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Generative Artificial Intelligence and Its Role in Shaping Customer Loyalty in Banking: A Conceptual Framework

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Abstract

The role of Generative Artificial Intelligence (Generative AI) in Electronic Customer Relationship Management (Electronic-CRM) systems is reshaping consumer engagement in the banking or financial industry. There is a significant gap in understanding the direct impact of Generative AI on Electronic-CRM and customer loyalty in the banking industry. This paper proposes a conceptual framework to investigate the influence of Generative AI on enhancing Electronic-CRM, particularly in three key dimensions: data security, problem-solving, and customer orientation, and its ultimate impact on customer loyalty in the banking and financial sectors. An extensive literature review suggests that the role of Generative AI enhances data security measures, as data security remains a crucial concern in the banking industry. By addressing customer issues efficiently, streamlining queries, and reducing response times, Generative AI enables customer-oriented strategies that foster a stronger relationship between the bank and its customers. Data is compiled from databases such as Scopus, Google Scholar, and ScienceDirect to conceptualise and critically evaluate the customer's long-term relationship after incorporating AI-driven CRM systems, particularly the role of Generative AI. Future empirical research will employ a quantitative methodology using Structural Equation Modelling (SEM) via Partial Least Squares (PLS) path modelling to validate the relationship and expand the proposed

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framework. Furthermore, the study will provide valuable insights for banking executives, policymakers, decision-makers, and technology developers on the role of Generative AI and Electronic-CRM in the banking business.

Keywords: Generative Artificial Intelligence, Electronic Customer Relationship Management, Data Security, Problem-Solving, Customer Orientation, Customer Loyalty

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1.0 Introduction

The banking business is crucial to the world's economic system, as it facilitates access to loans, investments, and other financial services for customers and companies. An efficient banking system can only be achieved by utilising minimal cost and maximising output, enhancing profitability, service quality, and the overall system. So, for the existence of efficient banking, banks must perform their functions properly to retain customers and maximise their profits (Xu et al., 2018). Due to increased competition in the banking industry, banks continually strive to enhance financial performance and customer service to remain competitive and support their growth (Munir et al., 2024). The banking industry is the backbone of financial institutions and a crucial component of a country's economic system. Also, it is well-developed and highly efficient, having experienced exponential growth over the years. Furthermore, it reveals strong performance and significant profit-generating potential. The current position of banking reflects a thriving system (Tariq et al., 2025). Over the past two decades, technological advancements have transformed customer expectations and created new opportunities for fostering close customer relationships. The growing use of the internet and disruptive technologies enhances customer satisfaction, adds value to the customer experience, boosts sales, and increases operational efficiency.

The term E-CRM emerged in the late 20th century, coinciding with the technological advancements that improved business operations. This technological advancement transforms operations that utilise the internet and digital channels, such as email and social media. Electronic-CRM has replaced traditional CRM systems by leveraging technology to enhance customer engagement, streamline business processes, improve customer interaction and communication, and organise vast amounts of data for marketing and service plans (Li & Alfayez, 2024). The quality of customer relationships depends upon the organisation's ability to maintain existing customers, as it is expensive to acquire new customers. The organisation can improve customer experiences in the long run by adopting effective technologies that lead to operational success factors, provide excellent customer service, facilitate faster problem-solving, and enhance personalised customer experiences. Among disruptive technologies, AI is a well-trained technology that can process data, allowing it to make essential decisions and predictions.

According to Ooi et al. (2025), various industries, including marketing, healthcare, education, and banking, are adopting these technologies to drive advancement. Moreover, Generative AI is a subset of AI capable of creating new content, including texts, images, videos, and code, based on data patterns. Although Generative AI was introduced in 1960, chatbot applications may have contributed to the rise of Generative AI's popularity in 2023 (Minsky, 1961; Shalini & Bagrecha, 2023). In the banking industry, Generative AI chatbots offer 24/7 customer service, responding to queries, allocating customer complaints to relevant branches, updating customer information in the database, facilitating chequebook issuance and delivery updates, and generating solutions for customer issues (Bahadur Singh, 2024). The advancement in information and communication technologies led to the emergence of Electronic-CRM. The banking industry has undergone a significant transformation by adopting Electronic-CRM, which is also considered a highly competitive sector that provides financial products and services to its customers. To remain viable, banks must engage customers to retain their loyalty, as customer loyalty is a key factor in sustaining a high number of customers and profitability (Kim et al., 2024).

Additionally, data security in Electronic-CRM plays a crucial role for customers, as many payments are now conducted digitally. As a result, it is essential to safeguard online payments (Olayah et al., 2022) and protect sensitive customer data. Promptly resolving customer issues always creates a sense of value. Additionally, Electronic-CRM provides efficient problem-solving platforms to facilitate the swift identification and resolution of customer issues (Paliouras & Siakas, 2017). Real-time access to customer data enables swift handling of customer issues, enhances the customer experience, and fosters customer loyalty in the banking industry. Electronic-CRM enables the use of valuable customer information based on customer transaction history to establish new strategies (Mahdavi et al., 2011), which may lead to improved customer orientation in the banking industry. Furthermore, mediating factor issues while handling Electronic-CRM may result in data insecurity, inadequate problem resolution, technological inefficiencies, and skewed customer information. Such issues cause a gap between customer expectations and the banking business.

