

Value Segmentation of Remotely Acquired Customers in Banking: A Model-Based Approach

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Abstract

Innovations in information technologies lead to significant changes in the banking sector. While consumers' adaptation to digital services is accelerating, there are developments in the areas of customer experience and expectations. The integration of banks with high technology to meet customer expectations ensures that new products and services are emerging in the digital banking. Remote customer acquisition has become one of the most important developments in digital banking, enabling banks to acquire new customers by overcoming geographical restrictions and without any physical interaction. The possibility that digital channels will be the most important customer acquisition channels for banks soon makes remotely acquired customers have a strategic importance for banks. It is important for banks to get to know these customers better acquired through digital channels without any physical interaction. Efforts to bring these customers to a value segment that will create more value for the bank are increasing significantly. In this study, it has been tried to emphasize the strategic importance of remote customer acquisition and online account opening process within the scope of digital transformation in the banking sector. Using data obtained from a private bank operating in Turkey, various machine learning models were applied to estimate the value segment of customers opening remote accounts and the results of the models were compared. Random Forest was the best performing machine learning model, which predicted customers' value segment with 76% accuracy.

Keywords: Customer value segmentation; digital banking; remote customer acquisition

INTRODUCTION

Innovations in information technologies lead to significant changes in the banking sector. The inclusion of technology giants like Google, Amazon and Facebook in the financial ecosystem, which they are reshaping customer experience and customer expectations, has made it even more evident that digitalization is inevitable for the future of the banking sector, especially after the pandemic epidemic (Meinert, 2019). While the use of high technology in the banking sector is increasing day by day, there is an increase in digital banking solutions that will improve the customer experience. In this context, the concepts of remote customer acquisition, digital onboarding and branchless banking stand out as the latest developments and trending subjects in digital banking.

The fact that the internet and mobile devices have become more accessible to large masses leads to changes in consumers' behavior and expectations. Increasing consumer adoption of digital services is increasing consumers' demand for remote access to financial services without time and location constraints. (Thu Nguyen et al., 2020). This regard the concept of remote customer acquisition comes forward in terms of facilitating consumers' access to financial services. With this service, consumers can become bank customers without the need for any physical interaction only through mobile devices with internet access.

Remotely acquired customers are a relatively new and strategically important group for banks. These customers even perform their account opening transactions through digital banking channels instead of physical branches. This gives an important clue in terms of the possibility of this group to use digital channels intensively in accessing financial services after becoming a customer. Digital channels are expected to stand out as the most important customer acquisition channel for banks in the coming period. Banks should better understand these customers they gain without any physical interaction. It is also important that they work to raise these customers to segments with high added value that will create more value for the bank.

This study aims to establish a model that can predict customer value segmentation of remotely acquired customers. In this model to be established, the demographic characteristics and financial transactions of remotely acquired customers will be analyzed.

In this way, it is aimed to identify the factors that have a significant impact on the promotion of these customers to the higher value segment. In addition to variables such as income level, age, education level of customers, financial transaction information including credit, credit card and debit card usage will be examined and these factors will be tried to be reached.

In addition, marketing suggestions will be presented to increase customers to higher value segments based on the factors determined as a result of this study. Strategies such as providing personalized services, special offers and promotions to strengthen customer relationships will be among the suggestions. In this way, banks will be able to improve the customer experience, increase customer loyalty and gain long-term profitability by taking customers to higher value segments.

In this study, it will be tried to emphasize the strategic importance of the concept of remote customer acquisition and online account opening process within the scope of digital transformation in banking. It will be pointed out that banks should know this customer group better and focus on these customers in order to achieve higher value. It is expected that the results obtained from this thesis will benefit banks in developing their marketing strategies, offering personalized offers to the target audience and increasing their competitive advantages.

Digital Banking

Digital Banking Concept

Digital banking refers to receiving financial services through a banking system using mobile phones or computers. Financial transactions such as depositing, withdrawing and transferring money are among these services (Ozili, 2018). In addition, the concept of digital banking is a mechanism that creates a distribution channel that enables financial products and services to be offered over virtual environments. This mechanism helps to better recognize customers and anticipate their needs quickly by using high technology. Customers can directly communicate with their banks and perform financial transactions using the internet and mobile phones (Cuesta, 2015).

