

EFFECT OF ARTIFICIAL INTELLIGENCE STRATEGIES ON PERFORMANCE OF COMMERCIAL BANKS IN KENYA

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Abstract: This study examined the effect of artificial intelligence strategies on performance of commercial banks in Kenya. Performance was measured using indicators such as profit before tax, number of customers and the net promoter score. The study used a descriptive design with questionnaire as the instrument for data collection. Reliability of the study instrument was established using Cronbach Alpha, internal consistency method. Validity of the research instrument was determined using content and construct validity. The target population was 42 commercial banks in Kenya. The unit of observation was senior operations managers, product development managers and information technology managers from the banks. The study conducted a census on all the banks. Data collected was analyzed using SPSS version 25 to produce frequencies, descriptive and inferential statistics which were used to derive conclusions. The study conducted a multiple regression analysis to determine the relationship between artificial intelligence and performance of commercial banks. The results indicated that there was a positive and significant relationship between artificial intelligence strategies and performance.

Keywords: Artificial Intelligence, Performance, Innovation Strategies, Commercial Banks.

1. INTRODUCTION

According to Mande and Ngonga (2020), the banking sector in Kenya has undergone tremendous changes in the last two decades. Increased competition has led to the introduction of new products and services in the market. In order to survive and grow in the market, banks have been forced to adopt new technology and innovative products. One of the most significant changes in the banking sector has been the growth of financial technologies. Strategic innovations such as use of financial technology has provided a new and emerging industry that uses technology to provide financial services (Kemboi, 2018). Strategic innovations such as e-banking, mobile banking and open banking use technology to provide services such as payments, lending, investments and money transfer. Financial innovation companies have grown rapidly in the last few years and have raised billions of dollars in investment. Rajapathirana and Hui (2018) study in China found that finance innovation strategies generally do seem to have positive effects in raising financial performance of financial banks. Innovation strategies use a four-equation model, to link the innovation decision of firms to their performance through the impact of innovation input on innovation output and the innovation output on productivity and better performance. Their findings confirm the positive relationship between finance innovation activities and productivity at the firm level and provide further evidence on the relationship between size and innovation activities.

According to Hinterhuber and Liozu (2017) study in Canada, finance technology strategies are important strategies that can be used by commercial banks to grow new markets, to expand their market share and gain a competitive advantage. Getting from their motivation from the competitiveness in the dynamic global markets, many organizations are embracing innovation as an important way to stay relevant in a competitive market.

Hewitt et al. (2018) study among South African banks found that commercial banks have been able to create competencies and in order to sustain them the banks have invested in online marketing, mobile banking, paperless banking and customized customer service. This has helped them to come up with favorable core banking systems, marketing strategies, products as well as organization innovation. It has improved the financial performance of financial institution.

Banks were first established during the British colonial period and back to 1890's, these foreign owned banks had branch banking with financial external trade for a long time, with less concentration on African growing populations and needs. In 1925 the Barclays bank (currently ABSA) was formed through a merger of two British banks, later on many commercial banks were established and especially after the attainment of the independence.

Before the modern banking systems of mobile and internet banking were developed, the banks the banks were practicing barter trade, without a regulated body or defined banking policies. It later went to movable banking where the banks use to take money to the villagers in a given market day, where they would deposit or withdraw the money. The bodies regulating banking include Companies act, the Banking act and the central bank of Kenya. The commercial banks, offers different products and services such as deposits, loans, insurance, and shares.

In Kenya, the growth of finance technology innovations has been spurred by the country's mobile money infrastructure, which was created by mobile network operator Safaricom in 2007 (M-Pesa) (M-Pesa, 2018). M-Pesa is a mobile money platform that allows users to send and receive money, pay for goods and services, and access credit (M-Pesa, 2018). M-Pesa has been a success story, with over 30 million users and a 70% penetration rate as of 2018 (M-Pesa, 2018). The success of M-Pesa has attracted the attention of international investors, and Kenya has become a hotbed for fintech investment (Fintech Global, 2020).

