Holders

**Interpretation:** Customers were asked whether they currently had a UCB PLC debit card in the first question. The column chart above indicates that more than 97% of the users have a debit card. However, only 3% of the customers still need it. Based on this information, we can assume that users can use a debit card for financial transactions.

2. Several customers are familiar with the cash deposit and withdrawal features of the UCB PLC cash recycling machine.

Table 4. Number of customers who are familiar with CRMs

Remark	Number of Respondents	Percentage
Yes	27	90%
No	3	10%

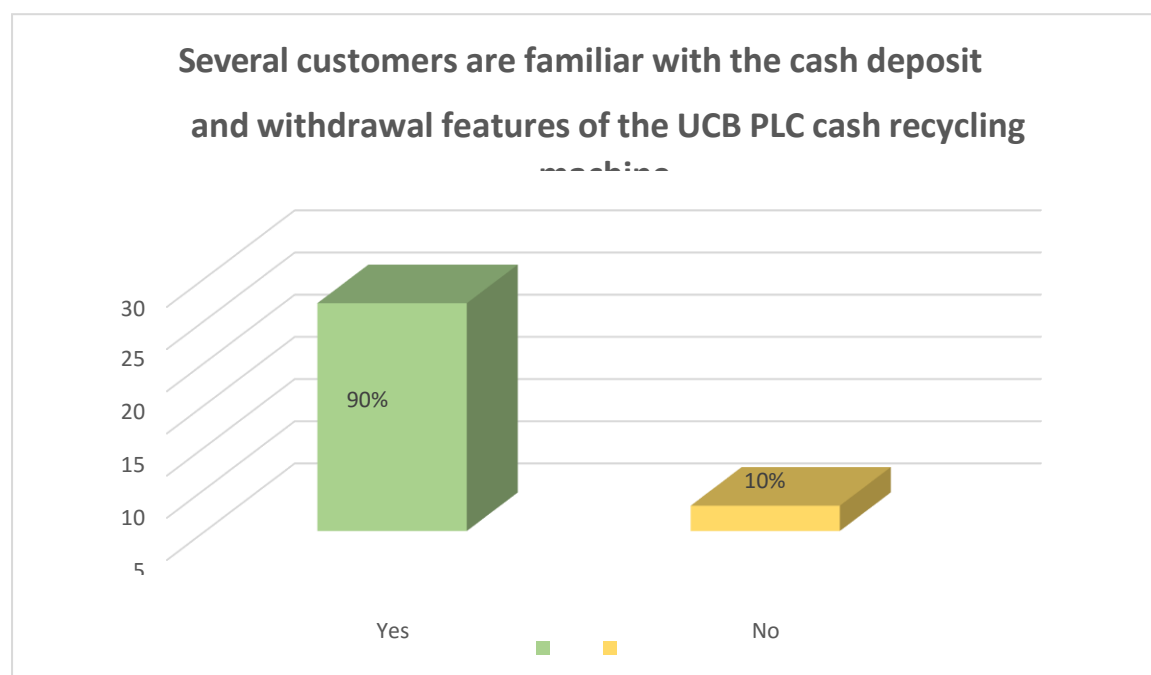


Figure 6: Number of customers are familiar with CRMs

**Interpretation:** The above graph shows how widely recognized UCB PLC CRMs are among its clients. The responses of 90% of the customers agreed. Since the UCB PLC, clients have provided nearly all of the responses. However, three customers expressed disagreement. This demonstrates that they need to be informed of information on the UCB PLC's CRMs and that cash may be deposited and withdrawn around the clock. However, it is encouraging that most individuals are curious about banks' services.