Despite growing interest in disruptive technology such as Generative AI, most studies concentrate on conceptual papers, case studies, systematic reviews, and review articles on adoption, implications, and challenges. In contrast, practical implications lack empirical evidence. Additionally, a significant gap exists regarding the direct impact of Generative AI on Electronic-CRM and customer loyalty in the banking industry. However, this research will contribute to synthesising the existing literature on Electronic-CRM and Generative AI, identify gaps across multiple findings, and provide a theoretical foundation for future AI-driven customer relationship management studies. In the context of banking professionals' and customers' perceptions of Electronic-CRM (data security, problem-solving, and customer orientation), this research examines the influence of Generative AI on Electronic-CRM dimensions and its impact on customer loyalty. Additionally, the study provides a comprehensive understanding of Generative AI as a moderator between Electronic-CRM dimensions, comprising data security, problem-solving, and customer orientation, and its impact on customer loyalty in the banking industry. Furthermore, the study examines how these Electronic-CRM dimensions affect customer loyalty.

In contrast to prior studies, specific applications, such as automation and AI-based chatbots, have been explored for significant improvements in customer experiences, data security, and problem detection. However, this study inquires: What is the role of Generative AI in the banking industry, specifically in improving data security, problem-solving, and customer orientation? And what is the impact of these factors on customer loyalty? As businesses gradually adopt disruptive technologies like AI and generative AI solutions into their operations, a lack of clarity remains on whether these technologies enhance or weaken customer loyalty. This research aims to provide a comprehensive view and compare the importance of Generative AI in Electronic-CRM from the perspectives of banking professionals and customers who engage with the Electronic-CRM system in managing customer relationships. However, the significance of the study lies in its contribution to academic research and practical business applications in the banking industry. The findings will help the banking business to optimise its CRM strategies by effectively adopting Generative AI to upgrade data security systems, streamline problem-solving operations, improve customer interactions, and prioritise customer needs.

2.0 Literature Review and Hypotheses Development

The literature review of this study examines the evolution of Electronic-CRM systems, focusing on their impact on enhancing customer loyalty in the banking industry. It will examine the impact of Generative AI on Electronic-CRM systems, addressing concerns such as data security, problem-solving, and customer orientation. The study will review supported theoretical models, such as the Technology Acceptance Model (TAM), TAM2, TAM3, and Unified Theory of Acceptance and Use of Technology (UTAUT), to understand customer acceptance behaviour toward new technologies. Additionally, it will identify the gaps in existing research, emphasising the need for empirical research on Generative AI-powered CRM and its impact on customer loyalty in the banking business.

2.1 Technology Acceptance Model (TAM)

Fred Davis formulated the Technology Acceptance Model (TAM) in 1986, and the model proposed by Venkatesh and Davis (2000) focused on users' perceived usefulness and perceived ease of use, emphasising user behaviour, attitude, intention to use, and acceptance of new technologies. Many researchers have extensively validated variables in the Technology Acceptance Model (TAM), significantly impacting user acceptance of new technologies in online banking and E-commerce (Azim et al., 2011). Additionally, the Technology Acceptance Model 2 (TAM2) was refined and extended to develop a new model. Venkatesh and Davis developed the Technology Acceptance Model 2 (TAM2) in 2000 and proposed that a user's social environment, family or peers, community norms, confidence, perceived usefulness, and ease of use impact decision-making, as well as the acceptance of new technologies. TAM2 added external factors, influence, and job relevance to the model for a better understanding of user acceptance behaviour of technology. In addition, Milly et al. (2021) analysed the variables of TAM2, which explore the relationships between perceived usefulness, perceived ease of use, and intention to use in mobile banking. These variables demonstrate a significant correlation with actual mobile banking usage.

Later, in 2008, Venkatesh and Bala introduced additional influence on Technology Acceptance Model 3 (TAM3), proposing that training and experience can moderate factors in the original model. TAM3 added individual-level technology adoption based on user experience (Venkatesh & Bala, 2008). Integrating the TAM3 model with technology readiness has a significant impact on the level of user technology acceptance in digital banking (Musyaffi et al., 2021), as shown in Figure 1. The Unified Theory of Acceptance and Use of Technology (UTAUT) was developed in 2003 by Venkatesh, Morris, and Davis, which is the most widely used comprehensive model of technology adoption that integrates elements from TAM, TAM2, Theory of Planned Behaviour (TPB), Motivational Model, and Innovation Diffusion Theory (Venkatesh et al., 2003). Rachmawati et al. (2020) analyzed the factors of the Acceptance and Use of Technology (UTAUT) model. Key variables show a significant impact of performance expectancy, effort expectancy, social influence, and facilitating conditions on behavioural intention to use banking applications. While TAM, TAM2, TAM3, and UTAUT may not serve as a core theoretical foundation, they contribute to theoretical support for the current model for understanding how customers engage and perceive Electronic-CRM technologies. In recent studies, the extended Technology Acceptance Model (TAM) has incorporated loyalty as a primary outcome, particularly in research involving digital banking and technology-driven customer behaviours.

Digital banking users are more likely to adopt and continue using new technologies if they believe the system offers benefits such as easy access to information, data security, prompt response to queries and problem-solving, an easy transaction process, and reduced time spent visiting the bank branch. Original constructs from established technology models, such as perceived usefulness, ease of use, external social influence, and individual-level adoption of technology, are used to explain how customers interact with AI-driven CRM-based systems and Generative AI features in the banking business. The core construct of TAM (perceived usefulness) enables the recognition of how efficiently customers perceive the AI-driven CRM system resolving queries and problems. Additionally, perceived ease of use relates to the AI interface and how easily customers can interact with and continue using the AI-driven CRM system. Therefore, the integration of Generative AI in the banking business linking Electronic-

CRM and customer loyalty; the conceptual framework connects theoretical constructs to the proposed hypothesis.

