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The Use of Artificial Intelligence for Business Optimization in Banking: The Case of Nigeria

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Aim of Study

This study explored how commercial banks in Nigeria use AI technologies for business optimization, focusing on customer retention and satisfaction. It addressed the growing implementation of AI in Nigerian commercial banks and the need to understand its practical implications.

Research Questions

How do commercial banks in Nigeria use AI technologies for business optimization?

Sub-questions:

- What motivates Nigerian commercial banks to use AI technologies?
- What AI technologies do Nigerian commercial banks use for business optimization?

Research Problem

This study focused on the use of AI technologies in organizations, specifically from a developing country context. Nigeria is ranked the second highest among African countries where organizations utilize AI (Jaldi, 2023). Nigerian banks increasingly adopt AI for data analysis, customer behavior prediction, and business intelligence (BI) to improve customer satisfaction and retention (Borokini et al., 2023; Ukpong, 2022). However, not all banks currently use AI, resulting in a gap in knowledge regarding its practical application for customer retention and satisfaction (Desai et al., 2021; Neumann et al., 2022).

This research identifies how Nigerian commercial banks leverage AI to analyze customer data, implement predictive analytics, and enhance the customer experience.

Methodology and Theoretical Framing

This study followed an interpretive, abductive approach and adopted a qualitative research design using a multiple-case study method. It employed a relativist ontology and a constructivist epistemology. Organizational Information Processing Theory (OIPT) served as the theoretical framework (Premkumar et al., 2005). The research explored AI use in Nigerian commercial banks by focusing on the alignment of information processing capabilities and information processing needs. Three banks were selected from nineteen commercial banks for the case studies. The target population comprised data professionals who served as subject matter experts. A purposive sampling technique was used to select the most experienced data professionals. Data was collected through semi-structured interviews conducted over a cross-sectional timeframe and analyzed using thematic analysis.

Results

Findings revealed that the growth of structured and unstructured customer data and evolving customer needs motivated Nigerian commercial banks to adopt AI technologies. These banks used machine learning (ML) algorithms to support customer retention and satisfaction as part of their business optimization strategies.

However, deep learning (DL) models were not employed due to limited computational resources and insufficient model accuracy for production deployment. AI technologies such as sentiment intensity analyzers, logistic regression, k-means clustering, Naïve Bayes, k-nearest neighbor, and recommendation engines were used for tasks such as sentiment analysis, customer segmentation, churn prediction, loan credibility assessment, and product recommendation (Hassanien et al., 2023; Kanan et al., 2023; Nwanakwaugwu et al., 2023).

Data professionals used various procedures to determine the most appropriate model for specific tasks. The choice of model was often influenced by the nature of the problem and the domain expertise of the data scientist. After model selection, data professionals followed defined steps to analyze customer data and evaluate model performance in relation to the problem identified.

Contributions of the Study

This study extends existing research on AI usage in financial institutions by offering empirical insights into how Nigerian commercial banks implement AI for business optimization. Key contributions include:

- Confirming the role of AI in enhancing customer satisfaction and retention in commercial banks.
- Refining the OIPT theory into the Nigerian commercial bank Information Processing View. The Nigerian commercial bank Information Processing View is an expanded version of the OIPT theory that reflects the specific information processing needs and capabilities of Nigerian commercial banks. This refined version incorporates AI and BI technology awareness, the skills of data professionals, and the specific AI tools used in BI departments. It also offers insights into customer needs, data analysis processes, and technologies used in Nigerian banks.
- Providing practical guidance for other banks in low- and middle-income countries that are considering AI adoption but lack a clear understanding of its application. This includes details on specific information processing needs (e.g., customer and data requirements) and capabilities employed in Nigerian banks.
- Addressing a gap in literature by offering a detailed explanation of how AI is used in the banking sector, rather than simply listing the technologies employed.

More Information

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More information about the thesis:
https://drive.google.com/file/d/1SrXBnWnzpSkUlKWXUSWieZUNSKTR9COe/view?usp=sharing

Declaration of AI

During the preparation of this work, the author used ChatGPT to help summarize the thesis. The chatbot output was cross-checked and rewritten to ensure accuracy.

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