The growth of finance innovations in Kenya has had a profound impact on the country's banking sector. In 2016, the Kenyan central bank released a report on the impact of finance innovations on the banking sector, which found that innovative finance solutions were eating into the banks' market share, particularly in the areas of mobile payments and loans (Central Bank of Kenya, 2016). The report found that financial technology solutions offered by Fintech were able to offer faster and more convenient services than the banks, and that they were able to reach customers that the banks could not, such as small businesses and rural customers (Central Bank of Kenya, 2016).

2. STATEMENT OF THE PROBLEM

The growth in the number of banks in Kenya spurred by the entry of foreign banks, the consolidation of existing banks and the establishment of new local banks has increased competition in the banking sector (Julius, Gudda & Agoki, 2021). In order to survive and grow in the market, banks have been forced to adopt new technology and innovative products (Fang, 2020). In 2016, the banking sector experienced increased disruption due to technological advances. According to Equity Bank (2016) financial report, the bank recorded 3 times more mobile banking transactions and almost 4 times more loan applications from phones than physical branches. Kenya Commercial Bank (KCB) reported a similar phenomenon with 70% of transactions driven by mobile channels (CBK, 2018). However, smaller banks faced challenges adopting innovative solutions which has led to increased acquisitions by larger banks. According to the Central Bank of Kenya (2020) report, total deposits among commercial banks in Kenya increased by 12.5% in 2019 and 13.9% in 2020 due to deposits through mobile banking and agency banking. However, despite improvements in customer deposits, the banking sector recorded declined performance in 2020 to a tune of 29.5% (CBK, 2020). In 2022, customer deposits increased by 12.3% due to mobile phone platforms (CBK, 2022).

According to the Kenya Fintech report 2017, innovative solutions in financial services have led to banks continuously focusing on strategies that capitalize on financial technologies models to increase their presence in the unbanked population (CBK, 2022). Chang et al. (2018) analyzed how Indonesian banks changed business processes and found that in order to optimize the role of innovations, it is necessary to build business synergies between banks and non-bank financial providers. Huebner et al. (2019) research on impacts of innovations on financial intermediation and the financial services value chain, found that innovative technologies cut out financial intermediaries. Ondiek (2021) studied effects of digital banking strategy on financial inclusion among commercial banks in Kenya. The study concluded that commercial banks in Kenya had adopted diverse digital banking strategies to not only ensure their sustainability but also to reach the unbanked people in Kenya. However, there were challenges keeping up with increased advances in technology. The study

noted that smaller banks faced greater challenges in finance technology adoption due to financial constraints and lack of infrastructure to support innovation. Julius, Gudda and Agoki (2021); Wanalo, Mande and Ng'ong'a (2020); Nduta (2020) investigated the impacts of innovation strategies in the banking industry in Kenya and found that innovation strategies have positive and significant influence on competitiveness.

In Kenya, research work on the strategic innovations in the financial sector and digital revolution is scarce despite witnessing the most rapid financial evolution since 2007 when M-Pesa entered the market. A lot of studies done on financial innovations have been conducted in developed countries (Chang et al., 2018; Huebner et al., 2019; Fang, 2020) which presents contextual gaps. In Kenya, little has been done on strategic innovations in banking. Studies conducted in Kenya (Ondiek, 2021; Julius, Gudda & Agoki, 2021; Wanalo, Mande & Ng'ong'a, 2020; Nduta, 2020) assess one or two strategic innovations but little attention focusing on other strategic innovations under study. Studies conducted in Kenya do not examine open banking strategy which present conceptual gaps. The studies present conceptual and methodological gaps since they assess different variables and use case study designs. This study sought to fill these gaps by examining the effect of artificial intelligence on performance of commercial banks in Kenya.

3. LITERATURE REVIEW

Artificial intelligence enhances a firm's way of presenting new ideas, work processes, strategies, products, and services. Artificial intelligence technology ought to enhance existing processes, products, and services in order to tackle a challenge or attract new customers (Shafei & Sijanivandi, 2022). Artificial intelligence enhances process innovations which are geared towards adding value to the organization in terms of profit generation as well as to its customers through meeting their demands and the desired level of satisfaction.

