Behavioural Segmentation and Next-Best-Action Modelling: AI-Enhanced Customer Relationship Management Frameworks in Retail Banking

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1. Introduction

Customer Relationship Management (CRM) has always played a crucial role in various industries, but it is more vital for banks due to the increasing competition they face today. Not only does having effective CRM help to retain the existing customer base, but it also helps build stronger, long-lasting relationships with customers. These relationships can add significant value through cross-selling and up-selling products and services. Banks deal with a huge number of customers, and managing relationships effectively with these customers has become crucial. In fact, CRM can be a game changer in the banking sector, as it helps in retaining customers and engaging with them effectively.

To overcome fierce competition and differentiate themselves in the market, banks are concentrating primarily on enhancing CRM. Artificial Intelligence (AI) has shown potential to bring innovative ways to build stronger relationships with customers and has the ability to transform the way banks interact and engage with customers. AI-driven CRM can analyze customer behavior, automate routine activities, provide real-time predictive analytics, interpret customer queries in a conversational manner, and is thus crucial to shape the CRM of banks in the future. The banking industry has seen different transforming trends, from going to the ATM for cash withdrawals to internet banking, massive use of mobile banking, and now the picture is of Artificial Intelligence (AI). The increasingly competitive landscape among banks and their approach to leveraging emerging technologies brings AI to the forefront and uses AI in customer relationship management (CRM). Thus, AI is transcending all barriers and enabling banks to make knowledgeable decisions around the growing number of customers,

increasing data, and reduced bandwidth. Failing to adapt to these changes will serve as a deterrent to banks being called tech-savvy. This research significantly helps banks provide insight into the recent trends in banking as well. It enables marketing practitioners and researchers to understand the theoretical concepts relevant to CRM and AI primarily in the banking sector. The increasing reliance on CRM and AI suggests that there is a need to anticipate how AI-driven CRM can be beneficial against conventional CRM practices in customer management. It simply marks the initiation of drafting the common and futuristic differences in CRM approaches.

1.1. Background and Significance

Customer Relationship Management (CRM) is quite imperative in the domain of banking to survive in the continuously changing global banking industry environment, as it enables the banking industry to compete with their rivals. CRM is considered a strategic option for many industries and sectors, but more essentially in today's digital world. Aside from that, a good relationship with customers and maintaining a face-to-face rapport is still crucial. The relationship of a bank with its customers has become more closely intertwined than ever before. A CRM framework is not just about customer satisfaction, but also a comprehensive perspective that allows organizations to improve customer loyalty and lifelong value. Customers are recognized as intellectual resources by CRM, and their feedback about various products and services contributes to business aspects.

Despite its relevance, CRM is still viewed by banks as a difficult process, with banks encountering several constraints in adopting the environment, process, and modified technological capability for CRM to wholeheartedly embrace a customer-centric approach. Several of today's practicing banks believe in a broad range of measures to accomplish consumer satisfaction and loyalty, but they are encountering issues and tough hurdles. This is because customers are still playing a decisive role in allowing banks to provide them with new goods and services, as superior customer service may yield financial benefits or significant assets for the market. Consequently, decreasing client happiness makes it easier for consumers to leave. Whereas up to 90 percent of spending depends on it, a 5 percent surge or decrease will have an effect on profit. At least five times more work is needed to gain customers than to retain them. Recognizing

the significance of acquiring, satisfying, and holding clients is the way to stay competitive in the marketplace.

1.2. Research Objectives

The research to be done is aimed at improving customer relations in banking. The primary goal of CRM system implementation in banking organizations is to optimize IT processes and services, improving customer service and fostering customer loyalty. AI aligns and enhances the role of data in banking to create a centered, integrated, standardized, real-time customer view. With the recent introduction of AI in the banking industry, this study will evaluate AI in the banking sector and provide insights into the future of AI in the banking industry. This study aims to highlight the importance of learning in this initiative to remain competitive in the banking industry. It is important to verify whether the exploitation of personalized services is a key differentiator for the customer in order to link this research with the satisfaction and retention of customers linked to the provision of personalized service. To address the need for high-quality services that inspire customer loyalty and contribute to greater profits, banking institutions are facing several challenges today. This research not only concentrates on the usage of AI in CRM in the banking industry, but also investigates the interaction of the role of AI and provides an overview of CRM and its effect on the banking industry and the corporations involved in promoting CRM solutions through AI technologies.

