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Adoption of Blockchain and Cloud Computing in Morocco Insurance Sector: A SLR Approach

Maryam Saeed[1], **Noman Arshed**[2]

Abstract

This paper aims to investigate the challenges and prospects regarding adoption of Blockchain and Cloud Computing in the Moroccan Insurance Industry, in an Islamic country context, through a Systematic Literature Review (SLR). Several millennia prior to Christ, the concept of insurance was discovered (BC). Shifting or distributing risks was a tactic used by traders from Babylonia and China in the second and third millennia BC. Insurance is now the backbone of the economy, but increasing its ubiquity in developing countries is challenging. The recent emergence of IoT, Big Data, and InsurTech prompted the fourth insurance business revolution in the industrialized world. This study looks at the issues with Blockchain and Cloud Computing adoption and possible solutions to increase insurance coverage in Morocco. A PRISMA approach opt to find pertinent literature from Google Scholar or Emerald, by using number of keywords. The selected studies were evaluated against predefined inclusion and exclusion criteria. This analysis identified multiple barriers that hinder the adoption of Blockchain and Cloud Computing in Morocco's insurance industry, and it also highlighted potential mitigation strategies. The findings offer actionable insights that could assist policymakers in improving service delivery across the sector. Morocco's insurance sector faces Blockchain and Cloud adoption challenges, including security risks, infrastructure limitations, skill shortages, and regulatory gaps. Solutions focus on government support, collaboration, staff training, and secure, compliant technological implementation.

Keywords: InsurTech, Insurance Industry, Digital Technologies, Morocco, Blockchain, Cloud Computing.

Introduction

This study explores the challenges and prospects regarding adoption of Blockchain and Cloud Computing in the Moroccan Insurance Industry by a systematic review.

[1] University of Management and Technology, Lahore, Pakistan.
maryamsaeed566@gmail.com
[2] Sunway University, Kuala Lumpur, Malaysia. noumana@sunway.edu.my

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Blockchain has potential to transform the whole financial sector by eliminating the border and human agency to satisfy customer demands directly based on algorithm. It eliminates the need of inter-mediation in transactions of people. Cryptocurrency adoption is growing in Morocco as 9% of sample population claimed to have investment in it. Morocco banned this Bitcoin and cryptocurrency transactions since 2017. As of September 2020, cryptocurrencies are banned in nine countries. The list includes Algeria, Bolivia, Egypt, Iraq, Morocco, Nepal, Pakistan, the United Arab Emirates, and Vietnam. The terms blockchain, cryptocurrency, and bitcoin can be difficult to distinguish from one another and are occasionally used synonymously. The technology that powers cryptocurrency is called blockchain. Even though there are dozens of other cryptocurrencies, Bitcoin is the most widely used since it has the greatest market capital. It controls between 50 and 60 percent of the total market capital for cryptocurrencies (Wiesflecker, 2020).

Morocco is still in the early stages of its digital revolution, with paperless culture accompanying it. Maintaining global insurance sector changes while building a flexible regulatory architecture is difficult. Morocco has lengthy laws and regulations in every area. The Covid 19 had a negative impact on Morocco's digitization, but regulations are currently being implemented slowly.

According to FNACAM, the Moroccan insurance market holds the top position in the Arab world and ranks second in Africa. The industry generates 41 billion dirhams. For the regulation of insurance and reinsurance companies, insurance intermediaries, as well as social welfare organizations such as pension funds, social welfare mutuals, and entities managing Compulsory Health Insurance, ACAPS is the designated authority. It oversees insurance products, ensures compliance with legal standards and industry best practices, regulates business conduct, handles complaints and inquiries from policyholders and beneficiaries, and supports the promotion of an insurance culture. Due to fraud prevention and a conservative cultural attitude, most Moroccan customers still prefer traditional insurance methods. However, the number of individuals embracing and using digital services has increased in the past year, largely due to the impact of the Corona virus, indicating a growing openness to change. Consumer choices are driven by various psychological factors; some prioritize the best value, others seek convenience, but the majority value peace of mind. Because of the strict regulations in the Moroccan insurance sector, it is challenging for new entrants, particularly Insurtech firms, to establish themselves (according to static.com, between 10 to 15 Insurtech startups launch each month globally). Moreover, companies like GAFA (Google, Apple, Facebook, and Amazon), which possess vast amounts of data and continue to collect information daily, are also making their way into the insurance market. Partnership is considered a vital element

for the overall growth and development of the Moroccan insurance sector (Halima & Yassine, 2022).

