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SOCIAL AND BEHAVIORAL SCIENCES. Economics

REVIEW ARTICLE

Technology Factors Required for Adopting Cloud-Based Big Data Analytics in South African Banking

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A – Study design;
B – Data collection;
C – Statistical analysis;
D – Data interpretation;
E – Manuscript preparation;
F – Literature search;
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Abstract

Background and Aim of Study: *South African banks are generally known for early technology adoption. While this is so, there is a need to integrate some of the fourth industrial revolution technologies such as big data analytics and cloud computing collectively referred to as cloud-based big data analytics; and subsequently consider technology related aspects required for adopting integrated technologies of this nature. The aim of the study is to identify technology related factors that are necessary for adopting cloud-based big data analytics in South African banking.*

Material and Methods: *A qualitative research approach was followed as well as an interpretivism paradigm and a single case study research strategy. Semi-structured interviews were employed for data collection from eleven professionals in the Information Technology division of a South African bank.*

Results: *In total, 35 technology factors required for adopting cloud-based big data analytics were identified in this study and furthermore categorized into; internal cloud-based big data analytics criteria, cloud-based big data analytics capabilities or skills, cloud-based big data analytics data integrity levels, data security and readiness for adopting cloud-based big data analytics and cloud-based big data analytics external criteria.*

Conclusions: *The results of this study could imply that the adoption of cloud-based big data analytics in the banking sector takes into consideration an outsourcing model or setting. In this structure, technology factors are not only specific to the bank concerned. The banking sector has its own technology requirements that banks are expected to adhere to or take into consideration, while some technology factors could only be addressed by the cloud-based big data analytics service providers. The identified factors could be used in the conceptualization of a cloud-based big data analytics framework in future research.*

Keywords: *cloud-based big data analytics, technology adoption, cloud computing, banking innovation, data as a service.*

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Introduction

South African banking organizations have been in the forefront of technology adoption. Today, computing advancements have introduced Fourth Industrial Revolution (4IR) technologies in the banking sector such as big data analytics (Ajibade & Mutula, 2020), machine learning, artificial intelligence, blockchain (Melnyk & Pypenko, 2020; 2024; Paramesha et al., 2024) and cloud computing (Adwan & Alsaeed, 2022) among others.

This paper focuses on the integration of big data analytics (BDA) and cloud computing, termed cloud-based big data analytics (CBBDA). It is important that these technologies are well defined, to provide a theoretical background of CBBDA.

Cloud computing offers a model facilitating convenient, on-demand network access to a customizable pool of computing resources (Mell et al., 2009). Cloud computing technology does not only provide storage but also offers processing speed for the analysis of big data (Lutfi et al., 2022).

However, there are still concerns around data protection, privacy, and governance around storing data in the cloud managed by other organizations providing the cloud service. There are, however, ways to ensure that data is safe and adequately protected in the cloud, which is not covered in this paper.

Big data analytics entails the analysis and processing of both structured and unstructured data, which are large in volume and, therefore, require the application of technologies, techniques, and algorithms that enable the extraction of insights from big data and scalability (Nkatekho, 2024). Big data analytics needs high-performance processors to effectively deliver the outcome for computing data mining algorithms (Stergiou et al., 2018). BDA and cloud computing combination propose operative results that produce valuable insights in reduced time.

The relationship between big data analytics and cloud computing is that big data analytics needs high-performance processors to effectively deliver the outcome for computing data mining algorithms (Stergiou et al., 2018). BDA and cloud computing combination propose operative results that produce valuable insights in reduced time.

CBBDA is a service model through which BDA processes are hosted by either a private or public cloud (Talia, 2013). BDA therefore requires scalable storage to cater for the growing data and high process power to run the complex analytical tasks within acceptable timelines. Infrastructure is shared among numerous clients, supports applications, activities, and processes in a timely and cost-effective manner (Berisha & Meziu, 2021).

According to Khan et al. (2018), CBBDA – also called Data-as-a-Service (DaaS) – is a model, in which data is readily accessible through a cloud platform. In other words, DaaS is a new approach of retrieving important business data within a current data centre also referred to as CBBDA. DaaS could also be viewed as a service, in which files are made available to users over a network (Internet). In their study Khan et al. (2018) illustrates the use of cloud computing for large data analytics by implementing MapReduce.