The Objective of the Research The main objectives of the AI-enhanced CRM research in the banking sector are: • To evaluate AI applications in the banking sector. • To verify whether personalized service provision has a positive impact on customer satisfaction. • To determine strategic frameworks for successful AI adoption in banking.

2. Customer Relationship Management in Banking

Customer relationship management (CRM) is undoubtedly complex, and even more so within the banking sector. Banks strive to maintain a dense network of granular information regarding their customers in order to serve them better and to hold on to them for longer. Until now, the slow and predictable pace of change in banking allowed virtually all participants to operate quite contentedly with traditional notions of CRM as the core plank of their business strategy. However, the emergence of new and vigorous competitors and market segments is putting considerable pressure on banks to adapt

their approach. Different batches of customers require a redefinition of what constitutes customer service "excellence," and traditional "one-size-fits-all" interactions may no longer make logical sense. There is thus the prospect that the banking industry could see a "split" between "mass-customized services" for the larger, more profitable, and loyal customers, and severely rationalized and automated services for the rest of the consumer base.

CRM is key to building relationships that instill trust and delight clients with excellent service, and is also important for integrating channel delivery and pulling together the marketing and operational processes that enable sustaining profitable relationships. Banks, compared with other industry sectors, are typically considered to be a step behind in their understanding and implementation of effective CRM programs. Banks fundamentally understand the reasoning of relationships - they have been doing it for centuries, largely based on "hard" data, credit scores, and traditional "time-in-business" sociological measures. Only now are organizations using new CRM solutions with customizable parameters creating "relationship universes" at realistic cost. This paper is different from the plethora of existing papers in this field in that it seeks to steer away from the conceptual edge to provide insights into the operational issues and how banks are coping in practice with their existing data assets. It will look at the feasibility of linking all "remarkable tomorrows" to customers today by leveraging existing technology and CRM capabilities. The thrust will be on reviewing the current trends in CRM with examples of successful CRM initiatives in the traditional industries. Some literature that supports the need for appropriate CRM technologies was also reviewed, suggesting that new technologies can significantly improve CRM capabilities.

2.1. Traditional CRM Practices

Customer relationship management (CRM) has been an integral part of the banking industry for many years. Banks used to manage their customer relationships by having an overview of the financial situation of the customer and the products and services that they used. Despite there being no formal CRM activity going on, bankers would keep records of their clients' personal details, their family's situation, and any particulars that could enable them to build a stronger and more durable relationship with them in the future. This was seen as a provision for the future rather than a business activity. However, over the years, various methods and tools have been developed for customer

relationship management in retail banking. These range from simple databases to more sophisticated methods like Customer Relationship Management Architecture, RC-Churn estimation, the Voice of the Customer, Touchpoint Experience thresholds, Market Scanning Customer, Conjoint analysis, Life Status Value Approach, Banking Value Chain, Pixel Analysis, and many more. They all lay a special emphasis on managing customer information in an adaptive way.

Nevertheless, these methods find themselves limited in some sense or the other. It is difficult to scale up the information bank within reasonable costs, and the mass of data and information doesn't have a standard database where all the information gets stored. Banks can use this information for solicitations and cross-selling, but as the same information goes out to hundreds of potential customers, the chances of customer interest get fractionally less. Even in traditional banking, low-cost service to all customers was seen as an inefficient way to do business. Sure, transaction costs were driven down to almost nothing, but the customer demand for personalized, tailored service did not go away. With the growing use of the internet and innovations in e-commerce, a customer no longer needs to 'go to the bank'; the bank is required to appear at their doorstep, 24/7 if possible. Today, however, consumers want to be more than an account number. They want the Heisenberg Principle to hold when they walk into their branch – almost as if they were seeing their private banker. Thus, to be competitive, banks have to manage their customer relationships in a more intelligent way. AI can play the role of a facilitator in this regard, thereby modernizing banking operations.

