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LEVERAGING BLOCKCHAIN TECHNOLOGY TO ENHANCE HRM PROCESSES AND SECURITY: A PATHWAY TO SUSTAINABLE DEVELOPMENT IN EMERGING ECONOMIES

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Abstract: *This study leveraged on blockchain technology to enhance HRM processes and security: A pathway to sustainable development in emerging economies. A number of issues prevent blockchain technology from being fully incorporated into HRM systems in developing nations. These include low technological infrastructure, a lack of knowledge about the advantages of blockchain, and worries about expensive deployment. Furthermore, the adoption process is made more difficult by a lack of qualified specialists and unclear regulations. The general objective of this study leveraged on block chain technology to enhance HRM processes and security. The study anchored on New Growth Theory. The accessible population of the study consists of twenty (21) firms in Rivers State. The sample size was made up of one hundred and nine (129) employees from HR departments of the twenty (21) firms in Rivers State. Using Taro Yamen sample size determination formula with the use of questionnaire method, one hundred and twenty nine copies (129) of the questionnaire were administered to respondents, and after retrieval and data cleaning, one hundred and five (105) copies were used for analysis. The study is a correlational work and the Spearman Rank Correlation statistical tool was used to analyze the raw data with the aid of Statistical Package for Social Sciences (SPSS). In conclusion, the result demonstrates the beneficial effects of decentralization on performance management metrics and shows how a decentralized strategy can result in quicker feedback, more accurate assessments, and higher employee engagement. The study recommends that, to promote openness and give employees insight into their performance journey, HR managers should let employees examine their immutable performance records and the history of reviews.*

Keywords: *Blockchain technology, HRM, Security, Sustainable development, Emerging economies.*

INTRODUCTION

Decentralized and distributed ledger technology, or blockchain, is becoming a disruptive force that might completely change security and HRM procedures, particularly in developing nations. Transparency, immutability, and decentralization, three fundamental characteristics of blockchain technology were first made prominent by cryptocurrencies like Bitcoin and are now widely

acknowledged for its wider applications outside of finance (Tapscott & Tapscott, 2016). Blockchain technology can help HRM with long-standing problems with fraud prevention, data security, and operational effectiveness.

HRM systems in developing nations frequently struggle with inefficiencies like laborious administrative procedures, opaque hiring and payroll practices, and heightened fraud vulnerability (World Economic Forum, 2021). Issues including data manipulation, unauthorized access, and processing inefficiencies from manual labor are commonplace in traditional systems. Blockchain technology offers an answer by giving HRM functions a safe, transparent, and unchangeable method of management. For example, blockchain can guarantee the integrity of sensitive HR data, expedite payroll procedures with smart contracts, and provide safe and verifiable employee credentialing (Murray, 2020).

The use of blockchain in HRM in emerging economies presents a number of obstacles despite its potential. These areas might not have the most advanced technological infrastructure, and it's common to lack the technical know-how needed to set up and operate blockchain systems (Bierstaker, 2018). Adoption may also be significantly hampered by large upfront implementation costs and regulatory concerns (World Economic Forum, 2021). To effectively use blockchain technology to improve HRM procedures and support sustainable development, several obstacles must be overcome. This introduction emphasizes how blockchain technology can both advance the more general objective of sustainable development in emerging economies and enhance HRM procedures. HRM systems may become more effective, safe, and transparent by addressing the obstacles to blockchain adoption and putting it into practice. This will improve organizational performance and spur economic growth in these areas.

STATEMENT OF THE PROBLEM

Blockchain according to Ikegwuru and Nwokah (2022:77) is “a record-keeping system that stores information about transaction records shared peer-to-peer crosswise all computers contained by its network, and allows diverse organizations to collaborate and validate entries in the Blockchain hence giving stakeholders visibility of the overall activities taking place” .Blockchain technology, especially in emerging nations, has the potential to completely transform HRM procedures by improving security, transparency, and efficiency. In these areas, traditional HRM systems frequently encounter serious difficulties, such as ineffective personnel record management, fraud susceptibility, and a lack of transparency (World Economic Forum, 2021). These problems not only make organizations less effective, but they also create obstacles to long-term, sustainable economic growth. By offering a safe platform for handling HRM procedures including hiring, payroll, and employee verification, blockchain's decentralized and immutable ledger can solve these issues (Tapscott & Tapscott, 2016).