3. Number of times UCB PLC customers use CRM services per month.

Table 5. Number of times CRM services used

Remark	Number of Respondents	Percentage
NEVER	1	3%
1 to 3	5	17%
4 to 7	14	47%
8 to 10	4	13%

10+	6	20%
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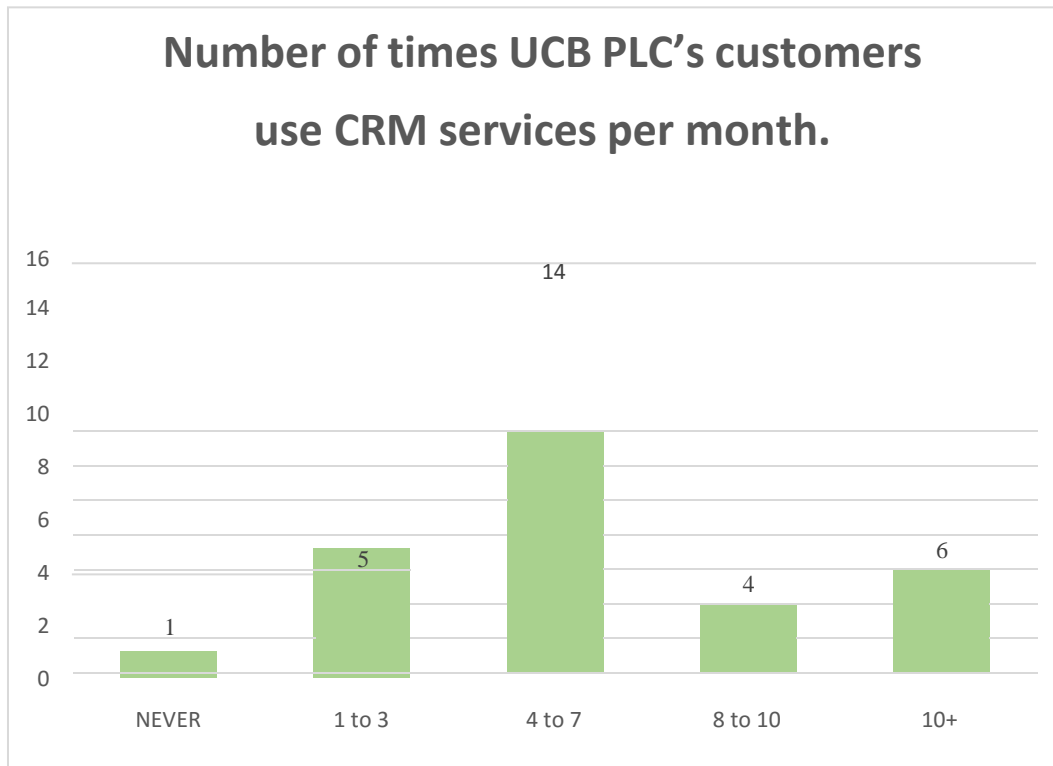


Figure 7: Number of times CRM services are used

**Interpretation:** According to the data, approximately 47% of customers use CRM services. Among the participants, this rate was the highest. However, 3% of users still use traditional banking. They need to understand the advantages of utilizing a bank's CRM services. However, 20% of respondents who were customers used this service more frequently.

4. CRM services were used most frequently.

Table 6: Most frequently used CRM service

Remark	Number of Respondents	Percentage
Cash Withdrawal	15	50%
Cash Deposit	5	17%
Balance Check	8	27%
Fund Transfer	2	6%
Pay Bills	0	0%