As the internet and new generation mobile devices become more accessible to wider audiences at competitive prices, changes occur in consumers' habits and preferences.

Consumers are increasingly adapting to using digital services. Consumers are now demanding financial services that are compatible with their social lives, regardless of time and location. The traditional products and services offered by banks are no longer able to meet the changes in consumer behavior and expectations. Consumers now demand financial products and services that they can access smoothly and comfortably from their mobile devices or tablets (Thu Nguyen et al., 2020).

The increase in the use of the internet and mobile devices worldwide has led to significant changes in the banking and finance sector and accelerated the development of digital banking. The concept of digital banking can be defined as the use of technology to provide financial services offered by banks more effortlessly and easily (Sardana & Singhanian, 2018). The term digital banking is used to express the concepts of electronic banking, internet banking and online banking more generally. The increase in the demand for digital banking and the widespread use of it ensure that the financial services offered to consumers become more efficient due to the increased competition among banks. (Riza, 2019). Developments in digital banking provide benefits for the banking sector to provide traditional banking services at a lower cost and to increase the number of people who demand financial services with ease in terms of accessibility (Choi & Loh, 2023).

In addition, the concept of digital banking can also be expressed as the digitization of traditional banking products and services that customers could only access through physical bank branches in the past. These services include cash deposits, cash withdrawals, transfers, check transactions, financial product applications, credit transactions and invoice processing (Proctor, 2019). Digital banking technology has affected the essence of banking and has brought the financial services system online, where previously offline and employee-dependent services were at the forefront. Digital banking has been beneficial in terms of increasing the efficiency of financial services provided by using technology and reducing costs. Bank managements have shifted their attention to reducing operational costs and increasing digital channel effectiveness. In addition, the increasing number of digital banking service providers has made it important for banks to take steps to understand how their customers use digital services and to improve customer relations (Son et al., 2016).

Developments in digital banking services have led to a transformation in traditional banking in terms of reducing physical operations in bank branches. With the use of digital banking products and services, customers' obligation to go to physical bank branches for banking transactions has been eliminated. In addition, digital banking has led to a change in the banking sector in terms of providing services to customers abroad, unlike traditional banking, in addition to the benefit it provides to reduce costs (Choi & Loh, 2023).

Digital Banking Channels

It has been revealed that the increase in self-service channels offered to customers also brings an increase in the revenues of the banks. Self-service technology gives a positive result for banks as it allows them to better understand their customers' needs and adjust their services accordingly. Also, self-service channels increase the quality of service by providing control of the service offered to consumers. In this way, more benefits can be obtained from service interactions (Giovanis et al., 2019). Although omnichannel services help increase customer satisfaction with the convenience they provide, these services also have negative aspects. Omnihannels can be challenging and inconvenient, especially for older consumers who struggle with digital complexity. For example, this group, who may have low attention and cognitive abilities in the decision-making process, may find it difficult to adapt to new products or channels. Therefore, age is one of the most important variables when searching for new channels (Cho et al., 2023).

Branchless Banking

The increasing use of technology in the banking makes important developments. Especially in digital banking the concept of branchless banking emerges as a trending topic.

Skinner (2014) defines the concept of branchless banking as an alternative banking application that allows all banking transactions to be made without going to a physical bank branch. Traditionally, deposit banking works on the basis of physical distribution, while branchless banking works with an electronic distribution model.

Branchless banking has become an important development in terms of offering financial services to wider masses, especially in rural areas due to the presence of fewer physical bank branches. Thanks to the increasing use of this concept in developing countries, it increases the rate of financial inclusion. The advantages of this concept in reaching remote

locations without the necessity of opening a physical branch are an important innovation for banks (Palaon et al., 2020).

It is an undeniable fact that the service quality offered by banks to their customers has increased in recent years, with the effect of technological innovations. But not all customers agree on the convenience. For customers unfamiliar with mobile technologies, the closure of physical branches will produce a negative impact. It should be noted that closing physical branches may cause these customers to switch to another bank or lose their motivation to purchase a product or service (Cho et al., 2023). Currently, branchless banking services are mostly offered to individual and micro-scale companies in Turkey and around the world. Branchless banking services for commercial customers are rarely offered due to the more complex structure of products for the commercial segment.