MapReduce or Hadoop model is widely favored for processing data across computer clusters, and Hadoop is essentially an open-source iteration of the MapReduce framework, originally intended as a distributed file system. Various cloud-based frameworks are available for BDA, such as Spark, Hadoop, Twister, and Hadoop Reduce, in addition to MapReduce. Cloud computing is employed to carry out BDA, and the frameworks are utilized to store data of any configuration (Khan et al., 2018).

CBBDA, as outlined by Zhao (2024), utilizes cloud computing infrastructure to efficiently analyze and process large volumes of data. It uses multi-core processors and advanced scheduling methods for the optimization of data processing tasks and develops a core structure analysis model for data fusion and acquisition, particularly in real-time operating system (RTOS) environments.

There are several CBBDA platforms such as Cloud-Based Big Data Mining and Analyzing Services Platform that are integrated due to the fact that it combines cloud-based big data mining and services for analyzing data. Particularly, the R language is integrated in this platform to provide services for advanced data analysis (Tsai et al., 2015).

Another CBBDA platform is Cloud-Based Big Data Analytics Software, a study by Romero and Navarro (2022) investigated the type of CBBDA software installed by firms when cloud-based packages became available. The study found that SAP-adopters had a competitive advantage manifested through productivity, particularly in technology, when CBBDA software was introduced.

A study by Khan et al. (2018) highlighted the importance of a CBBDA platform that supports various sectors including retail, security, energy, as well as financial services, among other sectors. This platform provides the necessary storage space, processing power, and intelligent analytics capacity to meet the data analysis requirements of these sectors.

Cloud-Based Big Data Analytics-as-a-Service (BDAaaS) is another CBBDA platform that utilizes cloud computing infrastructure to perform high-performance distributed computing for advanced analytics in healthcare and other industries (Romero & Navarro, 2022). Snowflakes are prominent for their availability, unique shared-data architecture and elasticity for efficient data processing and analytics (Dageville et al., 2016). Databricks on the other hand provide a collaborative platform that integrates with Apache Spark for big data analytics purposes. Data specialists such as data scientists, data engineers and machine learning experts can easily collaborate and perform machine learning tasks in the cloud. This provides sophisticated and advanced analytics solutions (Khan et al., 2017).

While CBBDA is a combination of BDA and cloud computing, there is a need to distinguish BDA and CBBDA. With regards to BDA, the organization has full control and does not have to worry about compliance and security. The cost of having a BDA on premises is quite high and there are a lot of configurations that must take place. While in CBBDA there is a concern about security and compliance in terms of the Protection of Personal Information and other government compliance needs, as it is hosted on the cloud that the organization does not fully control. There is less configuration, support, and maintenance that must be done as the cloud provider fully supports it. In addition to that, it is affordable, flexible, and easily scalable (Ajimoko, 2018).

Organizations globally spent billions of dollars ($187 billion to be precise) on BDA in 2019, with close to 92% of companies investing in big data related initiatives from the year 2019 onwards (Lutfi et al., 2022). The problem is that South African banking sector is expected to keep abreast with latest technologies, yet adopting integrated fourth industrial revolution technologies can be challenging, as there is a need to ensure that technology related issues are addressed for seamless transition, adoption and implementation. While studies such as Berisha and Meziu (2021) have identified factors and issues that are related to big data analytics and cloud computing, research on technology factors, especially in the context of South African banking institutions, remains limited. It is worth noting that every industry has its own technology structure (Ghouri et al., 2021; Grassi et al., 2022).

The aim of the study. To identify the technology-related factors necessary for the adoption of cloud-based big data analytics in a South African banking institution.

Materials and Methods

This study followed an interpretivism paradigm that enabled the researchers to embark on an inductive research process required to identify the technology-related factors required for the adoption of CBBDA in South African financial institutions. Goldkhul (2012) suggests that interpretivism entails conducting research with people, rather than with inanimate objects.

This study took a single case study of the South African bank that provides financial services to the middle- and low-income markets. According to Saunders et al. (2019), a research strategy is the method that researchers use to answer their main research question. The research strategy is founded on research questions and objectives, existing information on the subject to be investigated.

Additionally, interview questions were aimed to collect data from which technology factors for the adoption of CBBDA in the selected bank were identified. Purposive sampling was employed to identify and recruit eleven IT professionals and a set defined criteria related to the goal of this study (years of experience working in South African financial institutions, active involvement in decision-making processes related to adopting new technology projects, and a strong academic and business background in the Information Technology (IT) sector). Moreover, developing a single case study sampling strategy requires principled decisions about the persons to be interviewed, events or processes to be observed, and the time frame and settings in which data would be collected. Sampling in a single case study also requires linking whom or what is being investigated with the research questions being investigated such that unbiased sampling is achieved (Robson, 1993). Research ethics applications, approvals and requirements were approved and adhered to in this study.