### CRM services have been used most frequently.

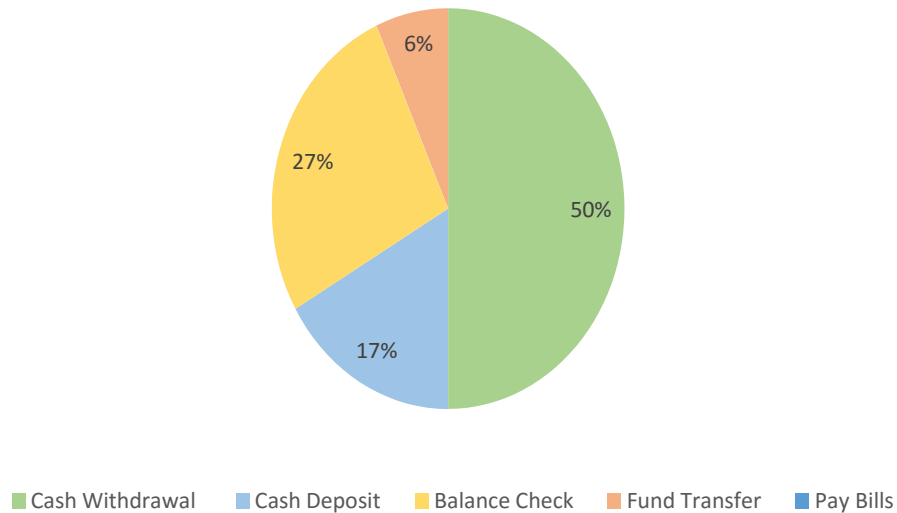


Figure 8: Most frequently used CRM service

**Interpretation:** Cash Withdrawal Services have taken up approximately half of the pie graph. Over 50% of the respondents performed Cash Withdrawals using CRMs. The Balance Check utilized 27% of the total. As clients utilize traditional banking for this specific service, 17% were used for cash deposits, 6% for fund transfers, and 0% for paying bills. CRMs provide gasoline for their growth. Need for 24-hour financial transactions. As a result, more people use CRM services.

5. Several customers use CRMs to deposit cash in accounts

Table 7. Number of customers who use CRMs to deposit cash

Remark	Number of Respondents	Percentage
Yes	24	80%
No	6	20%



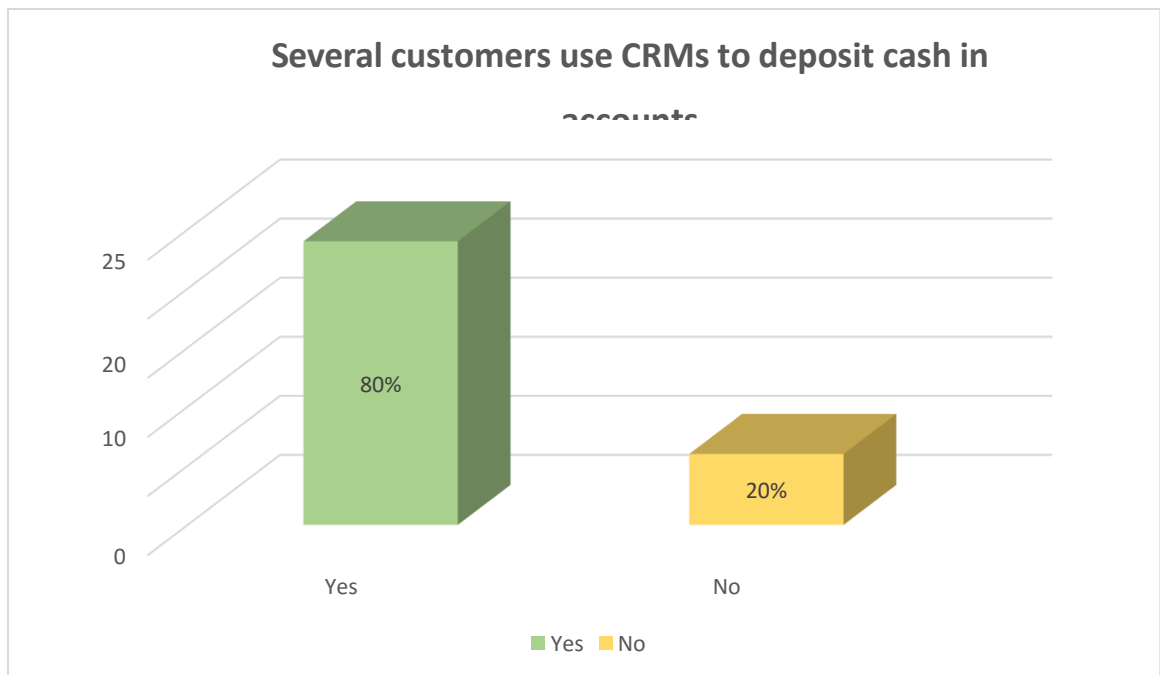


Figure 9: Number of customers who use CRMs to deposit cash

**Interpretation:** According to the above graph, 80% of the respondents deposited money into their accounts using the CRMS. Consequently, individuals can deposit modest amounts of cash after banking hours, among other essential banking services. Customers of the UCB PLC who only use their bank's debit card are given access to this service. At the same time, 20% of clients in this area need to utilize this service.