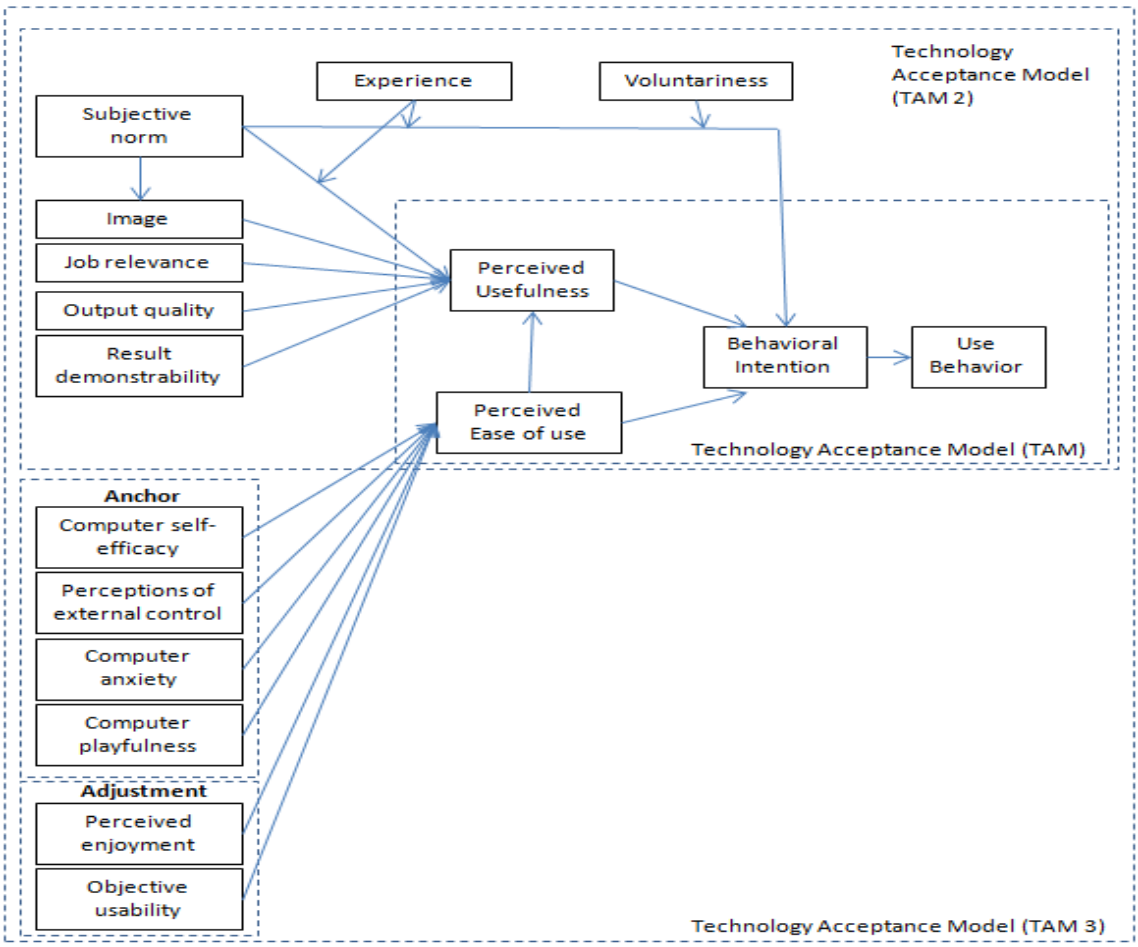

Figure 1: Technology Acceptance Model – TAM, TAM2, and TAM3

2.2 Electronic-Customer Relationship Management (Electronic-CRM)

In the digital era, electronic CRM has enhanced customer satisfaction and loyalty by adapting traditional customer relationship management practices to online environments. Younis et al. (2024) highlight the role of Electronic-CRM as a vital tool for generating consumer value, strengthening customer loyalty, enhancing the brand image on social media, and fostering long-term customer relationships in Lebanese e-commerce. The

proposed conceptual framework of this study analyses the relationship between different Electronic-CRM approaches, including perceived quality, online customisation, customer trust, and customer loyalty. This study concludes that adapting digital technologies is essential for customer loyalty, as customers primarily rely on information produced online. Electronic-CRM systems must therefore be accurate in providing the correct information to customers. Asadi et al. (2024) adopted an Electronic-CRM model through a literature analysis and expert consultations in the private banking sector. This study examines how various factors, including technological, organisational, cultural, and business-related factors, influence Electronic-CRM, focusing on the primary outcomes of customer satisfaction and loyalty. Among these factors, organisational factors such as customer interactions, customer service, and customer orientation are ranked as the most critical, followed by technology, culture, and industry factors. Furthermore, the structural model of this study supports the conceptual framework as all identified variables positively impacted Electronic-CRM, leading to improved customer satisfaction and loyalty.