Results

The study intended to identify and describe technology factors necessary for the adoption of CBBDA in a typical South African bank. First, the researchers familiarized themselves with the data, initiated the coding framework based on the CBBDA adoption framework proposed by Ajimoko (2018), this was followed by the identification of the factors from the interview responses, categories and corresponding interpretation and contextualization of results within the context of this study.

Participants narrowed down on their understanding of their understanding of CBBDA concept within the technological context. The tables in this section present the analysis of data in line with the goal of the study. The first column shows the objective of the interview question posed to the participants, the second column shows interview extracts, and the third and last column shows the researcher's comments.

The results presented in this section are organised according to the technology factors identified:

- Section 1 Internal technology criteria.
- Section 2 Organisational CBBDA technology capabilities or skills.
- Section 3 Factors related to acceptable levels of data integrity.
- Section 4 Data security and being it's readiness for CBBDA.
- Section 5 External technology adoption criteria.

Internal Cloud-Based Big Data Analytics Adoption Criteria

The first theme identified from the data analysis concerned internal technology adoption criteria derived from responses from six IT professionals as presented in Table 1.

According to the participants' responses, a thorough evaluation of various technological criteria for the CBBDA adoption should be taken into consideration.

Stability is a key consideration as it enforces reliability and consistency of the CBBDA system in handling large financial datasets.

Table 1
Internal Cloud-Based Big Data Analytics Adoption Criteria

What the researcher wanted to know	Examples of extract (s) from a supporting case(s)	Researchers' analysis / comments
Internal technology adoption criteria that motivate the organisation to adopt Cloud-based big data analytics services	"…from an Internal measure one of the most important aspects to adopt CBBDA, is for stability and storage. As it can get very expensive and hard to manage internal storage infrastructure." "Ability to integrate with other existing services the business has. The ease of use of the technology along with learning. The cost of technology is also taken into consideration. But the key one is business value in terms of usefulness." "…The ease of integration as well as the greatest benefit at the least cost is one of the criteria being used. The reusability of the solution as well as ease of customisation rate highly in the decision to select the CBBDA services..." "Yes, financial institutes have an influence in how vendors build their cloud-based systems in terms of what laws need to be considered before creating a service that would be considered by financial institutes. There's also a need for service providers to maintain a good reputation". "… Banks within South Africa realised that data could drive the business decision better, because some banks are international and also operates in UK, Australia and in South Africa they adopted a lot of international stands to drive decision making using data. Our organisation went into research mode for the best tools that can be used, and when they bought Microsoft Azure Suite that was a stand across each unit. Power BI within the Azure Infrastructures is now used to drive data within the bank…" "… The need for intelligence driven solutions."	Participants outlined the following internal criteria for CBBDA adoption: - Stability. - Storage. - Ease of integration. - Reusability of the solution. - Ease of customisation. - Vendor support models. - Interaction of CBBDA with existing services. - CBBDA ease of use. - Learning new technology. - Need for intelligent driven systems. - Institutional financial laws for IT systems. - Cloud based infrastructure to support CBBDA. - Cost. - CBBDA business value. - CBBDA benchmarks.

Storage capabilities should be prioritized, especially in the banking sector where financial big data is forever growing exponentially from banking transactions and corresponding infrastructural issues. Thus, capabilities ought to be customized particularly for CBBDA systems and the requirements in the banking sector.

Concerning CBBDA solutions, they ought to be reusable, scalable and flexible enough to accommodate various data needs as they arise. Vendors that provide CBBDA services are expected to ensure that models for supporting the banking sector and banks are in place such that reliable CBBDA support is provided accordingly in line with the needs and requirements of the bank concerned.

The interaction of CBBDA with existing services should be smooth and non-disruptive, promoting ease in the integration process. User-friendliness, ease of use and learning curves for new technologies are criteria for CBBDA adoption.

Intelligent-driven systems were noted in the responses as being important for data-driven decision-making in the South African banking sector.