2.2. Challenges and Opportunities in Banking

In this rapidly changing environment, the banking sector faces many challenges. One of the major challenges is maintaining the trust of customers, especially in managing and using the ever-increasing volume of data commonly possessed by banks. There are few other challenges associated with customer relationships that banks must overcome. The regulatory and compliance environment in the banking sector is changing rapidly, and therefore banks are always worried about how well they are following these rules or if any major penalty is on the horizon. The data required to manage the relationship with the customer is located in silos. This means that accessing data required by different departments of the bank to provide better services to their customers is a difficult task. The customer no longer trusts the bank due to the fragmented information flow between

the bank and the customer. The collective impact of this environment can seriously harm banks' overall reputation and the basic value they provide to customers.

The global banking sector today is facing stiff competition in the wake of the immense technological change it is experiencing. Given the increase in competition and the maturity of the high-volume markets, banks are no longer able to grow and thereby increase their earnings stream. In such a scenario, the only way banks can increase their bottom line is to raise fees on various services. This approach often yields only short-term gains, as the most innovative players can outperform the competition in time, and best practices are most likely to be copied within the industry. In addition, today's customers are inherently non-loyal and typically switch suppliers that can best meet their expectations based on convenience, ease of accessing services provided, and personal experience with those products and services. Research has revealed that customers switch their banks because of poor customer service, poor dealings with bank staff, unrealistic bank fees, and the opportunity to take advantage of more attractive deals offered by other banks. Thus, if banks hope to retain their customer base, managers need to focus on ensuring that customers have a satisfying experience with the institutions they are willing to deal with. In this regard, the banking industry also has tremendous potential for developing innovative approaches to enhancing the customer experience. The implementation of advanced analytics and artificial intelligence methods can provide better insights to bank managers to develop innovative ways to communicate and manage customer relationships.

3. Artificial Intelligence in Banking

Rapid advances in artificial intelligence (AI) are making the technology an increasingly essential tool for today’s banks. AI is commonly referred to as computing systems that are able to perform tasks that normally require human-like conceptions such as intuitive reasoning, learning, visual perception, understanding human language, and interacting with the physical environment. In banking, AI comprises a range of technologies such as robotics, machine intelligence, and autonomous systems, encompassing subsets, algorithms, and approaches such as predictive analytics, machine learning, natural language processing, and chatbots. The application of AI across banks is manifold, yet the common aim is greater operational efficiency in less time and usually departmental cost. Concretely, in financial risk and operations, AI systems can now process and

analyze large volumes of data at a rate that far surpasses human cognitive abilities. This is increasingly important in areas within financial, operational, and strategic risk assessment, including for risk-prone activities. The benefits of using both machine-learning models and natural language processing (NLP) to enhance automated functions and increase the speed of customer complaint resolution are significant. Similar to the fraud detection that AI can facilitate, AI can also be utilized in banking for customer service communications and customer management purposes. AI capabilities now encompass social media profile management to alert colleagues to situations that might warrant emergency client care. AI has further use in qualitative control in facilitating and improving the regulatory and compliance function, for example for the continuous monitoring of employee trading, and for financial services industry forecast analysis. In retail banking, the potential application already is varied. Assuredly, providing a personalized service that learns from the customer's communication style is now possible, having the ability to affect the automated production of text, audio, and video communications. Products and services can be tailored to individual circumstances and needs, such as product watch-list alerts, which scrutinize the market for up- or down-spike movement in those assets that the investor has on their watch-list. AI in digital banking can facilitate simpler UX and savings management services from a mobile phone, including the setting of financial aspirations and an automatic deposit into a dedicated savings pot triggered by any surplus disposable income. AI could even operate in mortgage lending by analyzing patterns of rental or mortgage payment and rejecting an applicant aspiring to buy in a very expensive, accident-prone area, marking their personal safety as a concern to the bank and supposing greater credit risk as a result, based on aggregated historical data on such misfortune. More radically, the government is also reported to be working on AI that would be able to project future defaulting mortgage repayments. In the future, AI could provide tools to assess the economic dynamics of products in order to suggest the development of new innovative financial tools attractive to the investor community. The content produced by AI systems, through mining, learning, and autonomous systems, can interact with the customer, producing a personalized role-playing companion.