According to Hassan Bahej, IBM's national general manager in Morocco, "Cloud is essential to the nation's growth," he says. The Moroccan government's "Digital Morocco" plan, launched in 2009, aims to boost the IT industry and includes a cloud initiative for ISVs. The government is focusing on promoting entrepreneurship, developing tech parks in major cities, and enhancing technical skills.

This study fills gap by exploring the following questions which are being addressed in this study:

1. What are the main challenges facing the adoption of blockchain and cloud computing in Morocco's insurance sector?
2. What potential solutions or strategies are proposed in the literature to address these challenges?

The Systematic Literature Review (SLR) method is used to address these questions by systematically identifying, screening, and analyzing relevant studies, ensuring that findings are linked to a defined research aim and presented in a structured, evidence-based manner.

This study examines the adoption of blockchain and cloud computing in Morocco's insurance sector, arguing that these technologies can significantly enhance operational efficiency despite existing regulatory and technical barriers. The findings are synthesized thematically, highlighting key challenges, potential solutions, and policy implications. By situating the analysis within Morocco's socio-economic and regulatory context, the study provides a structured, evidence-based discussion that links technological adoption to practical and policy-relevant outcomes.

Review of Literature

Previous studies often treat blockchain and cloud computing adoption descriptively, lacking a central analytical lens. This study addresses this gap using the Diffusion of Innovation (DOI) theory. The analysis is structured around three thematic categories organizational, technical, and regulatory challenges applied to both blockchain and cloud computing. This thematic organization enables systematic comparison of adoption factors and highlights recurring patterns across literature.

From the selected papers, the author extracted key details: author name, publication year, country, type of publication, and main findings. This information

was then combined into a narrative synthesis. Tables 1 and 3 list the literature that met the inclusion criteria, while Tables 2 and 4 present the challenges and proposed solutions identified for blockchain and cloud-computing adoption, respectively.

Table 1: *Characteristics of Reviewed Blockchain Adoption Studies in Morocco Insurance Sector*

No.	Journal name/Book/ Conference Name	Paper topic/ Conference paper Name	Methodology	Year	Author
1	Proceedings of the Business Innovation and Engineering Conference	A Conceptual Analysis of Factors That Lead to Blockchain Technology Adoption in A Developing Country Context Morocco	Qualitative	2021	(Oumaima et al., 2021)
2	Research in Globalization	The status of cryptocurrency in Morocco		2021	(Zakria, 2021)
3	The Third International Symposium on Internet of Things: Systems, Management and Security (IOTSMS-2016)	Blockchain for the Internet of Things: A systematic literature review		2016	(Marco et al., 2016)
4	SCA2019: The Fourth International Conference on Smart City Applications Casablanca Morocco	Blockchain technology impact on the maritime supply chain.		2019	(Safia et al., 2019)
5	Mathematics	Analysis and Evaluation of Barriers Influencing Blockchain Implementation in Moroccan Sustainable Supply Chain Management: An Integrated IFAHP-	Quantitative	2021	(Boutkhoum et al., 2021)

	DEMATEL Framework.	

Source: Author

Table 2: *Blockchain Adoption in Morocco Insurance Industry: Issues & Solutions*

No. of Studies	Issues	Solutions
Study 1	• Trust, perceived risk and security	• Nil
Study 2	• Legal and financial impediments to bitcoin adoption • An attacker may control several blockchain nodes. • This system requires a lot of processing power.	• Nil
Study 3	• Blockchain scalability is difficult. • Smaller blockchain systems with fewer miners may employ little computing resources, but their integrity is threatened by attacker-caused splits.	• Nil
Study 4	• Scalability of data	• Nil • The Moroccan government must assist public and professional groups adapt this new technology.
Study 5	• Lack of scalability • PC speed • Design of blockchain-based systems • Govt policy and help • High energy use • Interoperability concerns, blockchain culture resistance • Senior management aide • Human resource competence • Absence of new organizational blockchain policies	• To achieve widespread and efficient blockchain use, managers must engage supply chain colleagues and partners. • Building stakeholder confidence in blockchain will help reduce ambiguity about this new technology. • To minimize blockchain complexity and boost client happiness, blockchain technical experts are required to solve all security and privacy challenges.