6. The score of UCB PLC's CRM service is on a scale of 1 to 5

Table 8. Score is given to CRM service

Remark	Number of Respondents	Percentage
Excellent	14	47%
Good	6	20%
Average	8	27%
Bad	1	3%
Poor	1	3%

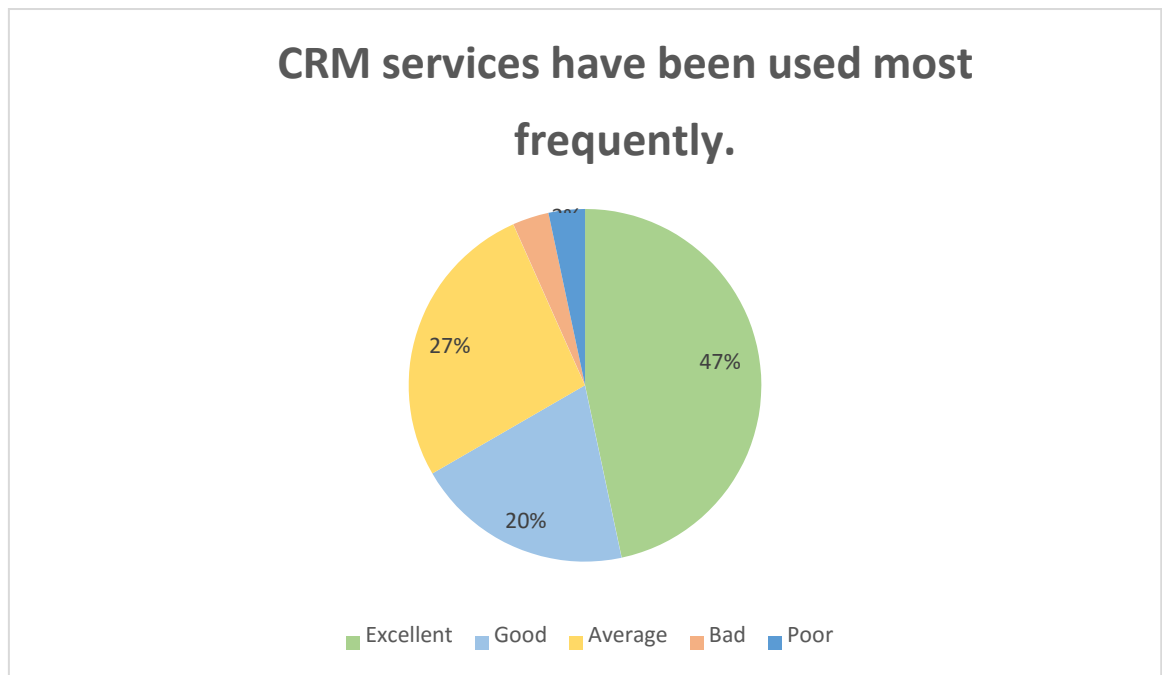


Figure 10: Score is given to CRM service

**Interpretation:** Nearly 47% of the respondents thought that UCB PLC's CRM service offered good services, giving the CRMs of UCB PLC an excellent grade. However, 27% of the respondents indicated an average. However, 20% of respondents believed that their CRM offerings could have been better. Three% of the participants indicated their disapproval of UCB PLC CRMs.

#### 7. It is easy to perform traditional banking activities using CRMs

Table 9. Ease of using CRM services

Remark	Number of Respondents	Percentage
Strongly Agree	8	27%
Agree	14	47%
Neutral	6	20%
Disagree	2	6%
Strongly Agree	0	0%