Ali et al. (2019) present a comprehensive model of CRM dimensions (Customer Orientation, CRM Technology, CRM process, and CRM organisation), illustrating how they interconnect to enhance organisational performance. Key findings indicate that the CRM organisation is observed as the foundation for developing all other CRM dimensions. Both CRM organisation and CRM processes were found to have a notable positive impact on organisational performance in the telecom industry. The findings of this study suggest that customer orientation and CRM technology have a less significant impact on organisational performance, particularly in the telecom industry, compared to other sectors, such as the financial or banking business, which may have different effects. Filling the industry gap, this study suggests examining the relationship between constructs to validate the proposed framework. This study aims to analyse these constructs in other industries to explore the relationship by adopting and refining these dimensions, which may enhance customer experience and loyalty, ultimately improving organisational performance. According to Tabassu (2024), customer satisfaction, loyalty, and profitability are enhanced by the pivotal role of Customer Relationship Management (CRM) within the banking business. Effective CRM strategies influence service quality, employee behaviour, complaint handling, and technology-driven solutions, leading to

improved banking operations. This study demonstrates that a thoroughly executed customer relationship management system enhances customer trust and engagement, spreads positive word-of-mouth, increases sales, and promotes long-term business sustainability. Furthermore, these findings align with the conceptual framework applied in our study, which highlights a significant relationship between customer relationship management and customer loyalty, emphasising the need for continuous refinement, technological advancements, and updates in CRM practices within the banking industry.

Prior studies have examined the significant relationship between Electronic-CRM and online customer loyalty (Shukla, 2021). The studies considered different dimensions of Electronic-CRM, such as security or privacy, customer service, information quality, web design, product variation, transaction ability, and payment system. The results show that all dimensions have a significant impact on the mediation role of online customer satisfaction. In contrast, this study shows that the direct relationship of Electronic-CRM dimensions is weaker than the mediation analysis, comparatively. Therefore, the study highlights the need to explore various variables to strengthen the relationship. Additionally, Electronic-CRM has a significant impact on customer loyalty, as discovered by Kumar and Mokha (2020). In comparison, the same theoretical framework was explored by Syaifullah et al. (2024), which shows no significant relationship between Electronic-CRM and Customer loyalty. In that case, the inconsistency between the variables creates a gap in analysing external factors.

2.2.1 Data Security

According to Helal et al. (2019), data security is a key factor influencing customer electronic loyalty; these variables have a positive effect on Electronic-CRM. Another study by Ali and Alfayez (2024) analysed the influence of Electronic-CRM and its dimensions (data security, problem-solving, customer orientation, and technology) on customer experience and loyalty in the Jordanian Airline industry. The result of this study is aligned with prior literature, indicating that effective Electronic-CRM strategies can enhance customer loyalty by improving customer experience. Notably, data security emerged as the most influential Electronic-CRM factor, underscoring the critical role of

data protection and privacy in the aviation sector. Customer orientation was the least significant Electronic-CRM dimension, suggesting a gap in customer-focused strategies. These findings support the role of Electronic-CRM dimensions and customer loyalty in our study.

In addition, Hasan et al. (2024) emphasised the importance of data quality and security, as well as their impact on adoption, trustworthiness, and potential for real-world applications, thereby reinforcing their relevance in this conceptual framework for the banking industry. This study highlights the role of effective data management techniques in maintaining customer trust. Furthermore, banks are increasing their reliance on big data. Robust data security measures are adopted to maintain confidentiality, ensure privacy, protect sensitive information, and reinforce customer trust. In recent studies, Riasat et al. (2025) employed the Technology Acceptance Model, focusing on perceived usefulness, ease of use, and trust, to explore emerging security issues in banking applications. Furthermore, customers prefer biometric authentication, fingerprint recognition, and AI-based alerts for data security. All these factors are unique to protect sensitive information and prevent unauthorised access to customer data.

Olayah et al. (2022) also underscore the importance of data security in Electronic-CRM systems in the banking business. According to this study, data security can be protected by implementing robust protective measures, such as safeguarding online servers, using strong and unique passwords, and avoiding password reuse across different platforms. This research provides a comprehensive view of application-layer denial-of-service (DoS) threats and response techniques, investigating various virus attack methods and their execution strategies in Electronic-CRM systems. Additionally, promptly updating and modifying standard identification in Electronic-CRM systems enhances data security. In Customer Relationship Management (CRM) implementations, data privacy and security are not just a controlling requirement but an underlying component of enhancing customer trust and loyalty. A significant impact on data privacy and security can be achieved by prioritising data security, thereby fostering a trustworthy customer relationship. By integrating advanced tools and technologies, such as AI, organisations can reduce the risk of unauthorised data access (Boppana, 2019).

2.2.2 Problem-Solving

Salihu et al. (2019) emphasised the role of independent variables, such as the security of data and applications and the ease of use of technology, while conceptualising the role of problem resolution. Technological advancements enable streamlined CRM processes and expedite problem-solving solutions by utilising advanced tools and platforms. This includes AI-driven systems, internet-based tools, e-banking, mobile banking, communication channels, and data analytics capabilities to enhance operations and effectively handle numerous complaints. Furthermore, Mosa (2022) examines the importance of Electronic-CRM in enhancing customer engagement, emphasising that the latest technologies foster customer satisfaction and positive electronic word-of-mouth. In the digital era, growing competition has rendered traditional factors, such as price and quality, insufficient for establishing long-term relationships. Instead, investing in the latest technology has become crucial for customer retention and engagement. This study confirms that Electronic-CRM plays a crucial role in enhancing the customer experience in E-banking. Additionally, this supports previous studies that suggest an AI-driven CRM system is essential for success in digital banking.