Remote Customer Acquisition

The difficult process of becoming a customer can mean a negative experience for potential customers. While technology giants such as Google, Amazon and Facebook are revolutionizing customer experience and customer expectation, it can be difficult for banks to create a successful remote customer acquisition experience that will meet customer expectations with limited technology budgets. The real implementation of digitization in a bank needs to be seen as a cultural shift rather than the successful implementation of digital solutions. Digital transformation must impact the entire organization and onboarding is at the heart of it (Meinert, 2019).

We can refer to the process of acquiring new customers only through mobile devices, without direct physical interaction with customers, as remote customer acquisition. The important developments in technology, the more frequent use of digital platforms and the increase in the level of knowledge of customers in the field of digital literacy have paved the way for banks to reach customers remotely. With this concept, it has become possible for banks to expand their customer base by avoiding the restrictions caused by geographical factors. The concept of remote customer acquisition is not limited to customers opening accounts remotely. This includes using social media to attract and convert potential customers and leveraging many online channels for digital advertising. The convenience, flexibility and cost-effectiveness of remote customer acquisition benefits both banks and customers. In today's world where digital transformation is developing rapidly, remote

customer acquisition has gained strategic importance for banks that want to expand their customer base and increase their competitiveness in national markets.

Digital Onboarding

It can be expressed as digital onboarding when customers register for a new product or service through digital channels and the identity verification processes take place during this process. In this process, distinctive information of customers, such as identity documents, is obtained through digital channels and verified. In this process, advanced technologies and digital tools are used. With digital onboarding, while complying with legal requirements, the need for physical documents is eliminated. Customers' onboarding experience becomes simpler thanks to a faster and more efficient account opening.

Consumers who want to become customers through internet banking and mobile banking must go through the process of recording their information through mobile applications called digital onboarding (Silva et al., 2023).

In the current financial ecosystem, it is very important to take attention of new customers while increasing the loyalty of old customers. Banks strive to create a personalized, simple and seamless digital customer acquisition and contracting experience. The ability to acquire customers through digital channels simplifies and facilitates a customer's first experience with the bank and significantly reduces the cost of customer acquisition. The pandemic epidemic that has affected the whole world recently has left banks and financial service providers faced with unforeseen challenges. While this period increased the importance of the digital onboarding process, there was an increase in the use of this concept. Digital customer engagement has become a buzzword in the industry as bank managers begin to realize the importance of digitalization (Master, 2022).

According to a survey by banking software company Temenos, only 31% of banks worldwide used digital onboarding in 2016, while in 2019 76% of banks actually embraced the digital onboarding experience. The banking industry has realized that they can no longer ask customers to come to branches for credit or credit cards. This is leading to a "great migration" towards digital onboarding (Meinert, 2019).

According to the study carried out by IBSi Research, digital onboarding was chosen as the most important and trending banking product for the third consecutive period. In 2020,

approximately 80% of the financial ecosystem has started to use new digital onboarding systems or have gone to upgrade their existent systems (Master, 2022).

Online Account Opening Process

Online account opening process refers to the digital procedure in which individuals can become customers by opening an account in a bank using internet-based platforms or mobile applications without going to a physical branch. This streamlined process offers users convenience, efficiency, and accessibility, allowing them to start and complete the account opening process from their mobile device.

With the relevant regulation that came into force in May 2021, banks operating in Turkey were legally allowed to acquire customers remotely through this process.

In the past years, an increase has been observed in customers' preference for digital channels. This change has been accelerated with the pandemic. Banking sector is working on platforms that digitally help for both their current and prospective consumers (PR Newshire, 2020).

Customer Segmentation

Customer segmentation is the identification of different customer characteristics and grouping accordingly in order to understand the various characteristics of customers (McDonald, 2012). Companies often segment customers based on their contribution to company revenue, considering factors such as purchase volumes. Thanks to customer segmentation, companies can effectively manage the needs of different customer groups (Batt, 2000).