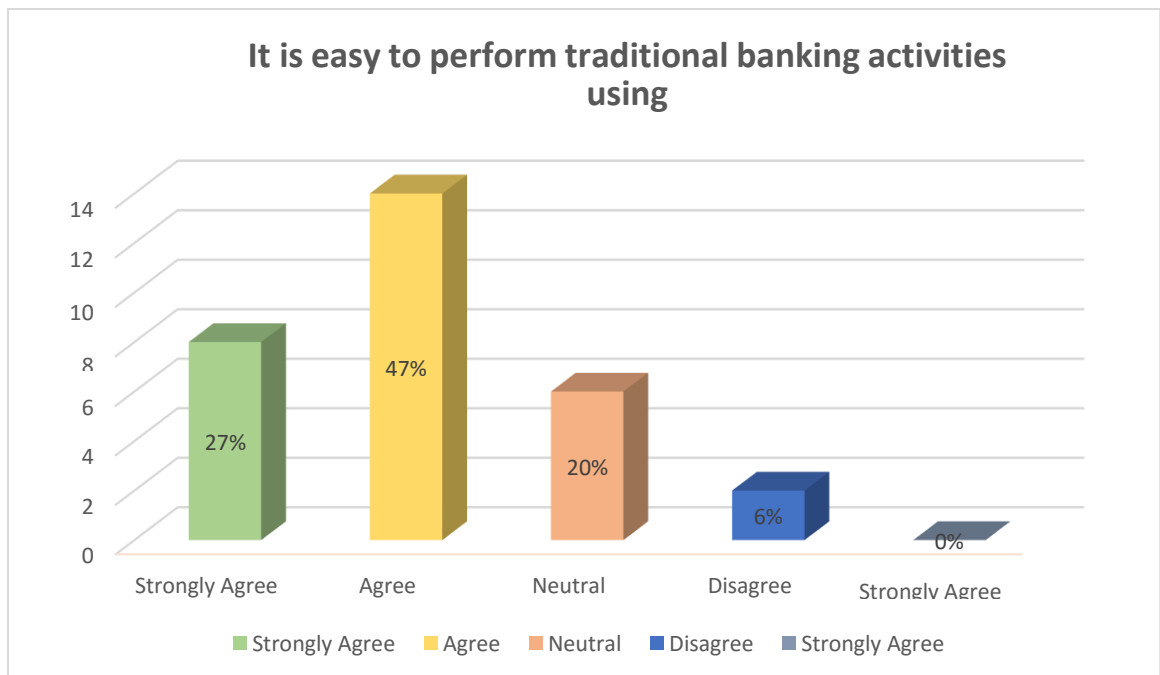


Figure 11: Ease of using CRM services

**Interpretation:** Nearly 27% of clients strongly agreed that utilizing CRMs makes banking tasks easier than those that require traditional methods. While 47%, or nearly half of the respondents, agreed to utilize CRMs, 6% expressed opposition. They believed that this was difficult and inconvenient. Twenty% of respondents held a neutral stance on the opposite side. They found this straightforward. However, none of them vehemently disagreed.

8. A secure system for banking transactions is the CRM service

Table 10. Security level CRM systems

Remark	Number of Respondents	Percentage
Strongly Agree	10	33%
Agree	13	44%
Neutral	5	17%
Disagree	1	3%
Strongly Agree	1	3%