Banks have adopted artificial intelligence tools in process automation. The concept of artificial intelligence was introduced in recent years. Especially, in the case of the financial industry, its usage was confirmed in the form of chat-box and virtual assistants in social media, websites, and mobile apps of the banks (Kruse et al., 2019). Artificial intelligence application in innovating financial processes such as mobile banking, internet banking, ATMs, and POS has accelerated the banking services with time and cost-saving and has increased the market share of banks. AI provides an opportunity for banking customers to naturally interact with banks in terms of gesturing, writing, and talking.

Business process automation (BPA) is the automation of complex business processes and functions beyond conventional data manipulation and record-keeping activities, usually through the use of advanced technologies. It focuses on "run the business" as opposed to "count the business" types of automation efforts and often deals with event-driven, mission-critical, core processes (Mukira et al., 2022). BPA usually supports an enterprise's knowledge workers in satisfying the needs of its many constituencies. Robotic process automation (RPA) is the use of software with artificial intelligence (AI) and machine learning capabilities to handle high-volume, repeatable tasks that previously required humans to perform. As BPM tools have begun taking characteristics of business process management. But they get more sophisticated and start to include artificial intelligence characteristics. These tasks can include queries, calculations and maintenance of records and transactions (Le & Ngo, 2020). RPA is the expression used for software tools that fully or partially automate human activities that are manual, rule-based, and repetitive. RPA works by replicating the actions of an actual human interacting with one or more software applications. Tasks performed may consist of data entry, process standard transactions, or respond to simple customer service queries.

Robotic process automation serves several purposes: it frees humans from monotonous tasks, it helps to ensure that outputs have more quality, and improve speed. RPA frees humans from tedious, low-value-added tasks like data entry. It makes them available for higher-value tasks that require human creativity, ingenuity, and decision making (Ayllon, 2020). RPA helps to ensure that outputs are complete, correct, and consistent between jobs and between human workers. RPA helps to ensure that tasks can be completed faster because the robotic process automation tool can find and retrieve any necessary data in the background.

Performance refers to the ability to operate efficiently, profitably, survive, grow and react to the environmental opportunities and threats (Ondiek, 2021). Commercial banks have both financial as well as social objectives. To measure bank performance, the extant literature relies on both accounting and market measures (Balyuk, 2018). Market performance reflects expectations of firm's prospects and its ability to adapt to potential changes (Krueger et al., 2019). It includes the present value of expected future profits valued by the financial market.

Smith et al., (2019) identified performance parameters that have been used to measure both financial and non-financial performance. For instance, measures such as return on investment, return on sale and return on equity are some of the commonly used parameters to measure performance (Ahmed et al., 2019). According to Hushko et al. (2019) both financial and non-financial indicators such as process improvements, customer satisfaction, capacity utilization and product service quality can be used to measure firm performance.

According to Gaganis et al. (2019) profitability is the primary goal of all business ventures. Businesses cannot survive without profitability, and a highly profitable business rewards its owners with a considerable return on their investment. According to Gateka (2019), different profitability ratios can be employed to evaluate a bank's performance. The tools include among others, profit margin, return on assets and return on equity. Gross profit margin, pre-tax profit margin, net margin, operating margin are different kinds of profit margins commonly used.

Zuo, Strauss and Zuo (2021) studied the impact of digitization among commercial banks in China. The study assessed digital transformation of the banks and concluded that digitization contributed to improved efficiency among the banks which reduced operational costs. The study recommended the digitization of commercial banks to improve efficiency and overall performance and profitability.

Chhaidar, Abdelhedi and Abdelkafi (2021) examined the effect of technology on profitability of European banks. The study assessed the effect of fintech on the banks profitability and concluded that adoption of fintech among the banks had a significant and positive impact on the profitability of the banks. The study recommended increased investment in digital technology among commercial banks to improve performance and profitability. Wu, Liu and Yang (2023) assessed the effect of digital finance on performance of commercial banks in China. The study assessed the adoption of artificial intelligence and big data technology and concluded that adoption of digital finance had significant impact on the competitiveness of commercial banks. They recommended adoption of digital finance among commercial banks since it had significant influence on their productivity.