Nevertheless, several issues prevent blockchain technology from being fully incorporated into HRM systems in developing nations. These include low technological infrastructure, a lack of knowledge about the advantages of blockchain, and worries about expensive deployment (Murray, 2020). Furthermore, the adoption process is made more difficult by a lack of qualified specialists and unclear regulations (Bierstaker, 2018). As a result, while blockchain has the

potential to improve HRM and promote sustainable development, these obstacles must be removed for blockchain to reach its full potential in these situations.

RESEARCH OBJECTIVES

The general objective of this study leveraged on block chain technology to enhance HRM processes and security: A pathway to sustainable development in emerging economies.

LITERATURE REVIEW

Applications of Blockchain in HRM

1. Data Security and Privacy: Employers can make sure that private information is safe and unchangeable by putting personnel records on a blockchain. - Cryptographic keys can be used to limit access to data, enabling only individuals with the proper authorization to access or edit records.

2. Employee Self-Service Portals: By enabling direct access to their records via a safe, blockchain-based portal, employees may foster confidence and transparency. With this self-service paradigm, employees can manage their own information and HRM personnel have less administrative work to do.

3. Streamlined Recruiting Procedures: By making it easier to verify a candidate's qualifications, including their work experience and educational background, blockchain lowers the possibility of fraud. -By automating on boarding procedures, smart contracts can guarantee adherence to legal and corporate policy.

Challenges of Implementing Blockchain in HRM

1. Interoperability: There may be technological difficulties when integrating blockchain solutions with third-party apps and current HRM systems. Effective communication between various blockchain systems will be essential for successful deployment.

2. Technology Adoption: Change may encounter opposition from organizations, especially from HRM specialists used to outdated processes. To fully utilize blockchain technology, personnel must receive training and upskilling.

3. Regulatory Compliance: Businesses need to make sure their blockchain solutions abide by rules like the CCPA and GDPR, which are always changing as governments create new data protection statutes. - Creating a transparent data governance framework in a blockchain system is essential to compliance.

The Role of Blockchain In HRM Data Security And Privacy

Blockchain technology has the potential to change HRM data management in a few ways: **Databases that are decentralized:** The personnel database utilized by HRM can be dispersed over a blockchain network in place of a single, weak database, making hacking nearly impossible. **Tamper-proof recordkeeping:** The immutability of blockchain technology guarantees that employee data cannot be changed or removed without leaving a trail. Audit trails: Transparent transaction histories make it simple to audit HRM procedures, which improves confidence and accountability.

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Employee consent: Employers can comply with privacy laws by automating and enforcing their consent tHRMough smart contracts on a blockchain. Digital signatures based on blockchain technology can protect private HRM correspondence and records.

Benefits of Adopting Blockchain Technology in Nigeria

By increasing financial inclusion and improving transparency and accountability, the application of blockchain technology can support the development of Nigeria's digital economy. The innate qualities of blockchain, namely its immutability and decentralization, facilitate safe and transparent transactions and undertakings via certain applications, such as smart contracts. These applications hold promise for numerous economic advantages (National Blockchain Policy for Nigeria, 2023). The National Blockchain Policy for Nigeria (2023) lists the following advantages of implementing blockchain technology:

Enhanced efficiency

Moreover, supply chain management, identity verification, and payment processing can all be made more efficient with the use of blockchain technology. Transactions may be carried out automatically by utilizing blockchain capabilities like smart contracts, which eliminates the need for middlemen and streamlines the procedure.

Improved accountability and transparency

Blockchain technology has the potential to improve accountability and transparency across a number of Nigerian industries. Every transaction is tracked using a distributed ledger system, which makes them accessible to everybody on the network. This may lessen the incidence of fraud, corruption, and other criminal activity.