Interview responses also highlighted the importance of compliance with institutional financial laws for IT systems, highlighting compatibility of cloud-based infrastructure to support CBBDA within the South African banking sector. Banking technological systems operate within an organizational setting, thus institutional financial laws should be considered for compliance, compatibility with CBBDA solutions. In this way, IT and business-related expectations and governance requirements in the South African banking sector could be met.

A notable aspect in the responses was on the emphasis of technology investments which are dependent on the costs of an organisations. Even within the banking sector, cost considerations cannot be overlooked. These cater for adoption of CBBDA, its implementation in various divisions of the bank as well as operational expenses. Akin to the CBBDA cost related issues is the CBBDA business value and benchmarks that could help banks to measure the overall performance, impact and performance of CBBDA solutions in meeting organisational goals.

The findings reveal that the South African banking sector places emphasis on ensuring that CBBDA meets their requirements and was a perfect fit with what IT professionals hoped to accomplish. This is in accordance with Ajimoko (2018), who mentioned that organisations must be certain that their potential innovations, alignment and fit of both technology and organisation before adoption cannot be overlooked.

Organisational Cloud-Based Big Data Analytics Technology Skills or Capabilities

The second theme focuses on CBBDA skills or capabilities. This theme was consistent among four participants; and the corresponding extracts are presented in Table 2.

Table 2
Organisational Cloud-Based Big Data Analytics Technology Skills or Capabilities

What the researcher wanted to know	Examples of extract (s) from a supporting case(s)	Researchers' analysis / comments
Participants view on their organisation's technological / skills capabilities required to deliver value from Cloud-based big data analytics	"The capabilities required from our organisation is definitely to get the correct resources with the right skills so that we can get the best value from this journey." "Shortage of skill to handle the different facets of Cloud based big data analytics. However, the company is currently working on that and some of us are looking into courses to learn." "Our organisation has been actively recruiting of data specialist with the necessary experience and knowledge." " Financial institutions are currently the drivers of Cloud based big data analytics because of them having to essentially play the "gate keeper" role to make sure that they are ahead of the curve when it comes to data driven analytics."	Participants view on their organisation's technological / skills capabilities required to deliver value from Cloud-based big data analytics. Participants outlined the following technological skills or capabilities required to deliver value from CBBDA: - Skills to acquire correct resources. - Upskilling. - Recruitment. - Maintain technology leadership role.

Shortage of skills and resources within the organisation to handle various aspects of CBBDA have been flagged as a major drawback. Even though this is the case, the organisation is currently trying to recruit people with appropriate skills.
Financial institutions also aim to maintain technology leadership roles.

Data Integrity Acceptable Level
The third thing pertains to factors influencing data integrity acceptable level in a cloud based big data analytics environment within the banking sector. The responses highlight big data characteristics that require attention for cloud based big data analytics adoption interview extracts from four participants from which the theme was derived are presented in Table 3.

Table 3
Factors Influencing Data Integrity Acceptable Level

What the researcher wanted to know	Examples of extract (s) from a supporting case(s)	Researchers' analysis / comments
Factors influencing data integrity acceptable level	"As this is still very new in our organisation, we are still in phase of defining the correct data integrity technology or standards." "With financial institution needing to comply against regulatory laws such as POPPIA and all other requirements by the regulators, the usage of data needs to follow strict rules irrespective of usage. This includes analysis of the data for any purpose as they are still required to abide by any regulatory standards." "… Data integrity will be the same as the initially before moving to the cloud, work will be required on how to make keep the client's information safe outside organisation on prem servers and now within AWS/Azure services…" "… Accuracy and verifiability are key…"	Participants highlighted the following factors that could influence data integrity acceptable level in the financial institution: - Data integrity standards. - POPI Act. - Data consistency. - Accuracy. - Verifiability.

The interview responses highlight the necessity of high levels of data integrity for banks to be able to outline principles and practices for accurate and reliable use of data and financial information following the use of CBBDA solutions in the financial institution for trust and compliance purposes.
Within the South African context, the Protection of Personal Information Act (POPIA) is one of the regulatory frameworks that banks should adhere to protect customer data and maintaining its integrity. Moreover, banks provide their service to different categories of customers and account holders whose data should be protected.

In addition to data protection is data consistency centred around uniformity of data across different data sources. Accuracy is another data related characteristic or criterion that requires meticulous validation for the elimination of errors and discrepancies in financial data. Furthermore, this data also needs to be verifiable allowing stakeholders and customers in particular to authenticate the accuracy of financial data through audit trials and validation mechanisms.
Based on this analysis, these factors could instil stakeholder confidence and ensure compliance with legal and standards in the financial sector.