Customer segmentation is the division of a company's customer base into different groups based on various characteristics such as demographics, financial behavior, and credit risk profiles. With the segmentation concept, significant differences between customers are identified. In this way, it is aimed to group customers with similar needs, preferences and profitability potential. Banks can develop marketing strategies by analyzing customer segments. If the unique demands and expectations of each segment can be met, customer satisfaction, loyalty and profitability can be increased.

Most companies today do not know their customers well enough. For this reason, it is difficult to understand how much profit different customers bring in the short, medium and

long term. Few companies know their customers well and can predict which customers are generating significant revenue for their businesses. Although some companies can classify and evaluate their customers according to criteria such as total turnover or gross profit, this practice is not sufficient. Still, it is better to have some degree of classification and evaluation than to have no knowledge of customers at all (Gel, 2004).

With the increase in the amount of data that companies can use and the developments in analytical processes, there have been developments in the field of customer segmentation in recent years. In traditional segmentation applications, segmentation was done based on demographic information. Today, more complex approaches based on advanced analytics and using machine learning algorithms are being used. Thanks to these new techniques used, not only demographic information, but also different sources such as transaction data, social media activities and customer interactions can be brought together. More complex analytical models can be used to use various datasets together. In this way, it is possible to create personalized product offers and marketing strategies. By using data-based customer segmentation methods, companies can use their resources more efficiently. At the same time, customer loyalty can be increased by targeting customers with segmentation studies. Once you have a deep understanding of customer needs and preferences, it becomes easier to separate customers into different groups. With this information, it is possible to understand what satisfies the customers and even exceed customer expectations. Such insights can be used to improve products and services. Today, services to customers are as important as the product sold, and companies should prioritize increasing the level of service. Ultimately, customer segmentation facilitates decision making by guiding companies on how much importance they should place on different service levels for various customer groups (Buttle, 2009).

Customer Value Segmentation

Customer value segmentation is a strategic approach that involves dividing a firm's customers into different segments based on their perceived value and preferences. By analyzing the expectations of different customer segments separately, companies can establish marketing strategies to increase customer satisfaction and loyalty. With this approach, companies can identify their high-value customers and offer them personalized offers and exclusive benefits. In this way, it can be ensured that company resources are

used more effectively in marketing activities for targeted segments. The concept of customer value segmentation can be useful to improve client relations, increase loyalty and increase long-term profitability.

The process of examining customer value is commonly employed to identify customers who generate profit and create targeted approaches to engage with them effectively (Irwin, 1994).

The use of various classification indexes is important for customer segmentation. Traditionally, these indexes include factors such as the client's age, occupation, gender, and family status. However, understanding customer buying behavior can be difficult if relying solely on these basic indices based on statistical population data. Analytical research on customer values enables applications to be made to identify, retain and develop loyal customers. This approach serves as a crucial strategy for scientifically segmenting customers, providing personalized services, and generating exceptional returns (Reichheld et al., 2000). Foundation of segmentation lies in the understanding that not all consumers who engage with a company's products and services hold equal value. It is essential for companies to recognize the varying significance of their customers in order to sustain their market presence. Companies must strategically allocate their attention and resources by shifting focus from non-profitable consumers to those who generate higher profits. To ensure continued profitability, companies should prioritize customers who frequently engage with their products or services or make larger purchases. This approach allows for the creation of fruitful customer groups that contribute significantly to a company's success (Kim et al., 2006).

RESULTS

Three different methodologies were used in the study. Among these methodologies, it was aimed to find the model that best predicts the value segment of customers. While various methods were explored, the focus was on determining the model that gave the optimum result.

Three different machine learning algorithms which are random forest, decision tree and multilayer perceptron are applied. Among these algorithms, it was aimed to find the model

that best predicts the value segment of customers. The random forest chosen due to better prediction results.

1.1. Random Forest Model Results

The global importance values of the features are provided in Figure 1, as indicated by the random forest model utilized in the study.