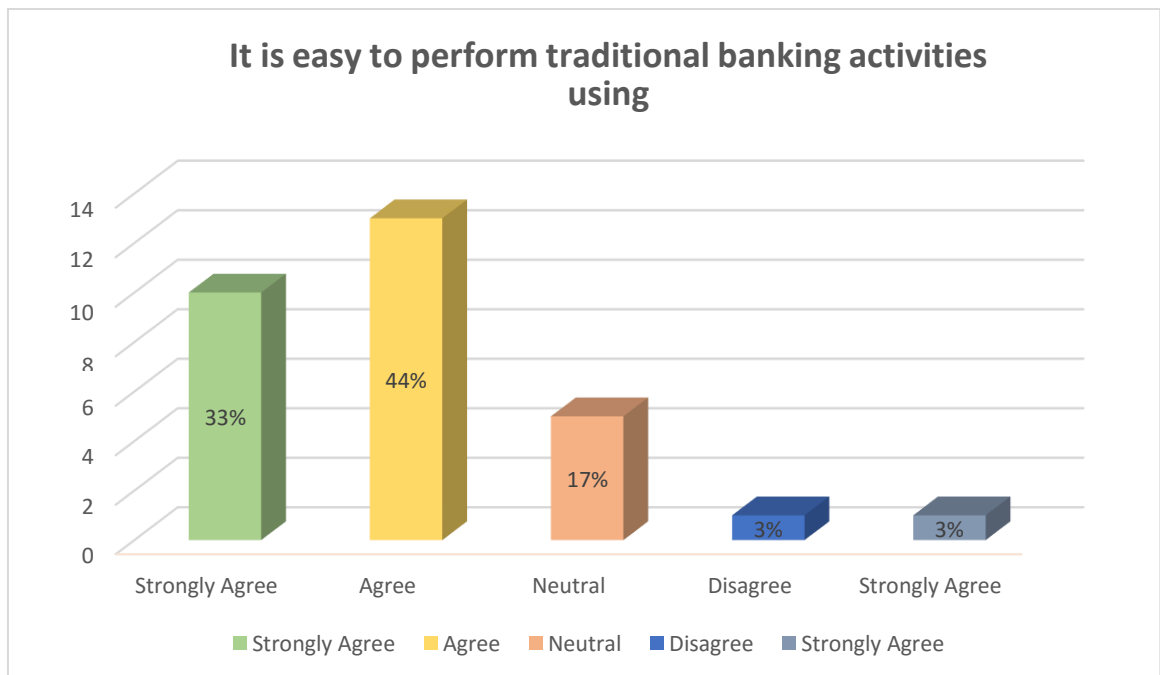


Figure 12: Security level CRM systems

**Interpretation:** The data demonstrate that 44% of consumers believe that CRM systems are secure for banking transactions. However, 3% expressed strong disapproval, indicating that CRMs were less secure than traditional ones. However, 17% of the respondents remained neutral. However, they did not appear to be safe. Thus, according to 33% of respondents, the app is safer than traditional banking. In addition, 3% of the participants disagreed.

#### 9. Several times, UCB PLC's CRM system failed

Table 11. Number of times UCB PLC's CRM system failed

Remark	Number of Respondents	Percentage
NEVER	11	37%
1 to 3	14	47%
4 to 7	2	6%
8 to 10	3	10%

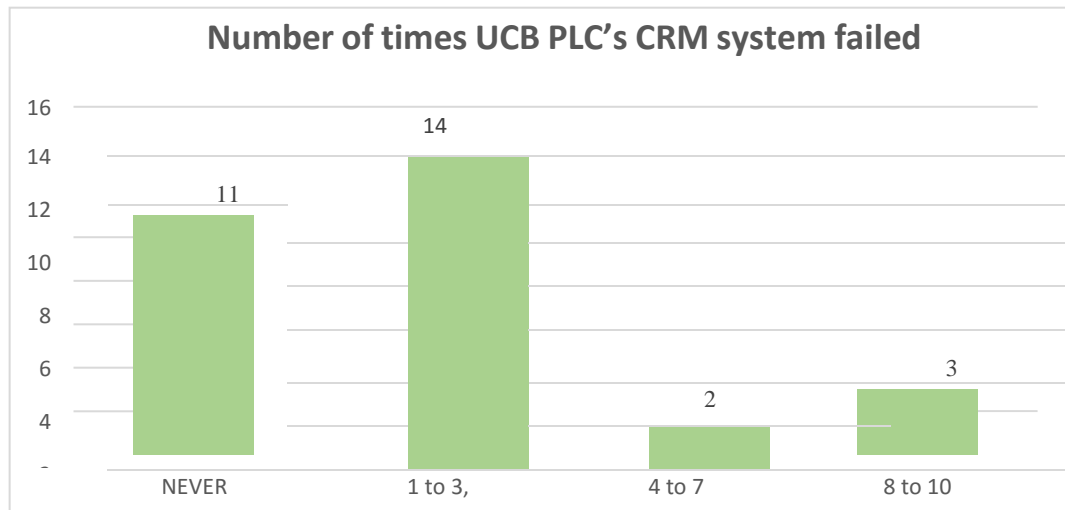


Figure 13: Number of times CRM services are used

**Interpretation:** Data show that 47% of CRM system users failed one to threetimes. It had the highest rate among the participants. Simultaneously, 16% of users had issues or repeatedly failed to complete a transaction. Several transactions have failed because of the poor qualityof the Internet. However, 37% of respondents said that theyhad never had a problem using CRM. However, these consumers had problems owing to the slow Internet.

