



CLOUD COMPUTING ADOPTION CHALLENGES AND SOLUTIONS IN KENYA

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Abstract

The idea of insurance was discovered several millennia before Christ (BC). In the second and third millennia BC, traders from China and Babylonia practiced shifting or dispersing risks. Today, insurance is the foundation of the economy, but expanding its penetration is difficult in emerging nations. The fourth insurance industry revolution in the developed world was sparked by the recent advent of IoT, Big Data, and Insurtech. To boost insurance coverage in Kenya, this study examines the problems with and potential solutions to cloud computing. To identify the themes and factors pertaining to problems and solutions in implementing cloud computing in Kenya insurance business, this study used a systematic literature review. To find pertinent material from Google Scholar, a number of keywords were employed. The filtered studies were examined based on inclusion and exclusion standards. This article outlined many obstacles to InsurTech adoption in the Kenya insurance sector as well as potential remedies. The proposals could help policymakers improve the insurance industry service delivery.

Keywords

Cloud Computing, Insurance Industry,
Digital Technologies, Kenya



1. Introduction

Cloud computing is seen as a potential platform that can drive and accelerate innovation in Kenya across various industry sectors including insurance. However, there is a lack of awareness and trust in cloud-based systems, which hinders their adoption in the insurance sector of Kenya. This study fills gap by exploring the challenges along with solutions in

adoption of cloud-computing in Kenya's insurance sector by using SLR methodology. Cloud Computing allows companies to access ICT-based services i.e. computer infrastructure, applications, platforms and business processes, via the internet. Cloud Computing is still in the infancy stage in Africa. Studies have indicated a lack of cloud-based

awareness, even among big organizations in Africa. Kenya just like any other African market is yet to fully adopt cloud-based systems due to trust and security concerns. The transmission of on-demand computer resources through the internet on a pay-per-use basis is referred to as cloud computing (CC) or cloud. Instead of relying on individual devices or local servers to handle applications, CC makes use of shared computing resources. The term "cloud computing" may be used to refer to both the kind of platform and application. It provides, configures, and reconfigures servers as a platform. The servers may be virtual or actual computers. On the other hand, cloud computing refers to software that is extended to be available via the internet, and for this, web applications and web services are hosted on powerful servers in huge data centers. The phrase "cloud" is frequently used as a synonym for "the internet." As a result, "cloud computing" is a sort of internet-based computing in which various services, including storage, servers, and applications, are supplied to the computers and other devices used by a business over the internet (Foster, Zhao, Raicu, & Lu, 2009). Experts note that Cloud Computing might actually be ideal for Africa, which is characterized by little traditional internet infrastructure, unreliable electricity grids in many areas, and an ongoing boom in business and development. A major hurdle to cloud computing adoption in Africa has been the lack of knowledge about its benefits. Many countries in Africa are in the process of building data centers capable of delivering cloud services. Kenya's financial systems including insurance sector are relatively well developed and diversified. However, major structural impediments prevent it from

reaching its full potential (Mwangi, 2012). A well-developed financial system widens access to external finance and channels resources to the sectors that need them most (Nicoletti, 2013). Cybercrime in the financial systems and services sector, diverse product lines, and mobile banking system solutions open up financial services organisations to increased cybercrime, unless they implement appropriate controls to safeguard customers and improve information security (Gathungu, 2012). Financial systems are now embracing the cloud approach in Kenya and outsource some of the non-core services (Mwangi, 2012). Kenya is slowly developing as an ICT region of interest. Insurance companies that had adopted cloud computing services in productivity applications, business application development platforms, infrastructure on-demand, databases and desktop. The study revealed that most insurance companies used or expected to use cloud computing service applications, the services offered the companies with unmatched flexibility in terms of usage policies and scalability. Data storage is one of the major resources that insurance companies have moved to the cloud. With data storage on the cloud, the companies would pay for the volume of space consumed. Core software applications have not been adopted due to security concerns and lack of technology. Those interviewed feel that financial institutions, i.e. banks and insurance companies, are always a security threat and hackers will always try to penetrate the networks. Most feel that they will eventually go cloudy as the world is now moving towards that area. It was noted in the study that using cloud computing services led to the ability to work