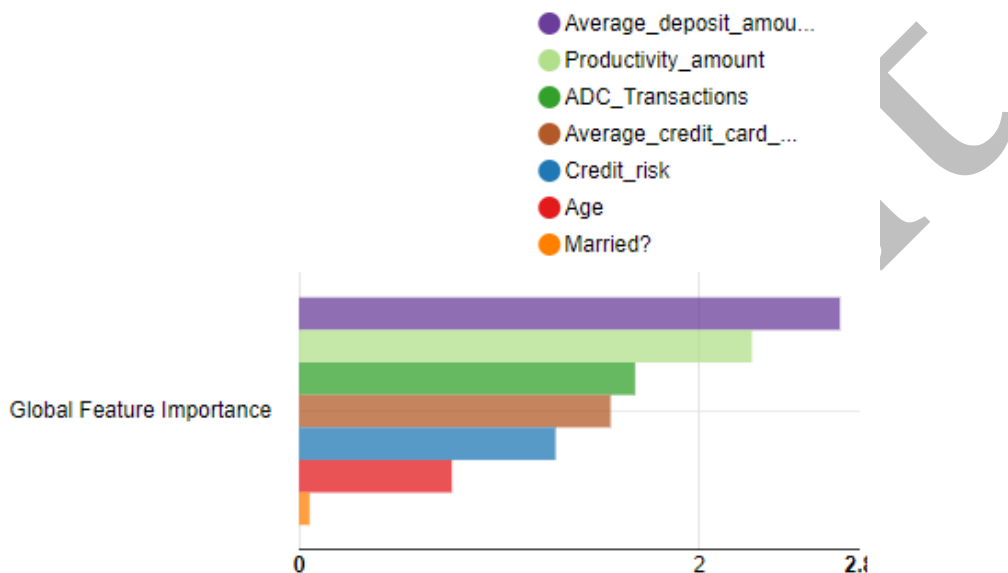


Figure 1. The global importance values of the random forest model.

The confusion matrix, shown in the table below, presents the results of the random forest model:

Table 1

Confusion Matrix of the Random Forest Model

Value Segments	True Positives	False Positives	True Negatives	False Negatives
Class A Actual	985	249	13,140	336

Class B Actual	1,740	939	11,030	1,021
Class C Actual	2,704	1,540	9,348	1,118
Class P Actual	5,742	831	7,053	1,084

The accuracy statistics of the model used in the study, in which the value segment of the customers is used as the target variable, are calculated, and given in the tables below.

Table 2

Random Forest Model Results in terms of Class Statistics

Model Results	Specificity	Sensitivity	Precision	F-measure	Accuracy	Cohen's Kappa
Class A	0.981	0.746	0.798	0.771	0.758	0.642
Class B	0.922	0.628	0.647	0.637		
Class C	0.859	0.707	0.637	0.670		
Class P	0.895	0.841	0.874	0.857		

DISCUSSION

This study aims to find the model that best predicts the value segment of customers by employing three different methodologies. While exploring various methods, the focus has been on identifying the model that yields the optimal outcome.

Machine learning (ML) models are used to solve many problems from simple to complex and outperform traditional techniques in terms of speed and accuracy. Machine learning enables predictions, classifications, and data-driven decision making. This enables companies to leverage historical data to understand consumers, optimize product strategies, and plan future activities more efficiently (Miklosik et al., 2019).

Decision tree methods are generally used for classifications. It provides top-down hierarchical mapping of organizational and operational links among given features and distributed judgments (Wang et al., 2020). Machine learning algorithms used for classification include Random Forest (FR), Decision Tree (DT) and Multilayer Perceptron (MLP) (Koranga et al., 2022).

In this context, three different machine learning algorithms which are random forest, decision tree and multilayer perceptron are applied, and random forest chosen due to better prediction results.

The global importance values of the features obtained as a result of the random forest model give an idea about the importance levels of the variables in the data set in terms of the model. The contribution of each variable to the model can be measured over these values. The visual in Figure 1 visually represents the significance levels of the variables. Variables with high significance in the graph have a greater impact on the model. Likewise, variables with low significance have a smaller effect on the model. With this graph, it can be understood which variables contribute more to the performance of the model. It is an important indicator for the variables to be selected to increase the accuracy of the model. According to the results of the random forest model, the three features that contribute the most to the accuracy of the model are the *Average Balance of Deposit*, *Efficiency Amount* and *ADC Transactions* variables, respectively. These variables are the most effective factors in estimating the target variable. The significance levels of these variables are higher in the model. This shows that they play a very important role in determining the accuracy of the model's predictions. By focusing on these features, valuable information can be gained and more informed decisions can be made regarding the target variable.