#### 10.Satisfaction level of customers who used UCB PLC's CRM service

Table 11. Satisfaction level of customers

Remark	Number of Respondents	Percentage
Very Satisfied	15	50%
Satisfied	9	31%
Neutral	1	3%
Unsatisfied	2	6%
Very Unsatisfied	3	10%

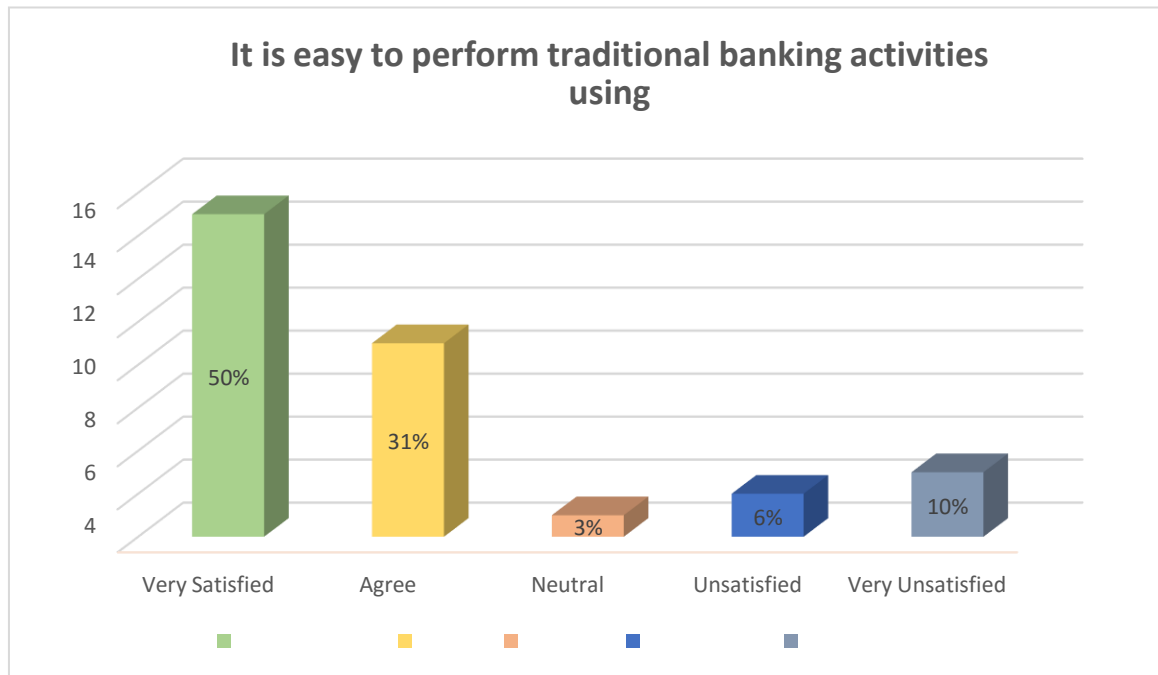


Figure 14: Satisfaction level of customers

**Interpretation:** 81% of respondents said they were satisfied with them, 50% said they were delighted, and customers were happy with UCB PLC's CRM services. However, 10% of the respondents were highly dissatisfied with UCB PLC's CRM services. Adoption of CRM systems for banking: 3% of respondents were neutral, neither satisfied nor dissatisfied, and 6% were unsatisfied.

#### 4.2. Findings

The analysis shows that about 3% of respondents do not frequently use CRM services and still rely on traditional banking channels. However, more than 20% of the respondents utilized CRM systems more regularly, with 47% doing so four to seven times a month. The analysis shows that most customers use CRM services for cash withdrawals. Nearly 50% of respondents answered yes. A total of 27% was used to check the balance and 17% was used for cash deposits. As none used it to pay bills, only 6% were used for fund transfers. This shows that banks are introducing new services to attract more clients, and clients have the chance to use banks' essential services, such as deposits and withdrawals.

According to the survey, most consumers do not use CRMs to deposit cash into bank accounts. However, most of them knew of this capability and completed at least one transaction using CRMs from the UCB PLC. The purpose of this service is to enable consumers to access essential banking services beyond their regular business hours. They have 24/7 access to banking through CRM.