form anywhere and from multiple devices hence, resulting in innovative work cultures in the insurance companies. The use of various platforms in cloud computing services enabled the insurance companies to turn ideas into innovations faster. With SaaS, the insurance companies reported that it was easy for the companies to streamline their maintenance and support, this was so because everything was managed by vendors: application, runtime, data, middleware, SAAS, virtualization, serves storage and networking. Respondents showed that standardization influences that rate of adoption, there were no clear standards set in the whole industry of insurance companies therefore, the rate of adoption was low (Akhusama, 2015). The potential of Cloud Computing in transforming the operations of universities in Kenya, both public and private, has been explored, but concerns about cloud insecurity and lack of awareness remain challenges (Muli & Kimuai, 2015). Recommendations for addressing these concerns include role-based training for Cloud services users, proactive management of Cloud services, and implementation of information systems governance policies. Overall, Cloud Computing has the potential to offer numerous benefits such as cost-effectiveness, resource efficiency, disaster recovery, business continuity, and data consolidation in Kenya. Several studies have highlighted the low level of cloud computing adoption among banks, SMEs, and insurance companies in Kenya (Odhiambo *et al.*, 2022). These studies emphasize the need for addressing factors such as data security, organizational culture, supplier lock-in, and

regulatory policies to fully embrace cloud computing in the finance sector (Evbuomwan & Omwansa, 2017).

2. Literature Review

Cloud computing adoption challenges in Kenya include data security concerns, organizational culture, supplier lock-in, regulatory policies, information generation, processing and dissemination barriers, capital constraints, technological readiness, service quality, expert scarcity, top management support, firm size, perceived usefulness, perceived ease of use, and social influence. Solutions to these challenges involve developing relevant guidelines for handling customer data within the cloud computing environment, creating a framework to support cloud computing adoption by SMEs, understanding factors affecting cloud adoption in the healthcare sector, addressing cloud security challenges faced by SMEs, and implementing role-based training, proactive management, and information systems governance policies in educational institutions (Ajowi & Reuben, 2019). The author took out the following data from the involved papers: author name, year of publication, country of publication, publication type and findings. Consequently, a narrative synthesis of the derived information was attained. Table 1 denotes to included literature like articles, conferences or books along with methodology and year. Table 2 denotes challenges and solutions derived after reviewing the selected studies.

Table 1: Characteristics of reviewed cloud computing adoption studies in Kenya insurance sector

No.	Journal name/ Conference Name	Paper topic/ Conference paper Name	Method ology	Year	Author
1	International Journal of Business and Social Science	Challenges of Cloud Computing in Business: Towards New Organizational Competencies	Exploratory	2014	(John, 2014)
2	Industrial Management & Data Systems,	Understanding the determinants of cloud computing adoption		2020	(Low <i>et al.</i> , 2011)
3	International Journal of Information Management	Cloud computing research: A review of research themes, frameworks, methods and future research directions.		2018	(Senyo <i>et al.</i> , 2018)
4	Technologies in the Small and Medium Sized Industries in Kenya	Exploring the Applicability and Challenges of implementing Industry 4.0.		2020	(Obadiah, 2020)
5	The African Journal of Information Systems	Adoption of Cloud Computing by Firms in Kenya: The Role of Institutional Pressures		2019	(Oredo <i>et al.</i> , 2019)
6	International Journal of Computer Applications Technology and Research.	Factors that affect cloud computing adoption by small and medium enterprises in Kenya		2013	(John, 2013)
7	International Academic Journal of Information Systems and Technology.	Factors influencing the adoption of cloud computing in software development companies in Kenya.		2018	(Samuel & Elisha, 2018)
8	University of Nairobi Research Archive	Adoption of cloud computing in Kenya by firms listed in the Nairobi stock exchange		2012	(Kituku, 2012)
9	International Journal of Scientific and Research Publications	Cloud Computing Adoption by Public Hospitals in Kenya: A Technological, Organizational and Behavioral Perspective		2020	(Billy <i>et al.</i> , 2020)
10	University of Nairobi Research Archive	Adoption of Cloud Services and Performance of Insurance Firms in Kenya.		2018	(Karanja, 2018)