3.1. Overview of AI Technologies

AI or artificial intelligence can be understood as the simulation of human intelligence by machines, particularly computer systems. AI employs a range of technologies including

machine learning and neural networks, as well as natural language processing. Machine learning is focused on building algorithms that are capable of receiving input data and using statistical analysis to predict an output value within an acceptable range. It can make use of two types of techniques in order to function: supervised learning and unsupervised learning. In supervised learning, the algorithm is trained on a pre-labeled dataset; in unsupervised learning, there is no pre-defined label for what the algorithm needs to learn.

Another AI technology relevant to customer relationship management is deep learning. Deep learning is a subset of machine learning based on the way the human brain works; it includes techniques for implementing artificial neural networks, which are algorithms intended to identify patterns in a dataset. Regarding the banking sector, deep learning can be used in different areas such as reducing seizure of assets, predictive banking, analysis of consumer habits, and increasing the effectiveness of customer service interactions. Natural language processing, another AI technology, is the interaction between computers and human language. One of the most popular forms of this technology is the chatbot or virtual assistant, which has rapidly become a standard in banks all over the world.

Chatbots and virtual assistants can be deployed to meet many of the following needs in banking: retail banking, customer service queries, investment banking, and general big data interaction. It is important to note that the use of AI creates important challenges and ethical considerations. Just a few of these considerations are the unknown effects and unintended consequences of algorithms when they are incorrect, the potential for a reduction in personal interaction, and the risk faced by businesses when it comes to storing large amounts of private customer data. The AI sectors have spent—and will continue to spend—a great deal of time and money trying to make algorithms as accurate, efficient, and safe as possible. As a result, the heavy investment has resulted in massive growth, and eventually reduced costs, of AI at a global level. Because of this, AI now has significant capabilities that are of relevance to almost every AI sector. When considering the capabilities of AI to be used in employee or customer interaction, understanding the benefits of each technology is extremely important.

3.2. Applications in Banking

AI technologies are now being adopted in several applications within the banking industry, such as customer service, improving risk assessment, fraud detection, and facilitating payments. The banking sector has become data-smart because of the adoption of AI technologies, and advanced analytics has been applied in banking to understand customers' preferences, classify the existing customers based on their behaviors, analyze the variables influencing their decisions, and understand the risk and relationship to propose suitable products and services to them. Data analytics in a bank is more effective using AI as it helps in providing interrelationships between data that are deeper than traditional statistical methods. It can also be used in predictive analytics to predict the future outlook or actions of customers based on the behavior extracted from the past.

Artificial intelligence and machine learning are beneficial to banks and credit unions in various applications. They facilitate transaction monitoring, KYC, SME lending, sales forecasting, customer acquisition and market intelligence, and employee engagement, among others. Furthermore, it has been reported that online fraud detection solutions with integrated machine learning can detect fraudulent activity with high accuracy, going a long way to meet financial institutions' risk and compliance requirements. The case studies presented show that AI has benefited banks with revenue enhancement, operational efficiency, cost reduction, and streamlined customer experiences. Moreover, the adoption of these technologies could help banks maximize the accuracy and efficiency of their risk assessments, enhance their operations, cut costs, and improve the customer experience. This seems to unarguably respond to the premises that were discussed.

4. Machine Learning for Personalization

Machine learning (ML), a subfield of artificial intelligence (AI), has been rapidly advancing and is used in services commonly encountered by people every day. Machine learning is employed to create personalized experiences for customers. The cross-industry standard process for data mining discusses the use of machine learning algorithms in the following steps: data preparation, modeling, evaluation, and deployment.

When using machine learning to analyze a customer transaction history and provide product recommendations, algorithms must be chosen that can build a model of a customer, their transaction, or another input. They should be able to provide personalized recommendations, such as promising applicants for a particular service or those likely to open an account, borrow money, or buy insurance products. Personalized service is the new normal, with AI predicting potential fraud or collections issues related to credit card users. AI has begun to predict credit and overdraft line customers who may need more money, extend payroll lines to meet customer demand, and forecast the need for home equity and car loans. Personalization is more than just a customer relations tool. It is essential for customer satisfaction and the primary factor in successful customer retention and loyalty.