Among the Electronic-CRM dimensions, effective communication and access to information have a significant effect on customer experience. However, customer complaints and quick problem resolution were identified, highlighting a critical gap in customer service strategies. This gap highlights the need to investigate the relationship between problem-solving resolution and emerging technologies in the banking industry. A positive relationship between Electronic-CRM, customer satisfaction, and customer loyalty has been explored by Kumar et al. (2022). This study focuses on six key dimensions of Electronic-CRM, including problem-solving, customised products and services, transaction security and privacy, alternative payment methods, online feedback, and FAQs.

2.2.3 Customer Orientation

According to Aria and Dafoulas (2023), Electronic-CRM is based more on human functions than on mere technology implementation, as it provides better customer service and fosters lasting relationships with current and potential customers. Electronic-CRM focuses on enhancing personalised and straightforward customer interactions across various digital platforms. These outcomes align with the present proposed framework, which emphasises the relationship between a customer-oriented approach and disruptive technology. In recent years, the banking industry has invested significantly in disruptive technologies to support long-term Customer Relationship Management (CRM) strategies. For instance, Sutriani et al. (2024) investigated the influence of customer experience, satisfaction, and service quality on word-of-mouth intentions, with customer satisfaction serving as a mediating factor. Their findings reveal that customer experience does not directly influence loyalty, but service quality significantly improves customer satisfaction. When customers perceive high service quality, they tend to form a stronger emotional connection with the brand, leading to greater loyalty.

This study also contributes to the literature by examining external variables, such as customer orientation, trust, and engagement, and offers a broader perspective on customer behaviour that leads to loyalty. The integration of advanced technologies, such as AI and machine learning, further enhances personalisation in CRM systems. For example, Rane et al. (2023) demonstrate how technological advancements support the identification of customer patterns and the prediction of customer needs and preferences. While technology plays a vital role, the success of customer-oriented strategies still relies on the effective implementation of these technologies, analysing customer insights across multiple channels enables organisations to gather relevant information about individual customers. These personalisation strategies, in turn, have a significant impact on customer engagement, loyalty, and retention (Rodriguez, 2023).

2.3 Role of Generative Artificial Intelligence in Banking

The successful integration of Generative AI is reshaping its role, particularly in the financial and banking industries. To understand its impact, Nor (2024) investigates key trends driving the adoption of Generative AI in the banking sector. This study highlights three main areas. First, the development of essential skills, including digital literacy, adaptability, communication, critical thinking, and problem-solving. Second, fostering a culture that empowers employees to be creative. Third, implementing personalised career paths and flexible workforce models to improve customer engagement and retention. These factors collectively contribute to the successful adoption of Generative AI in the banking business. Building on these insights, this study further explores the role of Generative AI in shaping the relationship between Electronic Customer Relationship Management (ECRM), particularly in areas such as data security, problem-solving, customer orientation, and customer loyalty.

In the rapidly evolving domain of Generative AI, Chen et al. (2023), El-Shihy et al. (2024), and Li and Lee (2025) explore customer trust in ChatGPT, a representative example of Generative AI, and find that it has a significant positive impact on customer loyalty. However, other factors, such as communication accuracy and personalisation, also play key roles in building customer trust. Additionally, perceived value, customer trust, and satisfaction are shown to enhance loyalty. The functional and human-like features of AI-powered digital assistants significantly moderate the relationship between customer emotions, engagement, and loyalty. Furthermore, the ease of interaction and the provision of high-quality information by digital assistants have a positive influence on customer engagement. Maduku et al. (2024) further emphasise that a positive service experience in AI-based technologies is crucial in fostering customer emotions. A high level of customer engagement and positive emotional responses, in turn, contribute to greater customer loyalty in the context of AI-powered digital assistance.

Pattanaya (2023) provides strong support for the role of Generative AI in transforming banking risk management through improved predictive accuracy, enhanced fraud detection, and increased compliance efficiency. The study highlights significant outcomes, including enhanced credit risk modelling (27%), faster fraud response times

(62%), and improved operational efficiency (45%). Additionally, AI-driven compliance systems have been shown to reduce errors by 35% and enhance customer-oriented personalisation by 30%. Despite these benefits, challenges such as data security and privacy concerns, AI bias, and the rapid pace of technological change pose obstacles to long-term implementation. Overall, the study demonstrates the substantial impact of Generative AI on the banking sector.

Similarly, Alenezi and Kuwait (2024) argue that the rapid adoption of Generative AI improves customer service, engagement, fraud detection, and operational efficiency in the banking business. However, they also emphasise the growing data security risks associated with its use. The current regulatory framework under the Central Bank of Kuwait (CBK) lacks AI-specific security controls. Their study identifies key threats, including adversarial attacks, data poisoning, and model manipulation, and proposes leveraging existing global cybersecurity frameworks to mitigate these risks. Nonetheless, a dedicated regulatory framework tailored to the unique challenges of AI is deemed essential to ensure the secure and responsible deployment of AI in the banking sector. These findings support further investigation into the data security risks associated with Generative AI applications. Shalini and Bagrecha (2023) examine the role, challenges, and benefits of Generative AI in the banking business, particularly its potential to enhance operational efficiency, improve service delivery, and better understand customer demand for various financial products. Generative AI is recognised as an emerging disruptive technology capable of transforming multiple industries, especially financial services. The study reveals a strong enthusiasm among respondents for adopting Generative AI; however, concerns regarding data security, privacy, and sustainability remain significant. These challenges underscore the importance of strategic implementation, seamless integration, and compliance with regulatory requirements. Ongoing research is necessary to ensure that Generative AI is deployed responsibly and efficiently, maximising its transformative potential while mitigating associated risks in the banking sector.