Enhanced security

Because blockchain technology is decentralized, it is extremely safe. Since transactions are stored on several nodes, data tampering is practically impossible. This can assist in safeguarding private information and averting cyber attacks in a number of economic sectors.

Inclusion of finances

By giving those who may not have had access to financial services in the past, blockchain technology can contribute to greater financial inclusion in Nigeria. Payment systems based on blockchain technology enable people to send and receive money safely and conveniently.

Creation of jobs

Adoption of blockchain technology in Nigeria could lead to a considerable increase in employment prospects in a number of industries (Trade Finance Global, 2023). Nigeria's population is young and tech-savvy, making it a prime candidate to develop into Africa's blockchain hub. The use of blockchain technology results in the creation of new professions including smart contract engineers, blockchain developers, and cyber-security specialists. Moreover, blockchain technology opens the door to new business ventures like blockchain-based payment systems and cryptocurrency exchanges, which have the potential to generate employment in a number of industries, including manufacturing, technology, and finance.

The use of blockchain technology in Nigeria would also lessen corruption and increase transparency, which will reassure investors and generate new job prospects. In general, the advantages of blockchain adoption for job creation in Nigeria have the potential to be very important for the economic development and expansion of the nation.

Challenges of Blockchain in HRM Functions
Blockchain technology has its own set of difficulties, just like any other revolutionary technology.
b. Scalability-wise, incorporating blockchain technology into current HRM systems might be difficult and resource-intensive.
a. Adopting blockchain technology may need hefty upfront costs and technical know-how.
c. Organizations may face compliance hurdles as a result of the regulatory and compliance issues around blockchain technology, which are still shaping the legal landscape.
In terms of blockchain's potential application to HRM operations, we discover that it might make it possible to tokenize HRM assets like employee stock options, improving their security and accessibility. Decentralized HRM platforms may also enable workers to exercise greater control over their personal information (Oneyemachi, 2023).

Relationship Between Decentralization and Employee Relations Metrics
Decentralization, or the transfer of decision-making authority from a central authority, has a big impact on a lot of different employee relations indicators. Maintaining a positive work environment depends on these indicators, which include employee engagement, conflict resolution, job satisfaction, communication efficacy, and corporate culture (Chen et al., 2020).
Relationship Between Decentralization and Performance Management Metrics
Performance management is an additional domain where decentralization has an impact. Decentralized businesses may benefit from more effective performance management techniques since local managers are more aware of the advantages and disadvantages of their team, according to a 1998 study by Becker and Huselid. Employee relations may be enhanced by more accurate and customized performance reviews that result from this localized knowledge. But it's crucial to make sure that expectations and performance criteria are applied consistently throughout the company (Murphy & Cleveland, 1995).
Relationship Between Immutability and Employee Relations Metrics
Organizations looking to use blockchain technology to increase accountability, transparency, and data integrity are finding that the relationship between immutability and employee relations metrics is becoming more and more important (Beck et al., 2018). Data that is immutable guarantees that, once recorded, it cannot be changed, creating a permanent, unchangeable record.
Relationship Between Immutability and Performance Management Metrics
Through the provision of an unambiguous and unchangeable record of all performance-related activities and evaluations, immutability improves transparency in performance management. Managers and staff can rely on the authenticity and lack of manipulation of the data utilized for performance evaluations (Tapscott & Tapscott, 2016). Because employees can be sure that their performance measures are recorded truthfully, consistently, and without bias or manipulation, this transparency helps to build trust between the management and the workforce (Narayanan *et al.,* 2016).

EMPIRICAL REVIEW
Onyekwere *et al.,* (2023) investigated adoption and sustainability of bitcoin and the blockchain technology in Nigeria. 320 responses to an online survey were gathered by the study's authors using a survey strategy that combined a homogenous approach and a non-probability purposive

sampling technique. The data was analyzed using IBM SPSS version 25 using descriptive and correlational analysis. With 97.5% acceptance, bitcoin is the most widely used cryptocurrency, and it is predicted to overtake all other virtual currencies in the next five years, according to the data. The study's conclusions will aid scholars and policymakers in understanding the necessity of bitcoin adoption, which will ensure its long-term viability. The study also shows that the perceived benefits of cryptocurrencies are what may lead to the acceptance and sustainability of bitcoin. The absence of regulations, which prohibits banks and other financial institutions from processing payments for bitcoin trading, is one of the main obstacles impeding its development.