Banks must be very careful and present the information in such a way that customers understand it, in order to derive customer trust and satisfaction from data collection, personalization, and future solicitations. Some customers worry about their information's privacy, while others value personalized service. Customers inquire about the collection and use of their data to improve their banking experience. To obtain customer consent, financial organizations must be transparent. As a result, banks in Europe and around the world are debating the extent to which they should promote open banking. To build trust and avoid alienating customers, it is critical to gather, unite, and navigate customer data in a method that puts consumers first and then collects banking information.

4.1. Concepts and Techniques

Data-driven content and personalization are among the key drivers for success in today's banking industry. To achieve a deeper understanding of the actual needs and transactions of their clientele, different concepts of machine learning offer opportunities. For a better understanding of the different approaches, the following definitions are established: In a high level of abstraction, machine learning provides the potential to gain an understanding of the behavior of customers in virtual and physical environments across the banking and insurance domains. The nature of the data enables the following three perspectives of learning: Supervised Learning: This approach, also known as predictive learning, is used when it is required to gain insights from the data. The learning process is associated with a target variable, which needs to be predicted.

The most common approaches include regression and classification. Unsupervised Learning: In contrast to supervised learning, it is not the target variable that is of interest. Instead, the question to be answered is whether patterns or structures are present in the data. If there are, the reasons for their existence might be investigated, and interactions among the features are analyzed. Reinforcement Learning: In banks and insurance, reinforcement learning might be applied in the field of fraud detection in order to adapt to the latest developments in the fraud landscape.

The methods and coverage are typically case-specific and might require a number of statistical and mathematical models. Example methods include decision trees, random forests, K-nearest neighbors, naive Bayes, and support vector machines. In recent years, more complex methods have been established, including neural networks and deep learning. On the one hand, this progression is due to the vast increases in computer processing power and memory. On the other hand, machine learning has a preference to work with vast amounts of data, which are increasingly available to organizations. These different approaches offer a wide range of options to personalize the banking content, often depending on the technical infrastructure and capabilities of the individual banks. However, the primary objective of selecting the most appropriate features and methods is the accurate prediction of future interactions. The training of the models happens on historical data, using the history of customers to predict future interactions based on potential similarities, such as the time of day and item purchased, or the region and age of the customer. What is done here is very similar to the functioning of recommender systems that predict and rank customer preferences for products.

4.2. Case Studies in Banking

Table 1 illustrates some instances of close-knit banking with the help of AI. These example banks decided individually to implement a machine learning solution from top performance. Some of these banks are top Slovak and Czech banks with many people. There are some well-known all-Polish institutions. Our company approached every financial institution with a ready-made pipeline of the CNaaS system. Our recommendation was selected after careful consultation by the representatives of the clients of each bank and an assessment from the best international tool ranking institutions. After the implementation of CNaaS, we have seen the ongoing positive

effects of our solutions in the form of increases in customer satisfaction and customer engagement. We have also seen positive changes in customer profile characteristics and behavior as they have become more technically and socially engaged in their digital bank. Increased customer engagement is also manifested in the increased use of services and products recommended by the bank. We have noticed greater customer activity in the modules on the bank's channels where these products are promoted and where a number of customers make inquiries about these products. An additional contribution of the first and fourth case studies, not only to the case but also to the wider issue, is the emphasis on the particular value of customer-centric action for non-banking customers. All in all, these rewards are just the beginning. It is a great pleasure for us to see growing confidence in AI in banking. Thanks to our know-how and the personalization and automation of our advanced AI software products combined with a dense solution. Of course, the grand plan is to scale up and engage in many similar next close-knit banking projects.

5. Machine Learning for Targeted Marketing

Within the banking sector, data analysis techniques are utilized in the marketing strategy seeking to predict which customer should be provided with which banking product or service. Banks are fully aware of trends in the consumption of banking products and consumers' demographics and lifestyles from data captured through various customer relationship management systems. Through the analysis of this captured data, banks can divide customer data mining into clusters and target market segments. By classifying customer data mining into simulations according to behavior patterns based on past data, and now the characteristics of customer behavior and purchasing banking product data.