Based on the data provided in the Table 1, the value segment of 11,151 out of 14,710 customers was accurately predicted. The overall accuracy of the model is 75.8%.

Accuracy statistics calculated for the A value segment were especially examined, since it is more important to correctly estimate the A value segment for the purpose of the study. The overall model accuracy was 75.8% and the sensitivity value for the A value segment was calculated as 74.6%.

CONCLUSION

This study presents a model focusing on the strategic importance of remote customer acquisition in the banking sector and aims to bring this customer group, who open accounts remotely, into a higher value segment. During the modeling stage, the demographic characteristics and financial transactions of customers who open accounts remotely were analyzed to identify the factors that would elevate customers to a higher value segment.

In the modeling phase, in which three different machine learning algorithms were applied, the results of the models were close to each other. However, the random forest model showed the best performance. Although the number of customers in different value segments was not close to each other in the data set to which the model was applied, the final accuracy of the model was 76%. In line with the purpose of the study, since suggestions will be presented to help banks take their customers to the higher value segment, the model results of the A segment, which is the highest value segment, were also paid attention. The sensitivity value of the model was realized as 75% for this segment. In other words, with this model, the value segment of the customers can be predicted correctly at a rate of 76%.

According to the results of this study, the most important features in the model are as follows:

- *The Average Deposit Balance*: represents the average deposit balance in customers' accounts. Deposit Balance is an important factor in promoting customers to a more valuable segment. This variable indicates the financial strength and level of financial accumulation of the client. Customers with high deposit balances are candidates for a more valuable customer segment for the bank.
- *The Productivity Amount*: represents the total revenue generated by a customer to

the bank through their financial transactions. Another important variable that has a high impact on the customer's value segment. Customers with a high amount of efficiency bring more revenue to the bank and are potential candidates for inclusion in the higher value segment.

- *The ADC Transaction Count*: represents the number of financial transactions performed by customers through digital channels. It is a variable that reflects the customer's digital activities. Customers who perform a large number of transactions through digital banking channels are considered active users and show great interest in digital banking. These customers are more likely to belong to a higher value segment due to their inclination and active use of digital banking services.

These above-mentioned variables appear as factors that have a high impact on the value segment of customers. Banks can use these variables to improve their marketing strategies. For example, special campaigns can be offered to customers with low deposit balances so that they can reach higher deposit balances. Thus, an increase in the value segments of the customers in this group can be expected. On the other hand, customers with high deposit balances can be offered special services or investment opportunities to increase their loyalty to the bank. Similarly, banks can offer special campaigns or discounts to their customers with high productivity levels. In this way, it is possible to work on improving the relations of the customers in this group with the bank and for these customers to perform more transactions. The high number of transactions made by customers through digital channels also carries these customers to the higher value-added segment. For this reason, investments can be made to improve the customer experience in digital channels in order to increase the number of transactions performed by customers through digital channels. In conclusion, this study aims to present a model and insight into the strategic steps that banks can take for remote customer acquisition and value segmentation concepts. Banks can work on target marketing strategies to leverage customers' value segments by focusing on the above-mentioned variables that have a significant impact on customers' value segments. These strategies can help banks improve the customer experience, strengthen customer loyalty and achieve long-term profitability.