Chen *et al.* (2020) considered a block chain-driven platform for supply chain finance and to establish a reliable and efficient financing platform for the auto retail industry in China. According to the study's findings, supply chain (SC) network participants in block chains with built-in trust mechanisms collaborate widely and observably to operate a stable, strategically located, and identifiable business. Similarly, traditional supply chain finance (SCF) realized partial automation of SCF work flows tHRMough smart contracts in BCautoSCF, resulting in fewer human errors and interruptions. The practicality of BCautoSCF in SCF is suggested by such open and secure characteristics.

THEORETICAL REVIEW

This study anchored on New Growth Theory.

The work of (Romer, 2014) is credited with stimulating the development of the New Growth theory (Endogenous growth theory). According to the notion, economic growth is the outcome of growing returns on investments made in new technologies or knowledge. A knowledge-based economy replaces a resource-based one according to new growth theory. It highlights the idea that the development of business firms is significantly shaped by the economic processes that generate and disseminate new information. New growth theory's central tenet is that growth is driven by knowledge. The main tenets of the new growth theory are as follows: a. It treats technical advancement as an outcome of economic activity, as opposed to earlier theories that saw technology as an outcome of non-market causes. b. It makes the claim that, in contrast to material items, knowledge and technology are characterized by growing returns, which in turn propel the process of growth. Applying this theory to the research, we can conclude that, if properly embraced and integrated into corporate operations, technology innovations like blockchain and cybersecurity technologies that have been introduced to the global business community can improve HRM performance in Nigeria.

METHODOLOGY

The objective of the study was to leverage on block chain technology to enhance HRM processes and security: A pathway to sustainable development in emerging economies. The accessible population of the study consists of twenty (21) firms in Rivers State. The sample size was made up of one hundred and nine (129) employees from HR departments of the twenty (21) firms in Rivers State. Using Taro Yamen sample size determination formula with the use of questionnaire method, one hundred and twenty nine copies (129) of the questionnaire were administered to respondents, and after retrieval and data cleaning, one hundred and five (105) copies were used for analysis. The study is a correlational work and the Spearman Rank Correlation statistical tool

was used to analyze the raw data with the aid of Statistical Package for Social Sciences (SPSS). The collected raw data were tabulated and evaluated with the application of the 5-point Likert scale.

ANSLYSIS AND RESULTS

The study data was analyzed based on its aim, to examine if there is a significant relationship between these dimensions blockchain technology and the measures of HRM processes, and the variation of such relationship. The data from the analysis is showed below while conclusion was made based on the findings.

Hypotheses 1

H_{01}: There is no significant relationship between decentralization and employee relations metrics

Table.1: Statistical Analysis for Hypothesis 1

			Decentralization	Employee relations metrics
Spearman's rho	Decentralization	Correlation Coefficient	1.000	.647**
		Sig.(2-tailed)	.	.
		N	105	105
	Employee relations metrics	Correlation Coefficient	.647**	1.000
		Sig. (2-tailed)	.	.
		N	105	105

**. Correlation is significant at the 0.01 level (2-tailed).

From the result of the above table, the correlation coefficient (r = 0.647) between decentralization and Employee relations metrics is very strong and positive. The coefficient of determination (r^2 = 0.65) indicates that 65% of Employee relations metrics can be explained by decentralization. The significant value of (p< 0.05) reveals a significant relationship. Based on that, the null hypothesis was rejected. Therefore, there is a significant relationship between decentralization and employee relations metrics in firms in Rivers State

Hypotheses 2

H_{02}: There is no significant relationship between decentralization and performance management metrics

Table 2: Statistical Analysis for Hypothesis 2

			Decentralization	Performance management metrics
Spearman's rho	Decentralization	Correlation Coefficient	1.000	.688**
		Sig.(2-tailed)	.	.
		N	105	105
	Performance management metrics	Correlation Coefficient	.688**	1.000
		Sig. (2-tailed)	.	.
		N	105	105

**. Correlation is significant at the 0.01 level (2-tailed).

From the result of the above table, the correlation coefficient (r = 0.688) between decentralization and performance management metrics is very strong and positive. The coefficient of determination (r^2 = 0.688) indicated that 69% of performance management metrics can be explained by decentralization. The significant value of (p<0.05) reveals a significant relationship. Based on that, the null hypothesis is rejected. Therefore, there is a significant relationship between decentralization and performance management metrics in firms in Rivers State.