The prediction of customer responses is very important from the marketer's point of view, as it can yield more profitable results if marketing campaigns are run in a timely manner. This means that besides banks having these rich websites and other customer touchpoints, it is equally or more important to advise the banks to set up an internal analytic capability that can analyze the collective customer data across all such touchpoints to see how these customers behave. If machines can learn this from data and make intelligent decisions, every dollar spent on profiling the customer and retargeting them has a direct return on investment. The term used throughout the hospitality and

rail industry for this is customer loyalty scheme. However, the fundamental objective is more about promoting predictive tools in the hands of intelligent marketers. A point to ponder is the legal and ethical implications of such systems. Large companies have paid peanuts for such profiling and relabeled it under the guise of CRM. Implementing a system in your organization that enables the automated delivery of relevant messages to specific segments.

5.1. Strategies and Best Practices

5.1.1 How to Address Targeted Marketing Implementing artificial intelligence methods in targeted marketing is one of the most important strategies in the banking industry. The great advantage of these tools is the application of breakpoint thoughts – both in segmentation and in personalization, since this is where AI can truly stand out and outperform traditional marketing with its mass approach to segmentation and only one way for further personalization connected to the use of such information as the previously purchased product. Different machine learning algorithms can be used to analyze the data coming from CRM systems, e.g.: • Discovering correlations and making predictions – statistical tool/algorithm. • Detecting tendencies and patterns – association analysis algorithm. • Customer segmentation – cluster analysis algorithm.

5.1.2 How to Define a Targeted Campaign That Is Effective A recommended best practice in sales and marketing is to continually test target groups as well as propositions and offers in order to refine campaigns. It is common to reserve some portion of the overall campaign volume for testing new communications, customer groups, products, cross/up-sell paths, and the like. Next, those parts of the campaign that perform well are selected and launched in a more significant way. It is important to use the results of those tests to improve both the process and the content of market communications. Once a campaign has been set, it is then useful to run what is known as a control cell. This is a group of people who are not marketed to at all.

5.1.3 What It Is Worth Using to Develop the Campaign Developing a strategy – computation of ROI calculations are one of the most effective techniques that can be used to convince anyone of the efficacy of one's marketing campaign in general or more specifically, of one's targeted marketing experiment. A clear reach in most cases will be developed for the campaign, the expense of which will deliver a qualitative result greater than alternatives on the same investment. It is also extremely useful to co-opt the

sponsored strategy from the perspective of the cost of follow-up marketing; in our case, that cost is inbound telephone calls. It is necessary to ensure that the marketing, IT, and customer service departments all work together across the globe. The marketing professional will be better able to identify signals from the messy data that indicate interest (or disinterest) in the services.

For Whom – Targeted Campaign? It is common to target campaigns at known market segments or specific customers. In these cases, customers are usually selected and marketed to on the basis of criteria that define the target. Some companies may use subjective or qualitative criteria to segment the market and outline target segments, such as those who are looking for a car, those who are looking for another supplier of 'product X,' and those who can afford luxury items. Other companies, however, may use a more structured approach that does not depend on just anyone's opinions; these companies would not base their targeting on the opinions of those who spend time around the proverbial 'water cooler.' In their case, the criteria would be more concrete, such as age, income, demographics, etc.

5.2. Implementation Challenges

The implementation of machine learning for targeted marketing in banks may be challenging due to several reasons as mentioned below. Data quality: Many studies have concluded that the fundamental problem lies in the data quality. Ads served might not be relevant or reach the right customers. This issue is referred to as the messaging problem. Integration and management: Customer data also need to be integrated, which often requires a data warehouse or CRM system, since data in banking are held in different departments. For example, the details of how the mortgage part of the business is held is likely to be different from how the credit card, current account, and other aspects of the bank are organized. Developing conventional prediction models requires significant data wrangling for insurers to prepare a suitable dataset. Even when data already exists, it is often spread across different silos within a firm and is in heterogeneous formats. The legacy issues are further complicated by different commercial and internal metrics and goals. Resistance to change: In addition, another issue arises around people, as they are usually caught in the traditional marketing-driven approach and resist changing their strategy. The involvement of senior management means strong resistance to adopting data-driven strategies, while middle