Table 2: Cloud Computing adoption in Kenya Insurance Industry: Issues & Solutions

No. of Studies	Issues	Solutions
1	- Security and privacy - One cloud service provider lock-in - Non-compliance or ambiguity - Integration with the user business model architecture - Limited customizability, Cultural resistance - Organizational tech readiness, Fear of loss of data	- Regulatory rules on cloud data retention - IT teams must upgrade their cloud architectural, development, implementation, and operation capabilities to transition effectively. - Staff development programmes

2	• Safety and confidentiality in the cloud • The absence of any applicable laws, technical infrastructure	• Nil
3	• Standardization • Information confidentiality • Trust, Cloud protection	• Using a private cloud rather than a public cloud may help with cloud security. • Legislation can safeguard cloud users from issues of trust and privacy.
4	• Fiber optics, wi-fi, high-speed internet, and cellular network necessary. • Lack of awareness, Cloud-based solutions and analytics training • Cloud service availability & dependability • Infancy stage in Kenya • Cloud service availability & dependability • Absence of tools for integrating and componentizing cloud components • Vendor lock-in due to several service and infrastructure providers.	• Nil
5	• Moving to the cloud may alter the function of it departments. • Regulatory issues occur when cloud service providers and users share the same legal or regulatory jurisdiction. • Limited scope for customization • Public, private and hybrid clouds are not known to insurance companies.	• Nil
6	• Some are hesitant to accept owing to perceived acquisition and failure costs. • Top management is unwilling to invest in new technologies • Security issues • Top management influences technology adoption.	• Nil
7	• Workplace attitudes and behaviors that support the adoption of a new cloud computing service. • Integrating cloud services with current infrastructure is difficult. • Lack of skilled human resources • Privacy and security • Interruption of data control on third-party hardware	• Businesses must first examine the requirement of cloud computing, then its compatibility.
8	• Low bandwidth for real-time server contact • Negative attitude • Information leakage due to data segmentation, server or hard disc failures, or user data storage in the same data center • Change of cloud service provider is difficult due to pricing or dependability issues.	• Nil
9	• People educated in cloud computing • Security & privacy, Lack of budget	• Nil

	• Top management support, Attitude toward usability • Internet access, Security & privacy • Costly migration, Absence of SLA • Incompatibility with other vendors' clouds	• Nil
10		

3. Research Methodology

Literature review discussing the challenges and solutions in adopting InsurTech in Morocco are analyzed by using SLR methodology wherein keywords mentioned in table 3 are opted to search

relevant article meeting including and excluding criteria mentioned in table 4. Systematic literature review identifies, selects, and critically appraises research in order to answer a clearly formulated question (Dewey & Drahota, 2016).

Table 3: Keywords Selections

Technology	Inclusion criteria	Exclusion criteria	Keyword Selection
Cloud Computing	Literature and conference proceedings on cloud computing in the Kenya financial industry, particularly insurance. Past works have been available since 2012. Primary and secondary research.	Studies not in English Magazine, newspaper, thesis, article data. Studies in non-financial fields including education, manufacturing Large-scale data analytics and other technologies.	Papers publishing platforms such as Google scholar and emerald were opted as the exploring means for this review. Following blend of search, terms are applied: cloud computing* AND (health insurance* OR insurance sector*) AND (challenge* OR obstacle* OR issue* OR disadvantage* OR threat). The exploration was carried out between 2012 to 2020.