Source: Author

Table 3: *Characteristics of Reviewed Cloud Computing Adoption Studies in Morocco Insurance Sector*

No.	Journal name/Book/ Conference Name	Paper topic/ Conference paper Name	Methodology	Year	Author
1	Africon	A collaborative intrusion detection and Prevention System in Cloud Computing	Qualitative	2013	(Mohamed et al., 2013)
2	IEEE International Conference on Technology Management, Operations and Decisions (ICTMOD),	Cloud Computing adoption in developing countries: A systematic literature review.		2018	(M'rhaouarh et al., 2018)
3	Proceedings of the 4th Edition of International Conference on Geo-IT and Water Resources	Adoption of Big data, Cloud Computing & IoT in Morocco perception of public administrations collaborators.		2020	(Aniss, 2020)
4	International Journal of Scientific & Engineering Research.	Adoption of Cloud Computing by Enterprises in Morocco: A survey.	Quantitative	2020	(Ibtissam et al., 2020)
5	MATEC Web of Conferences	Challenges of cloud computing use: A systematic literature review	SLR	2018	(Ibtissam et al., 2018)

Source: Author

Table 4: *Cloud computing Adoption in Morocco Insurance Industry: Issues & Solutions*

No. of Studies	Issues	Solutions
Study 1	• Cloud security issues limit business adoption.	• Cloud services should secure data and networks from attacks. • A collaborative approach should include Intrusion Detection and Prevention Systems with distributed IDS and IPS functionality. • Cyber-attacks including distributed assaults and port scanning attacks may use hybrid detection and permitted access.
Study 2	• Cloud usage is relatively young in underdeveloped countries like Morocco. • Experts are required to operate this system. • Cloud computing adoption in poor nations requires top management backing, and technology necessitates a firm's organizational and technical • Regulating cloud data storage protects privacy. • In many impoverished countries, the cost of communication is prohibitive, Cloud expertise is essential for cloud adoption. • Educating and educating employees on cloud computing is necessary. • Compatibility is important since organizations have complicated applications made up of numerous internal systems. • To integrate cloud solutions with infrastructure,	• Nil

	organizers must change procedures. • Cyber-attacks, Problems of privacy, Lack of tools, • No law, Management of change, Users and managers unaware • Human skillfulness, Inexperience staff	
Study 3		• Nil
Study 4	• Lack of research, lack of skills and resources • Cyber-threat, lack of awareness regarding cloud services & data storage	• Firms may choose between public, private, or hybrid cloud services. • Cloud computing services in ICT might help enhance company trust in cloud services in Morocco, Cloud service providers must offer risk protection. • Cloud suppliers and their clients should have a strong understanding. • cloud computing research may help increase cloud adoption.
Study 5	• When switching providers, lock-in vendors prevent data and software migration. Data governance and security issues and unavailability • A malicious insider with lots of information could damage the Cloud Customer's assets. • Cloud service providers share infrastructure, platforms, and applications, resulting in common vulnerabilities across all cloud delivery methods. • Managing resources and services is another difficult challenge. • Dos attacks prevent cloud users from accessing their apps or data, causing	• A service level agreement (SLA) is required for clients to get service assurances. • Data recovery is important in business, but it is not a guarantee of cloud computing. • Cloud computing vendors may be global. They should be informed of local legislation.

	unacceptably sluggish system performance. • Clients' value-added services through insecure APIs. • Data loss or leaking may cause integrity issues. • Data loss may be caused by a cloud service provider or a natural catastrophe such an earthquake, flood, or tsunami. • Data transmission bottlenecks occur when bandwidth cannot handle large amounts of system data at specified rates. • If an enterprise adopts this technology, it must rethink its current technology. • Interoperability issues prevent businesses from using cloud IT systems to boost productivity and cut costs. • Cloud-hosted software licenses may be overpriced.

Source: Author

Methodology

A literature review focusing on the challenges and potential solutions for implementing blockchain and cloud computing in Morocco was conducted using a systematic literature review (SLR) approach. The search process involved selecting keywords listed in table 5 to find relevant articles that met the inclusion and exclusion criteria outlined in table 6. The SLR method was used to identify, select, and critically assess existing research to address a specific and clearly defined research question, as outlined by Dewey and Drahota (2016). Following databases and search strings are opted for the study:

Blockchain: Literature and conference proceedings on blockchain in the Bangladesh financial industry, particularly insurance and health insurance, were explored. Papers were obtained from platforms such as Google Scholar and Emerald. The search terms applied were: blockchain * AND (insurance sector*) AND

(challenge* OR obstacle* OR issue* OR disadvantage* OR threat). The exploration covered studies published between 2016 and 2021.

Cloud Computing: Literature and conference proceedings on cloud computing in the Moroccan financial industry, particularly insurance and health insurance, were explored using the same platforms. The search terms applied were: cloud computing * AND (insurance sector*) AND (challenge* OR obstacle* OR issue* OR disadvantage* OR threat). The exploration covered studies published between 2013 and 2018.