Data Security and the Bank's Readiness to Adopt Cloud-Based Big Data Analytics

The fourth theme is based on the notion that big data should be secured and migration to the cloud should be well thought of. Corresponding interview extracts from are presented in Table 4.

Table 4

Data Security and Readiness for Cloud-Based Big Data Analytics

What the researcher wanted to know	Examples of extract (s) from a supporting case(s)	Researchers' analysis / comments
Organisational position in terms of data security and their readiness for Cloud-based big data analytics	"… a lot has been done in terms of security for this. But as it also still relatively new for us, there are still a lot that needs to be researched and explored to get this correct..." "… Security for client information is mostly pushed by regulators, and it keeps financial institutes honest. Application of big data within the organisations is a learning curve on the organisation as they need to learn the best way to use the client's data to drive business decisions and products that suits the client…" "…The organisation is absolutely ready for cloud-based data analytics as data security has increased in leaps and bounds over the past few years as a result of people needing to work remotely and the financial sector therefore made sure that they are not vulnerable to customer data that is being accessed by hackers who are not a part of the organisation…"	Regarding security measures, the organisation has undertaken significant efforts and implemented upgrades; nonetheless, there remains potential for further enhancement. Other data security and readiness issues include: - Data security benchmarks. - Regulator's requirements.

In accordance with the interview responses, there is a need for considering data security benchmarks, as well as ongoing security upgrades for protecting sensitive financial information. This is fundamentally crucial considering the busy nature of the banking sector as well as the systems used to provide services.

Similarly, regular upgrades to security measures are necessary in banks in order to adapt to being proactive as far as cybersecurity is concerned.

These proactive efforts such as adopting the latest security technologies and enhancing protocols, ensure resilience of CBBDA systems in cases of potential cybersecurity risks. This could subsequently ensure safe financial data analysis when CBBDA is adopted.

External Cloud-Based Big Data Analytics Adoption Criteria

The fifth theme encompasses technology adoption criteria external to the bank. Thus, cloud based big data analytics adoption could be influenced by external drivers that are eminent in the banking sector. These criteria could cater for national and global business enabling the banks to consider all the stakeholders involved in cloud based big data analytics adoption. Table 5 presents the evidence of the data collected from five IT professionals.

Table 5

External Cloud-Based Big Data Analytics Adoption Criteria

What the researcher wanted to know	Examples of extract (s) from a supporting case(s)	Researchers' analysis / comments
External technology adoption criteria that motivate the organisation to adopt Cloud-based big data analytics	" …From external criteria I believe scalability is one of the most important reasons for CBBDA adaption and the pressure keeping up with technological trends to remain relevant in the market and be one of the most innovative organisations..." "… Word of mouth and reliability, business owners across the country within the same sectors they communicate and knowing that the tool works for one organisation others will follow based on those factors…" "…From my years of experience pressure of competition and compatibility appeared to be of significant influence for financial institution to adopt CBBDA…" "With financial institution needing to comply against regulatory laws such as POPIA and all other requirements by the regulators, the usage of data needs to follow strict rules irrespective of usage. This includes analysis of the data for any purpose as they are still required to abide by any regulatory standards." "… Staying within the regulator's requirements and the cost of on-premises services compared to cloud-based services. Cloud based services can scale, and allow you to do more when required as you can scale up or down depending on the data requirements…"	The following external technology factors were outlined in the participants' responses: - Innovations. - Introduction of new technologies. - Scalability. - Marketing of CBBDA by other financial institutions. - Reliability of CBBDA solutions. - Competition. - Compatibility. - POPIA considerations. - Regulator's requirements.

Various external technology criteria were identified from the responses. Innovations is an unavoidable criteria that could help banks to take advantage of technologies that could help them to be and strategy-oriented and competitive.

With innovation comes the introduction of new technologies that could significantly have an impact on the adoption of CBBDA. Thus, banks are compelled to adopt CBBDA tools for the improvement of their analytical capabilities.

Scalability as a technological criterion is concerned with the banks' ability to adapt and adjust accordingly as the data volumes and business needs change.

Insights pertaining to CBBDA success and best practice in other banks is an external technology criteria that could in tandem influence CBBDA adoption in other banks.

The reliability of CBBDA solutions is another criterion identified from the responses for sustained performance and accurate data analytics.