Table 4: Selection Criteria

Technology	Criteria	Kenya
InsurTech	Identification	16
	Screening	15 after removing 1 duplicate
	Eligibility	12 after removing 3 archives
	Included	10 after removing 2 full articles

4. Findings of The Included Studies

Many issues and solutions are derived from literature reviewed using systematic literature techniques. Issues and solutions are further categorized under sub-heading by using content analysis. Table 5 provides the challenges faced by the insurance industry, while some prominent solutions are pointed out in Table 6 derived after reviewing the repeating nature of challenges and solutions. The

first is privacy and security. Third-party services engaged in supplying infrastructures used to host vital data are affected by security and privacy (John, 2014). The second problem is moving cloud service providers if the current cloud service provider is unsatisfactory. Users with data with one cloud service provider are locked-in and unable to switch. System interoperability influences insurance firms' use of cloud platforms (John, 2014). The third issue

is regulatory uncertainty. Cloud service companies must comply with multiple national regulations, creating regulatory uncertainty. The fourth difficulty is the availability of tools and standards required for application integration and componentization (Oredo *et al.*, 2019). Fifth, consumers demand more flexibility in customizing cloud services to their own business needs which are limited offered by cloud service provider. Sixth, cultural resistance may influence the function of IT departments. The seventh issue is technical preparedness. Because present technology is functioning, top management is unwilling to invest in new technology. They are waiting and watching (John, 2013). The eighth issue is data governance. Customer data should be protected against misuse and abuse in the cloud. The ninth issue is IT infrastructure. Fiber optics, Wi-Fi, high-speed internet, and cellular networks are necessary for communication infrastructure (Obadiah, 2020). The tenth issue is ignorance. Public, private, and hybrid clouds are not known to insurance companies. Some are hesitant to embrace it owing to perceived costs of acquisition and failure (John, 2013). Eleventh, Kenya's slow cloud adoption. The twelfth problem is employee competency. Cloud migration requires updating IT teams' cloud design, development, implementation, and management capabilities. The employee's

functional, learning, and career capabilities may be maintained or improved via competence development programmers (John, 2014). The thirteen difficulty is an attitude toward usability. Positivity is necessary to create a new cloud computing service. Fourteen, loss of control over data stored on third-party hardware instead of own. Fifteen, data segregation of different users kept in same data center or server failure leads to information leaking (Kituku, 2012). Sixteen issue is a shortage of funds for cloud service provider fees. The last challenge relates to the absence of a service level agreement which should be signed to monitor the performance of a cloud service provider as per contract. Uncertainty about cloud service provider offerings is another issue that makes corporate operations tough. What causes company failure or client dissatisfaction? Companies must first examine the requirement of cloud computing, then its compatibility. Using a private cloud rather than a public cloud may help reduce cloud security risks. Legislation may safeguard cloud users from issues of trust and privacy. Workforce development programmers include all actions undertaken by the employer and employee to maintain or improve functional, learning, and career abilities (John, 2014).

Table 5: Cloud Computing Adoption Challenges in Kenya Insurance Industry

Privacy & Security Issues
locked in with one cloud service provider
Regulatory ambiguity
Integration with the user's business model architecture
Customization is limited
Cultural Resistance
Organizational tech readiness
Poor data management
IT infrastructure

Lack of awareness
Infancy stage in Kenya
Employee talent, experience, or knowledge
Utility or ease of usage
Control over data saved on third-party hardware
User data segregation in the same data center or server
Lack of budget
Absence of SLA

Table 6: Cloud Computing Adoption Solutions in Kenya Insurance Industry

Companies must first examine the requirement of cloud computing, then its compatibility
Using a private cloud rather than a public cloud may help reduce cloud security risks
Legislation may safeguard cloud users from issues of trust and privacy
Competency-based staff training

Conclusion

In conclusion, while cloud computing presents numerous opportunities for enhancing efficiency, scalability, and innovation in Kenya, its adoption is hindered by several challenges, including limited infrastructure, cyber-security concerns, lack of skilled personnel, regulatory uncertainties, and high initial costs. However, these challenges are not insurmountable. Strategic investments in digital infrastructure, capacity building through education and training, formulation of clear regulatory frameworks, and public-private partnerships can significantly accelerate cloud adoption. Additionally, fostering awareness among businesses and government institutions about the long-term benefits of cloud computing will be crucial. With a collaborative and forward-thinking approach, Kenya can overcome these barriers and harness the full potential of cloud computing to drive economic growth and digital transformation.

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