Table 5: *Keywords Selections of Blockchain and Cloud Computing*

Blockchain	Literature and conference proceedings on blockchain in the Bangladesh financial industry, particularly insurance and health insurance. Past works available since 2016 Primary and secondary research	Studies not in English Magazine, newspaper, thesis, report 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: blockchain * AND (insurance sector*) AND (challenge* OR obstacle* OR issue* OR disadvantage* OR threat). The exploration was carried out between 2016 to 2021.
Cloud Computing	Literature and conference proceedings on cloud computing in the Morocco financial industry, particularly insurance and health insurance. Past works available since 2013 Primary and secondary research	Studies not in English Magazine, newspaper, thesis, report 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 (insurance sector*) AND (challenge* OR obstacle* OR issue* OR disadvantage* OR threat). The exploration was carried out between 2013 to 2018.

Source: Author

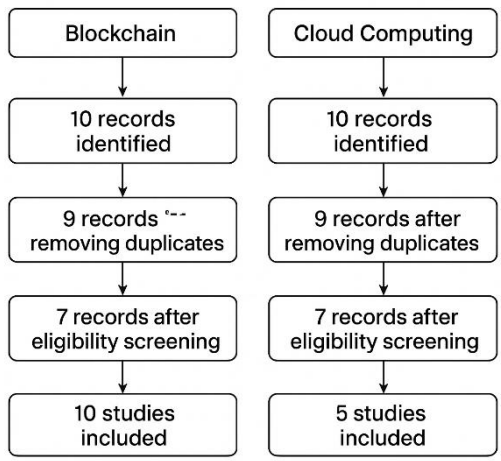
Table 6: *Selection Criteria of Blockchain and Cloud Computing*

Blockchain	**Identification**	10
	Screening	9 after removing 1 duplicate
	Eligibility	7 after removing 2 archives
	Included	10
Cloud Computing	**Identification**	10
	Screening	9 after removing 1 duplicate
	Eligibility	7 after removing 8 archives
	Included	5 after removing full article

Source: Author

Table 6 summarizes the study's selection process for blockchain and cloud computing literature, showing how articles were identified, screened, and filtered for eligibility. Figure 1 presents a PRISMA diagram visualizing this systematic review process for transparency and reproducibility.

Figure 1: *PRISMA figure*



Source: Author

Findings and Discussion

Systematic literature reviews reveal many issues and solutions. Content analysis subcategorizes issues and solutions. Table 7 lists the insurance industry's most common challenges, while Table 8 lists some notable solutions based on their repetition.

First, Morocco has the infrastructure and people to implement blockchain technology. Trust, perceived danger, and security drive Morocco's technology adoption (Oumaima et al., 2021). Second, Morocco can use this technology but faces legal and financial challenges (Zakria, 2021). Government aid is needed. The third challenge is stakeholder resistance to blockchain culture due to Morocco's blockchain expert shortage. They lack new organizational blockchain policies (Boutkhoum et al., 2021). An attacker with many blockchain nodes is the fourth challenge (Marco et al., 2016). Hackers take over many network nodes in Sybil attacks. Then fake nodes close all transactions around the victim. Fourth, this system needs high-powered computing (Safia et al., 2019). Fifth, Blockchain scalability is problematic. Scalability, system speed, complexity, and high energy consumption make sustainable practices and blockchain technology difficult to interact with. Finally, a small blockchain system with fewer miners can be used with limited computing power, but attacker-caused splits threaten system integrity (Boutkhoum et al., 2021). The Moroccan government must help public and professional groups worldwide adopt this new technology. Blockchain adoption requires collaborators. Addressing security and privacy issues will simplify blockchain (Boutkhoum et al., 2021).

Table 7: *Blockchain Adoption Challenges in Morocco Insurance Industry*

Trust, risk, and security
Legal impediments to cryptocurrency adoption
Investors reject blockchain culture
An attacker may control several blockchain nodes.
This system requires a lot of processing power.
Blockchain scalability is difficult.
Smaller blockchain systems with fewer miners may employ little computing resources, but their integrity is threatened by attacker-caused splits.

Source: Author

Table 8: *Blockchain Adoption Solutions in Morocco Insurance Industry*

Moroccan government must assist public and professional groups in adapting to this new technology.
Must find partners and allies to accelerate blockchain usage.

Stakeholders' confidence in blockchain should be built to reduce ambiguity.

To lessen blockchain complexity, blockchain security and privacy challenges must be resolved.

Source: Author

On adoption of cloud computing technology, systematic literature reviews yield many issues and solutions. Content analysis subcategorizes issues and solutions. Table 9 lists the insurance industry's most common challenges, while Table 10 lists some notable solutions based on their repetition.