Fang (2020) examined the implementation of finance technology among commercial banks in China. The study examined digital transformation in the banking sector and concluded that the adoption of finance technology among commercial banks had significant effect on customer service, product development and growth. The study recommended strengthening of finance technology strategies in commercial banks to increase efficiency and competitiveness.

4. METHODOLOGY

The study used a descriptive design with questionnaire as the instrument for data collection. Reliability of the study instrument was established using Cronbach Alpha, internal consistency method. Validity of the research instrument was determined using content and construct validity. The target population was 42 commercial banks in Kenya. The unit of observation was senior operations managers, product development managers and information technology managers from the banks. The study conducted a census on all the banks. Data collected was analyzed using SPSS version 25 to produce frequencies, descriptive and inferential statistics which were used to derive conclusions. The study conducted a multiple regression analysis to determine the relationship between artificial intelligence and performance of commercial banks.

5. FINDINGS

The study sought to determine the effect of artificial intelligence strategies on performance of commercial banks in Kenya. The respondents were asked to indicate the extent to which they agree with the statement on artificial intelligence strategies based on a Likert scale where Strongly agree -5, Agree -4, Moderate -3, Disagree -2, Strongly disagree -1. The results of the study were as shown in table 1.

The findings revealed that 30.8% of the respondents strongly agreed that the organization has implemented artificial intelligence strategies, 30.8% agreed, 18.3% were neutral while 6.7% disagreed. The study findings also showed that 80.8% of the respondents strongly agreed that the organization uses artificial intelligence tools while 85% strongly agreed that the organization has implemented machine learning. Moreover, 50% of the respondents strongly agreed the organization uses robotic process automation while 45% agreed. Further, the results of the study revealed that 75.5% of the respondents strongly agreed that artificial intelligence has improved organizational performance while 20.5% agreed. Further, 80.8% of respondents strongly agreed that the bank uses automated customer service processes.

The implication of the results is that majority of the respondents indicated that they agree with the statements on artificial intelligence strategies as shown by a mean of 4.10. The responses given by the respondents had little variation (standard deviation=0.88). The findings of the study are consistent with the results of a study by Fang (2020) which concluded that finance technology strategies in commercial banks increase efficiency and performance.

Table 1: Artificial Intelligence Strategies

Statements	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Std Dev
The organization has implemented artificial intelligence strategies	0.0%	6.7%	18.3%	30.8%	44.2%	4.13	0.94
The organization uses artificial intelligence tools	0.0%	0.0%	19.2%	0.0%	80.8%	4.62	0.79
The organization uses robotic process automation	0.0%	0.0%	5.0%	45.0%	50.0%	4.85	0.36
The organization has implemented machine learning	0.0%	0.0%	5%	10%	85.0%	3.28	1.16
Artificial intelligence has improved organizational performance	0.0%	0.0%	4%	20.5%	75.5%	3.11	1.26
The bank uses automated customer service processes	0.0%	0.0%	19.2%	0.0%	80.8%	4.62	0.79
Average						4.10	0.88

The findings of the study revealed also that there was a positive and significant correlation between artificial intelligence strategies and performance of commercial banks in Kenya as shown by a Pearson coefficient of 0.555 and significance level of 0.000. This implies that using artificial intelligence tools, robotic process automation and machine learning leads to a positive and significant effect in the performance of commercial banks in Kenya. The study findings are consistent with the results of a study by Rabbani et al. (2023) which revealed that the adoption of innovative financial strategies such as artificial intelligence increased the market share of commercial banks.

6. CONCLUSION AND RECOMMENDATION

The study concluded that artificial intelligence strategies has the most positive significant influence on performance of commercial banks. This shows that when firms focus on adopting artificial intelligence strategies, for instance through, artificial intelligence tools, robotic process automation and machine learning there will be a significant increase in performance. Since artificial intelligence strategies has the most significant effect on performance, the study recommends that managers of commercial banks and other firms should consider artificial intelligence as an important aspect of strategic innovations to improve performance. There is a need for effective adoption of artificial intelligence such as robotic process automation, machine learning and artificial intelligence tools to improve performance.

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