Additionally, 47% of respondents gave excellent ratings for UCB PLC CRM, the highest rating, but nearly 27% gave average ratings. This concerns the bank because it suggests that the second-best respondents believe that their CRM services could be better than those of other companies. Additionally, a few respondents expressed unfavorable opinions, endangering the effectiveness of their CRMs.

Finally, it can be concluded from the data that most clients have high satisfaction levels and are pleased with UCB PLC CRM services. However, a significant portion of respondents (nearly 10%) were highly dissatisfied with UCB PLC CRMs' services.

#### 5. Conclusions

To serve consumers, the PLC of the United Commercial Bank has established CRM/ATM booths in various locations around the nation. They provide customers with 24-hour access to services for cash

withdrawals and deposits, fund transfers, balance checks, and bill payments. This study will be helpful in bridging the gap between what consumers receive and what they expect. However, there are other situations in which the UCB PLC should focus, including the following:

CRM applications must be redesigned based on the bank's customer base. They should be responsive and user-friendly so that customers can easily utilize them. To motivate clients to use CRM systems, a variety of programs, such as awareness seminars, should be implemented. Customers should receive appropriate instructions on CRM-based banking. To make it simple for users to utilize the CRM system for cash deposits, all necessary functions should be implemented. The UCB PLC has to increase its marketing efforts for CRM services, particularly for deposit features. CRM systems should receive regular updates to keep them secure and bug-free.

### ***5.1. Recommendations***

The banking industry has evolved through digital technology. Bangladesh has also improved the use of these technologies, particularly in the banking industry. With various digital banking services, such as CRMs, the United Commercial Bank PLC plays a significant role in the economy of Bangladesh. People use the CRM solutions offered by the UCB PLC to conduct business more effectively and at lower costs. Although they face specific challenges and hazards in offering the best banking services, UCB PLC is working to overcome these obstacles so that customers can conduct transactions without issues. CRM system-based banking services, which are more affordable and effective than conventional banking systems, should receive more attention from the UCB PLC. The CRM services of UCB PLC have become very close to individuals, and customers will benefit from them. With the help of CRM banking, life is becoming simpler and more carefree.

This study discovered several characteristics of the UCB PLC by analyzing its CRMs, including first-rate customer support, customer satisfaction, standard banking service application systems, 24/7 accessibility, and more. The UCB PLC should expand its advantages. Regarding weaknesses, some of the main issues that have been observed include clients who need to be aware of the benefits of CRMs. The Bank must concentrate intensely on these issues and try to fix them. This research has the opportunity to thoroughly understand how digital banking has developed.

This study examined the impact of Cash Recycling Machines (CRMs) on customer satisfaction in Bangladesh's banking sector. This research reveals that CRMs enhance customer satisfaction through various channels, including convenience, transaction speed, financial inclusion, security, and versatility. The convenience of CRMs, particularly in terms of accessibility and transaction speed, has significantly improved overall customer experience. CRMs also foster financial inclusion by reaching individuals previously excluded from the formal financial system, thereby broadening access to modern financial services and empowering marginalized segments.

The study also assessed the security and transparency aspects of CRMs, revealing that advanced security features and real-time updates enhance customer confidence in the safety of cash transactions. The versatility of CRMs in handling different currency denominations also positively influences customer experience with a seamless and user-friendly interface.

This research also touches upon the potential environmental impact of CRMs, suggesting that the recycling feature of CRMs could contribute to customer satisfaction, particularly among environmentally friendly practices. These findings can inform policymakers, financial institutions, and stakeholders about enhancing the implementation and strategic placement of CRMs to maximize their positive impact on customer satisfaction in Bangladesh's banking sector.

### ***5.2. Limitations of The Study***

To provide the most recent information and make our reports meaningful, we depended on the participation of numerous parties. Despite our best efforts, we are yet to obtain the information required for our study. This study had the following limitations.

Secondary data may not accurately represent the UCB PLC's viewpoint because of its scalability. Because it is private, the bank must provide precise details. It would take more than a few days to comprehend the nature of the job. Due to clients' extreme reluctance to invest time in research, the sample size is restricted.

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