Banks are competitive in nature and could thus consider compatibility with existing systems. It is worth noting that compliance seems to be an internal and external factor that cuts across various divisions and perspectives of the bank.

Discussion

Internal Cloud-Based Big Data Analytics Criteria

This theme summaries the adoption of CBBDA that is reliant of internal technological factors, such as system stability, efficient storage solutions, seamless integration, and customization to fit various organizational needs. It emphasizes the role of vendor support, user-friendly interfaces, and the necessity of keeping up with new technology; as well as the need for banks to comply with financial regulations, adherence to cost-efficient mechanisms, and developing a strong cloud infrastructure.

Literature suggests that building a detailed framework for Big Data-as-a-Service involves tailoring technology stacks to match specific data and computing needs, enhancing customization in BDA solutions while addressing storage and processing needs to achieve optimal business value (Khan et al., 2017; 2018).

Cloud-Based Big Data Analytics Capabilities

This technology related theme focuses on CBBDA adoption that depends on IT skill management. These are not general IT skills but those concerned with accurate resource utilization. However, there is a need for upskilling existing teams and strategically recruiting individuals with specialized knowledge in CBBDA. Another aspect that is of utmost importance in the banking sector is maintaining a technology leadership role by ensuring a workforce with CBBDA skills.

Integrating institution systems such as ERP Platforms with CBBDA focuses enable a synthesis of CBBDA capabilities (Romero & Navarro, 2022).

Data Integrity

This theme highlights core principles of CBBDA related data governance and compliance with emphasis on rigorous adherence to data integrity standards that are in place. It specifically highlights issues pertaining to precision, uniformity, and adherence to regulations, which are key to the South African banking sector. The theme also brings to light the importance of data consistency for reliability and precision in CBBDA processes.

Literature also promotes availability and reliability of CBBDA platforms as it is important for uninterrupted operations and data-driven decision-making (Valmohammadi & Varaee, 2022).

Data Security and Bank's Readiness for Cloud-Based Big Data Analytics Adoption

This theme focuses on data security as one of the factors required by South African banking sector for the creation of a secure and compliant environment to protect valuable financial data assets.

This is a technological factor that is not only current and relevant but also revolves around establishing a robust and secure data ecosystem with stringent data security benchmarks specific to industry standards are also necessary for the adoption of CBBDA and aligning CBBDA operations with mandates set forth by relevant authorities in the banking sector. Developing and employing a proactive cybersecurity strategy or approach is also a factor that is necessary for the adoption of CBBDA in the South African banking sector, particularly due to the sensitivity of financial data.

Supporting literature by Edu et al. (2021) stress the importance of integrating CBBDA in banks, however, security and integrity of confidential financial data within the cloud environment ought to be prioritized.

Cloud-Based Big Data Analytics External Criteria

This theme revolves around external technological criteria required for the adoption of CBBDA in the South African banking sector, through a combination of innovation, scalability, and technological evolution.

The pursuit of innovations and strategic integration of new technologies also accommodate analytical capabilities that require CBBDA solutions. In this strategic and innovation consideration, reliability and particularly scalability seem to be a key requirement as far as the adoption of CBBDA is concerned. Furthermore, the importance of collaborations and shared insights within the IT industry create a platform for CBBDA marketing within the banking sector. Compatibility with industry standards becomes crucial in shaping a proactive and compliant CBBDA solution for the banking sector.

Supporting literature by Giebe et al. (2019) reinforces CBBDA external criteria by recognizing big data analytics as a sustainable tool necessary for the promotion of customer loyalty and delivering customer-centric services in the banking and finance sector.

Conclusions

Big data analytics are computing and CBBDA were introduced as well as existing literature related to the study particularly highlighting extent research findings CBBDA platforms followed by the gap addressed in this study. The qualitative methods employed were discussed, explaining how participants were selected in the South African bank, a research strategy and data collection

instrument employed to carry out this study. The results of this study could be contextualized in such a way that we can banks or any typical bank in a developing country considering the adoption of CBBDA based on internal technology criteria, external technology criteria, prioritisation of data characteristics such as integrity and security, while the required CBBDA capabilities are in the process of being improved, the overall readiness of CBBDA should be thoroughly assessed.

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Ethical Approval

This study obtained ethics approval from the Tshwane University of Technology. Ethical clearance was granted under the number: FCRE/ICT/2021/03/003.

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