REFERENCES AND NOTES

- Batt, R. (2000). Strategic segmentation in front-line services: Matching customers, employees and human resource systems. *International Journal of Human Resource Management*, 11(3), 540-561.
<https://doi.org/10.1080/095851900339756>
- Buttle, F. (2009). *Customer Relationship Management: Concepts and Technologies* (2nd ed.). Elsevier Ltd.
- Cho, S., Lee, Z., Hwang, S., & Kim, J. (2023). Determinants of bank closures: What ensures sustainable profitability in mobile banking? *Electronics (Basel)*, 12(5), 1196. <https://doi.org/10.3390/electronics12051196>
- Choi, H. S., & Loh, R. (2023). Physical frictions and digital banking adoption. *Management Science*, 1-53. [Research Collection Lee Kong Chian School of Business].
- Cuesta, C. M. R. (2015). The digital transformation of the banking industry. *Digital Economy*, 1-10.
- Gel, C. O. (2004). *Operasyonel Yönetimde Finansal Farkındalık* (2nd edition). Istanbul: Sistem Yayıncılık.
- Giovanis, A., Assimakopoulos, C., & Sarmaniotis, C. (2019). Adoption of mobile self-service retail banking technologies: The role of technology, social, channel and personal factors. *International Journal of Retail & Distribution Management*, 47(9), 894-914. <https://doi.org/10.1108/IJRDM-05-2018-0089>
- Irvin, S. (1994). Using lifetime value analysis for selecting new customers: Moving beyond traditional modeling applications. *The Credit World*, 82(3), 37.
- Kim, S., Jung, T., Suh, E., & Hwang, H. (2006). Customer segmentation and strategy development based on customer lifetime value: A case study. *Expert Systems with Applications*, 31(1), 101-107. <https://doi.org/10.1016/j.eswa.2005.09.004>
- Koranga, M., Pant, P., Kumar, T., Pant, D., Bhatt, A. K., & Pant, R. P. (2022). Efficient water quality prediction models based on machine learning algorithms for nainital lake, uttarakhand. *Materials Today : Proceedings*, 57, 1706-1712.
<https://doi.org/10.1016/j.matpr.2021.12.334>

- Master, W. (2022, Apr 04). Why Digital Onboarding is Imperative for Banking Today. *Addis Fortune*, Retrieved from <http://lproxy.yeditepe.edu.tr/login?url=https://www.proquest.com/magazines/why-digital-onboarding-is-imperative-banking/docview/2647053352/se-2>
- Meinert, M. C. (2019). Practical tips from two chief experience officers on designing a user-friendly digital onboarding process. *ABA Banking Journal*, 111(5), 30.
- Miklosik, A., Kuchta, M., Evans, N., & Zak, S. (2019). Towards the adoption of machine learning-based analytical tools in digital marketing. *IEEE Access*, 7, 85705-85718. <https://doi.org/10.1109/ACCESS.2019.2924425>
- Ozili, P. K. (2018). Impact of digital finance on financial inclusion and stability. *Borsa Istanbul Review*, 18(4), 329–340. <https://doi.org/10.1016/j.bir.2017.12.003>
- Palaon, H., Wiryono, S. K., & Faturohman, T. (2020). Branchless banking agents: Business satisfaction, continuity, and viability. *Cogent Business & Management*, 7(1), 1823585. <https://doi.org/10.1080/23311975.2020.1823585>
- Proctor, D. (2023, June 3). What is Digital Banking? Temenos. Retrieved from <https://www.temenos.com/news/2019/12/19/what-is-digital-banking/>
- PR Newswire Association LLC (2020). *ODX launches digital account opening to support contactless, online banking: Digital account opening enables services ranging from online checking to lending for financial institutions of all sizes.*
- Reichheld, F. F., Markey, R. G. J., & Hopton, C. (2000). The loyalty effect -- the relationship between loyalty and profits. *European Business Journal*, 12(3), 134.
- Silva, M. C. d., Tavares, G. M., Gritti, M. C., Ceravolo, P., & Barbon Junior, S. (2023). Using process mining to reduce fraud in digital onboarding. *Fintech*, 2(1), 120-137. <https://doi.org/10.3390/fintech2010009>
- Skinner, C. (2014). *Digital bank: Strategies to launch or become a digital bank*. Marshall Cavendish International (Asia) Private Limited.
- Son, Y., Kwon, H. E., Tayi, G. K., & Oh, W. (2020). Impact of customers' digital banking adoption on hidden defection: A combined analytical–empirical approach. *Journal of Operations Management*, 66(4), 418-440. <https://doi.org/10.1002/joom.1066>
- Thu Nguyen, T., Thi Nguyen, H., Thi Mai, H., & Thi Minh Tran, T. (2020). Determinants

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of digital banking services in vietnam: Applying UTAUT2 model. *Asian Economic and Financial Review*, 10(6), 680-697.
<https://doi.org/10.18488/journal.aefr.2020.106.680.697>

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