Similarly, Dhake et al. (2024) explore the integration of Generative AI and Large Language Models (LLMs) in banking, emphasising their impact on customer experience and loyalty by streamlining operations and enhancing decision-making systems. A major

concern identified is data privacy, necessitating strict compliance with data protection regulations to safeguard sensitive customer information. Reinforced security measures are essential to protect AI-driven systems and ensure explicit customer consent, which is critical for maintaining trust. Despite these challenges, the successful adoption of Generative AI and LLMs has significantly enhanced banking efficiency by enabling process automation, delivering personalised customer experiences, and facilitating informed decision-making. The study concludes that the role of Generative AI and LLMs will continue to grow, reshaping the banking industry through a collaborative model that blends advanced technology with human expertise to deliver more efficient, customer-centric, and competitive financial services.

2.4 Customer Loyalty

In a recent study, Ardhana et al. (2024) confirm that independent factors, particularly corporate image, customer service quality, and customer satisfaction, play a critical role in shaping customer behavioural intentions and brand loyalty. The study presents strong empirical evidence supporting the hypothesis that a positive corporate image and high-quality customer service significantly enhance customer satisfaction, which in turn boosts purchase intention, commitment, customer retention, and loyalty. While prior research has emphasised customer service quality, this study identifies a gap by incorporating additional external variables, such as response time and problem-solving capabilities, to better understand their impact on sustaining customer loyalty. The findings reinforce the importance of delivering excellent customer service and maintaining a strong brand image as key strategies for achieving long-term competitive advantage.

Similarly, Magatef et al. (2023) examine the role of Electronic-CRM dimensions, specifically the functionality of Electronic-CRM systems and personal interactions, in shaping customer loyalty and supporting business sustainability in the SME sector. The study highlights the importance of aligning emerging technologies with marketing strategies to drive customer commitment, engagement, and long-term relationships. Research conducted within Jordanian SMEs confirms that Electronic-CRM strategies

significantly enhance customer loyalty. The study supports key constructs such as Electronic-CRM and customer loyalty within the proposed framework and encourages the adoption of technology-driven CRM solutions. Notably, it is one of the first studies to assess the combined influence of multiple Electronic-CRM dimensions in this context, underscoring how effective Electronic-CRM practices can strengthen customer loyalty and ultimately contribute to long-term profitability and competitive advantage.

Yaqub et al. (2024) highlight CRM as a critical driver of customer satisfaction and loyalty across various sectors, including the banking industry. Their findings suggest that CRM strategies, particularly those driven by technology, significantly enhance customer retention, trust, experience, engagement, and loyalty. The study emphasises the importance of Electronic-CRM approaches in banking and aligns with the role of customer loyalty as the primary dependent variable. Further research affirms that CRM strengthens the relationship between service quality, brand image, and customer loyalty. Other studies in the banking sector also validate that effective technology-driven Electronic-CRM practices not only foster stronger customer relationships but also contribute to increased profitability. According to Kim et al. (2024), research on customer loyalty in the banking sector across 20 countries identifies customer experience and satisfaction as the most influential factors. Their study, which includes emerging markets such as India, Indonesia, South Africa, and Vietnam, identifies trust, service quality, perceived value, and reliability as key factors that determine customer loyalty. These findings offer a comprehensive, cross-regional perspective that reinforces the importance of customer loyalty within the proposed conceptual framework. Satisfied customers are more likely to develop long-term trust, demonstrate brand commitment, remain resilient to price fluctuations, and sustain loyalty to the brand.

Additionally, recent trends from 2021 to 2024 indicate a noticeable shift from traditional banking to electronic banking services, underscoring the growing significance of digital transformation and Electronic-CRM strategies in enhancing customer retention, experience, and loyalty. For instance, Harutyunyan (2024) examines the impact of CRM on customer satisfaction and loyalty in developing economies, highlighting its crucial role in the success of the banking sector. Although CRM has demonstrated effectiveness in enhancing customer relationships globally, the study reveals that its influence in

developing economies is comparatively weaker. This suggests a gap that warrants deeper exploration of CRM constructs and highlights the need for more tailored and effective strategies. The findings suggest that existing CRM practices may not fully address diverse customer needs, providing banks with an opportunity to refine their CRM strategies by strengthening communication channels, enhancing customer service, and introducing more impactful programs to boost customer loyalty.

Khan et al. (2022) support the conceptual framework by examining the impact of CRM on customer loyalty, particularly within small and medium-sized enterprises (SMEs). Their study reveals that both CRM and corporate prestige have a significant influence on customer loyalty. Moreover, the research emphasises the interconnected roles of customer commitment, engagement, experience, satisfaction, and trust in shaping loyalty. Empirical findings confirm that CRM and corporate prestige have a positive impact on customer loyalty, with customer satisfaction serving as a key mediating factor. The study utilises advanced statistical tools, such as AMOS and SPSS, to validate hypotheses, thereby further strengthening the insights. These findings align with broader marketing literature, underscoring that a well-executed CRM strategy, combined with a strong corporate image, enhances customer retention, engagement, and long-term loyalty.