Hypotheses 3

H_{03}: There is no significant relationship between immutability and employee relations metrics

Table.3: Statistical Analysis for Hypothesis 3

			Immutability	Employee relations metrics
Spearman's rho	Immutability	Correlation Coefficient	1.000	.723**
		Sig.(2-tailed)	.	.
		N	105	105
	Employee relations metrics	Correlation Coefficient	.723**	1.000
		Sig. (2-tailed)	.	.
		N	105	105

**. Correlation is significant at the 0.01level (2-tailed).

From the result of the above table, the correlation coefficient (r =0.723) between Immutability and Employee relations metrics is very strong and positive. The coefficient of determination (r^2 = 0.72) indicated that 72% of Employee relations metrics can be explained by Immutability. The significant value of (p<0.05) reveals a significant relationship. Based on that, the null hypothesis is rejected. Therefore, there is a significant relationship between immutability and employee relations metrics in firms in Rivers State.

Hypotheses 4

H_{04}: There is no significant relationship between immutability and performance management metrics

Table.4: Statistical Analysis for Hypothesis 4

			Immutability	Performance management metrics
Spearman's rho	Immutability	Correlation Coefficient	1.000	.632**
		Sig.(2-tailed)	.	.
		N	105	105
	Performance management metrics	Correlation Coefficient	.632**	1.000
		Sig. (2-tailed)	.	.
		N	105	105

**.Correlation is significant at the 0.01 level(2-tailed).

From the result of the above table, the correlation coefficient (r = 0.632) between immutability and performance management metrics is very strong and positive. The coefficient of determination (r^2 = 0.63) indicated that 63% of performance management metrics can be explained by immutability. The significant value of ($p<0.05$) reveals a significant relationship. Based on that, the null hypothesis is rejected. Therefore, there is a significant relationship between immutability and performance management metrics in firms in Rivers State.

CONCLUSION

Employee relations measures including engagement, contentment, and turnover rates can all be significantly impacted by decentralization. Decentralization has advantages like increased autonomy and responsibility, which boost employee engagement and happiness. However, it also has drawbacks like the requirement for good communication and the possibility of discrepancies. To maximize decentralization's advantages and mitigate any potential negative effects, organizations must carefully manage these dynamics in order to preserve good employee relations.

The result demonstrates the beneficial effects of decentralization on performance management indicators and shows how a decentralized strategy can result in quicker feedback, more accurate assessments, and higher employee engagement.

Enhancing accuracy, openness, and confidence in the management of employee data can be achieved by integrating immutability into employee relations measures. Organizations must, however, take flexibility into account and make sure that their immutability policy is in line with both their overarching objectives and applicable laws. The accuracy, integrity, and transparency of performance data are improved when immutability is incorporated into performance management metrics. It satisfies security and compliance requirements and facilitates impartial and accountable performance reviews. To retain the essential advantages of immutability, companies must carefully build their performance management systems to allow for the requirement for sporadic updates or changes.

RECOMMENDATIONS

The study recommends the following:

1. In order to retain the essential advantages of immutability, organizations should carefully design their performance management systems to handle the requirement for sporadic updates or changes.

2. Organizations should give local managers the know-how and abilities they need to make wise decisions and support the organization's objectives.

3. HR managers should make use of cutting-edge decentralization-supporting performance management software and solutions. Cloud-based platforms and other technologies can make it easier to manage and integrate performance indicators from several sources by enabling real-time data exchange and analysis.

4. To promote openness and give employees insight into their performance journey, HR managers should let employees examine their immutable performance records and the history of reviews.

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