Cloud security slows organization adoption. DoS attacks prevent cloud users from accessing apps or data, slowing system performance (Mohamed et al., 2013). Lack of research and funding is the second issue. Third, Cloud expertise is lacking. No Moroccan business cloud computing usage research. Moroccan firms lack personnel and technology (Ibtissam et al., 2020). Fourth, senior management support lacks. Cloud computing adoption in poor nations requires top management support (M'rhaouarh et al., 2018). The firm's organizational and technical structure is the fifth issue (Mohamed et al., 2013). Complex applications with many internal systems require compatibility (M'rhaouarh et al., 2018). The sixth issue is cloud data storage regulation to protect privacy (M'rhaouarh et al., 2018). Moroccan communication costs are the seventh issue. Cloud ignorance is the eighth issue. Staff training is ninth. Cloud adoption requires expertise. Staff must be trained on cloud computing's benefits (M'rhaouarh et al., 2018). Tenth issue is vendor lock-in. Moving providers is complicated by lock-in vendors. Data governance and security loss is issue eleven. Twelve, malicious cloud insiders can access large amounts of data to damage Cloud Customers' assets (M'rhaouarh et al., 2018). Thirteen, Denial of service attacks prevent cloud customers from accessing apps and data. Cloud services should secure data and networks from attacks (Muhammad et al., 2013). Unsafe client interfaces and APIs are challenge fourteen. Data loss or leakage is fifteen challenges. Data leakage which can compromise integrity. Cloud service providers or natural disasters like earthquakes, floods, and tsunamis can lose data. Business data recovery does not guarantee cloud computing (Mohamed et al., 2013).

The sixteen issue is bandwidth-related data transmission bottlenecks. Seventeen is incompatibility. Interoperability issues prevent cloud IT integration. Lastly, Cloud computing service providers may overcharge enterprises for software licenses (Aniss, 2020). Cloud providers secure data and networks. Distributed cyberattacks, IDS/IPS models, and port scanning attacks may use hybrid detection and authorized access (Ibtissam et al., 2020). Cloud services can be public, private, or hybrid. Cloud providers and customers must agree. Less sporadic cloud computing

research may improve cloud service. Global cloud computing services must comply with local laws (Ibtissam et al., 2018).

Table 9: *Cloud Computing Adoption Challenges in Morocco Insurance Industry*

Cloud security issues limit business adoption.
Cloud adoption is still young.
Cloud expert shortage
Top management back
Firm's organisational and technical system change
Regulation of data storage location in cloud to protect personal privacy.
Communication costs
Cloud ignorance
Under-trained staff
Lock-in vendor
Data and security governance loss
The cloud customer's assets may be harmed by a malicious insider in the cloud.
Dos attacks prevent cloud users from accessing their apps or data.
Clients' value-added services through insecure apis.
Integrity issues due to data loss or leaking.
Data transmission bottlenecks occur when bandwidth cannot handle large amounts of data.
Lack of interoperability
Firms may overpay for software licences on systems hosted by cloud computing service providers.

Source: Author

Table 10: *Cloud Computing Adoption Solutions in Morocco Insurance Industry*

Cloud providers provide data privacy and network security.
Collaborative model based on distributed IDS and IPS functionalities.
Cyber-attacks including distributed assaults & port scanning attacks may use hybrid detection & permitted access.
Firms may choose between public, private, or hybrid cloud computing services.
Cloud suppliers and their clients should have a strong understanding.
More concentrated cloud computing research may help increase cloud adoption.
Cloud computing services may be multinational and hence should be cognizant of local legislation.

Source: Author

Conclusion and Policy Implications

Morocco's insurance sector is at a transitional stage, with adoption driven by government policy and operational efficiency. Morocco's insurance sector is gradually adopting blockchain and cloud technologies, driven by government support and operational efficiency but constrained by regulatory uncertainty and skill gaps.

Morocco's adoption of blockchain and cloud in insurance is gradual and policy-driven, unlike India, Brazil, or South Africa, where private innovation and clearer regulations accelerate adoption.

Adoption is shaped by drivers (government support, cost efficiency, transparency), inhibitors (regulatory uncertainty, skill gaps, data privacy concerns), leading to policy implications for regulatory clarity, capacity building, and innovation encouragement.

Morocco should implement clear digital finance regulations, regulatory sandboxes, skill development programs, and public-private partnerships to foster faster, secure, and efficient adoption in the insurance sector.

Limitation: Limited data on Morocco's insurance sector, focus on a single country, and rapidly changing technology and regulations.

Future Directions: Track adoption trends over time, explore cross-sector applications, study customer and organizational readiness, and assess new regulatory impacts.

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