2.5 Conceptual Framework

The conceptual framework for this study examines the impact of Electronic-CRM dimensions (data security, problem-solving, and customer orientation) on customer loyalty in the banking sector. Additionally, these fundamental constructs within the conceptual framework provide valuable guidelines for the banking industry to enhance customer loyalty when integrating Generative AI into CRM systems. Furthermore, this present study also serves as a foundation for future research to examine the relationships between these constructs, as outlined in the following propositions.

H1: Data security has a significant impact on customer loyalty.

H2: Problem-solving has a significant impact on customer loyalty.

H3: Customer orientation has a significant impact on customer loyalty.

H4: Generative AI moderates the relationship between data security and customer loyalty.

H5: Generative AI moderates the relationship between problem-solving and customer loyalty.

H6: Generative AI moderates the relationship between customer orientation and customer loyalty.

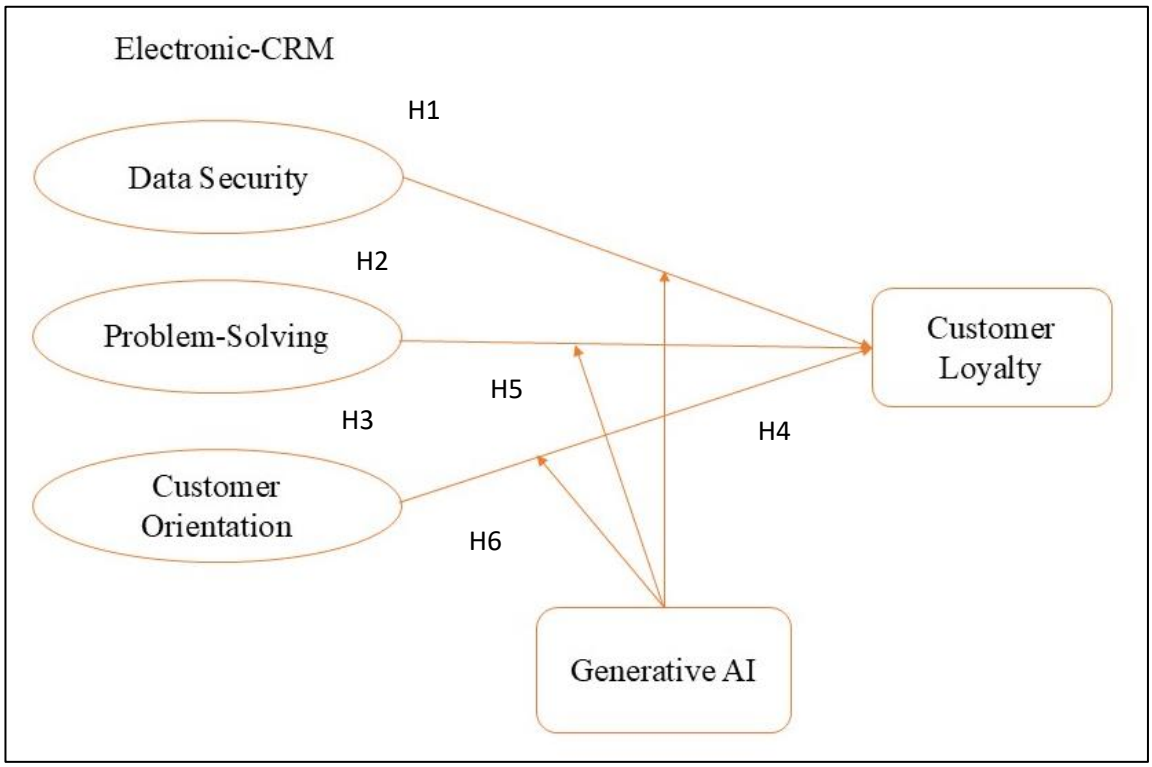

Figure 2: Conceptual Framework

3.0 Methodology

While this paper is primarily conceptual in nature, this section defines a proposed research methodology for potential empirical validation of the developed theoretical framework. This study aims to explore the role of Generative AI in shaping the Electronic-CRM dimension (data security, problem-solving, and customer orientation) and customer loyalty using a quantitative research approach. Additionally, it examines the impact of Generative AI on customer loyalty within the banking industry. By analysing data from banking customers and professionals who engage with digital banking CRM systems, this research will provide empirical evidence on the effectiveness of AI-driven solutions in improving customer interactions, securing sensitive data, and fostering long-term relationships.

3.1 Research Design

This study employs a quantitative research approach to examine the moderating role of Generative AI in the relationship between Electronic-CRM dimensions (data security, problem-solving, and customer orientation) and customer loyalty. A cross-sectional survey design will be utilised to collect data from banking customers and professionals who interact with digital banking CRM systems. The target population consists of banking professionals and customers who engage with Electronic-CRM systems in the banking business. A purposive sampling technique will be used to ensure the inclusion of respondents who have interacted with AI-driven CRM solutions in banking. The sample size will be determined using G*Power analysis, with the sample size based on the complexity of the framework to ensure generalizability.