management is only concerned with incremental changes and improving existing technical paradigms. Data: Big Data is about not just the volume, but also the variety of data; and different sources have different legal statuses. According to the principles of machine learning and data science, the larger and more varied the input data, the better the models can be. If multiple data sources are integrated, these additional challenges must be addressed in a coordinated manner to align the principles with the practical and realistic application of technology. Technical staff: In addition, experience suggests that many organizations may lack the in-house skills to explain such advisory solutions. Developing their in-house solutions often cannot interface well if not done from scratch to align with existing technology. Both insurers and reinsurers require a strong team of data scientists and data mining experts. Data scientists are expected to have a good understanding of each kind of model and could choose the most suitable model to better solve the problem. Experienced data scientists also have the ability to judge risk from the point of view of a non-technical user, assessing whether the risk profile or outcome of a model aligns with their market proposition.

6. Future Direction

The role of information technology in customer relationship management in banking is undeniable. With the increasing prevalence of AI and machine learning solutions in the sphere, the situation should change. In a hyper-connected and real-time world, it is expected that the customer should no longer reach out to the banking institution; on the contrary, the bank should contact the customer before requiring the customer's assistance. Therefore, banking institutions will need to be proactive rather than reactive. In addition, technological progress allows for a greater degree of personalization of financial products and services offered, for example, through the use of robo-advisors. In banking in the future, we can expect more use of AI in predictive analysis, where, based on historical and real-time data, AI will predict what and when the customer may need. Thus, the bank can, with greater precision, anticipate customers' behavioral insights or needs that are not always overt but may be relevant to the customer.

The future of customer relationship management should be underpinned by the use of AI for human-like conversations between the customer and representatives of the banking institution. The most advanced banking institutions are beginning to integrate AI into their customer service strategies, utilizing natural language processing, natural

language generation, and sentiment analysis to streamline customer-machine interactions. The voice of the customer is evolving. The increased use of such AI solutions means that banks and banking institutions will have to embrace digital tools that can collect and interact quickly and affordably. The voice of the customer is evolving. The increased use of such AI solutions means that banks and banking institutions will have to embrace digital tools that can collect and analyze large data sets from complaint consumers—data sources such as social media and product reviews. In terms of CRM in the banking of the future, it is likely that management will have to keep abreast of other developing IT fields and services, including but not limited to augmented reality, blockchain, or meta-learning. Given that future digital technologies are hard to predict thoroughly in advance, banks, as part of their CRM, should develop strategies based on continuous learning and development. To have a lead on the competition, banks, among others, will have to strive to meet the challenge of creating, through personalized recommendations, more cross-sell and up-sell opportunities. Innovative and continuously upgraded solutions, to be prepared for the challenges ahead, will be necessary.

7. Conclusion

This paper aimed to show the importance of enhancing customer relationship management with AI technologies in banking. The necessity of using these advanced technologies was already emphasized, which showed that strategies such as personalization and targeted marketing, which utilize AI, are essential for the success of financial institutions in the years to come. Given the customer, regulatory, and technological demands in banking today, we are convinced that it is very challenging for banks to move away from personalization and a focus on shared value with their customers, as suggested in our future recommendations.

The results in this paper illustrate that today's consumers certainly expect a lot, but new issues, priorities, and challenges arise that have been or need to be integrated into the customer relationship strategy of banks. Accordingly, we would like to make the following future recommendations for research. A known limitation of AI, especially in the area of machine learning, is garbage in, garbage out, which could be a serious issue given the poor data quality of financial institutions. Furthermore, banks need to adapt their current AI systems not only for personalization but also for compliance and the

creation of shared value and good returns for all stakeholders. A multi-stakeholder approach could also provide an interesting and convenient strategy for the financial industry. In summary, the use of AI in customer relationship management in the banking sector has many benefits. By leveraging AI technologies in banking, financial institutions can develop and engage with their customers in a more focused manner. This paper provides some basic steps for financial institutions to be successful and to be ready to meet the requirements that current and future customers are putting forward. Those who do not have the trust of their customers and do not continuously build on it will have no customers and no bank in the future.