3.2 Data Collection and Analysis Techniques

Primary data will be collected using a structured questionnaire distributed through online survey platforms. The questionnaire will be divided into sections covering demographic information of respondents, data security, problem-solving, customer orientation,

Generative AI, and customer loyalty. A five-point Likert scale (ranging from “strongly disagree” to “strongly agree”) will be used to measure the constructs. Validated scales from prior research will be adopted and adapted to ensure the reliability and validity of the questionnaire. A pilot study will be conducted to assess the feasibility of the research design. It serves as a technique to identify potential issues with data collection methods, refine research instruments, evaluate feasibility, and practice procedures before proceeding with the full-scale study.

3.3 Preliminary Analysis

A preliminary analysis will be conducted to ensure the quality, accuracy, and reliability of the data and the results. This process involves inspecting and cleaning the data, identifying missing values, outliers, and errors before conducting the main analysis (Leong et al., 2024). Data filtering will be applied to enhance data accuracy by focusing on data that meets specific criteria while removing irrelevant information. Missing Value Analysis (MVA) will be used to detect and address incomplete or erroneous data, thereby maintaining data integrity. In addition, Common Method Variance (CMV) analysis will be employed to identify and assess potential biases within the dataset. Normality assessment, using Mardia’s coefficient, will determine whether the data follows a normal distribution, as many statistical procedures assume data normality. Lastly, an outlier analysis will be conducted to identify and eliminate extreme values that may distort the results and lead to inaccurate conclusions.

3.4 Data Analysis

To ensure a comprehensive examination of the hypotheses, the collected data will be analysed using several statistical techniques. Descriptive statistics will be used to provide an overview of the dataset, including demographic information, trends, frequency distributions, and key characteristics, thereby offering a foundational understanding for further analysis. Internal consistency reliability analysis, using Cronbach’s Alpha and Composite Reliability, will assess the reliability and consistency of the measurement

scales to ensure the constructs are accurately being measured (Okoye & Ghapar, 2024). Indicator reliability, as measured by factor loadings, will assess whether the selected indicators consistently reflect the theoretical concepts under investigation. Additionally, Confirmatory Factor Analysis (CFA) will be conducted to examine the validity and reliability of the constructs by assessing the correlation and consistency among items, thereby ensuring the robustness of the measurement model. Structural Equation Modelling (SEM) will be used to perform moderation analysis, specifically to test the impact of Generative AI on the relationship between Electronic Customer Relationship Management (e-CRM) dimensions and customer loyalty in the banking sector. Interaction effects will be analysed to determine whether Generative AI strengthens or weakens these relationships. Lastly, hypothesis testing through path analysis will be carried out to validate the proposed hypotheses by examining regression coefficients and *p*-values (Inuwa, 2024).

4.0 Recommendation

This conceptual paper extends the current understanding by utilising a well-implemented AI-driven system and advanced machine learning models to maximise the benefits of Generative AI in data security, fraud detection, and encryption protocols, thereby protecting customer data and prioritising customer trust. Generative AI strengthens customer service by improving response efficiency and automating issue resolution. Optimise problem-solving solutions, streamline bank operations, and enhance customer satisfaction and loyalty through AI-driven predictive analysis by integrating AI-driven systems to handle complex queries. To foster long-term customer relationships, AI-driven CRM systems enhance preferences and personalisation. By adopting these recommendations, banks can enhance security, improve problem-solving, strengthen customer engagement, and foster long-term customer retention and loyalty.

Banking executives and technology developers should prioritise AI-driven CRM systems to enhance customer engagement, particularly by leveraging user-friendly interfaces for customer prospects. Additionally, bank executives must ensure that data security and privacy concerns are addressed, and customer queries are resolved quickly

in an AI-driven CRM system to foster loyalty and long-term relationships. The integration of Generative AI requires continuous monitoring and system updates, as well as digital training for employees. Furthermore, this study provides a roadmap for the banking business to implement Generative AI into Electronic-CRM systems, focusing on security measures and customer-centric strategies.

Future research should investigate how AI-specific technology affects customer loyalty in banking by extending traditional models, such as the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT). Comparative studies across different banking cultures or regions could also reveal in-depth insights regarding technology readiness and bank-customer relationships. The findings will help the banking industry optimise its CRM strategies by effectively integrating Generative AI to enhance data security systems, streamline problem-solving operations, improve customer interactions, and prioritise customer needs. Furthermore, the study will provide empirical evidence to banking executives, policymakers, decision-makers, and technology developers on the application of Generative AI in CRM systems, aiming to transform the digital banking landscape. Lastly, the study will investigate which factors have the most significant impact on customer loyalty.

5.0 Conclusion

The above conceptual framework has been developed based on a literature review of key factors that influence customer loyalty in the banking industry. This study examines the role of Generative AI in Electronic-CRM systems. It aims to provide valuable insights into the impact of Generative AI on customer loyalty within the banking industry's Electronic-CRM systems framework, focusing on three core dimensions: data security, problem-solving, and customer orientation. Drawing on existing literature and theoretical foundations, the conceptual framework examines the functionality of AI-driven systems, the Technology Acceptance Model (TAM), users' behavioural intentions, the role of Generative AI, data security measures, operational efficiency, customer-centric approaches, and the development of long-term relationships in the banking context. By investigating the moderating role of Generative AI in strengthening

the relationship between Electronic-CRM systems dimensions (data security, problem-solving, and customer orientation) and customer loyalty, this research contributes to a deeper understanding of digital transformation in the banking sector.

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