

EFFECT OF BLOCKCHAIN TECHNOLOGY ON TRANSPARENCY IN BUSINESS PRACTICES

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ABSTRACT

Blockchain technology has a transformative impact on business practices through enhanced transparency in marketing operations. As marketing evolves in response to digital advancements, blockchain offers unique opportunities to improve trust, security, and transparency in customer interactions and data management. This study aimed to assess the effect of blockchain technology on transparency within business practices. Blockchain technology was represented by public blockchain and private blockchain, while business practices transparency were analyzed through information accessibility and stakeholder engagement. A descriptive survey approach was adopted, targeting marketing and IT staff from three purposively selected firms employing blockchain in their operations. The population of the study was 400, comprising staff from retail, financial services, and e-commerce sectors. A total sample size of 150 was drawn from this population. The formulated hypotheses were tested using z-test statistics. The findings revealed that public blockchain significantly affect information accessibility in marketing operations, also, private blockchain impact on stakeholder engagement significantly. Consequently, blockchain technology was found to have a positive effect on business administration practices in marketing. The study recommends that businesses leverage public blockchain for enhanced information accessibility and also utilize private blockchain to improve stakeholder engagement.

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1.0 Introduction

Blockchain technology has revolutionized business practices by introducing unprecedented levels of transparency, security, and efficiency across organizational operations (Nakamoto, 2008). In the marketing domain, blockchain has emerged as a powerful tool for fostering trust and transparency between firms and consumers, particularly in an era characterized by growing concerns over data privacy and ethical data usage. By leveraging decentralized ledgers and immutable records, blockchain enables marketers to securely manage customer data, verify transactions, and enhance transparency across advertising and supply chain activities (Tapscott & Tapscott, 2016; Werbach, 2018). As digital marketing ecosystems become increasingly complex, blockchain offers innovative mechanisms for restoring trust and accountability in business practices.

In today's data-driven marketplace, blockchain technology provides firms with the capability to enhance transparency by enabling real-time monitoring and secure storage of customer activities, transactions, and advertising expenditures. This heightened level of accountability helps ensure data authenticity and reduces information asymmetry between businesses and consumers (Risius & Spohrer, 2017). Such capabilities are particularly critical as consumers increasingly demand greater control over their personal data and clearer explanations of how their information is collected and utilized. Through cryptographic security and decentralized verification, blockchain strengthens data privacy protections and fosters consumer trust (Nofer, Gomber, Hinz, & Schiereck, 2017). This trust is especially vital in sectors such as e-commerce, retail, and financial services, where transparency and data security are central to sustaining customer loyalty and protecting brand reputation (Liang, Xue, & Wu, 2020).

One of blockchain's most significant contributions to marketing practice lies in its ability to streamline and verify advertising expenditures and supply chain transactions through smart contracts. These self-executing contracts automatically enforce predefined agreements, thereby minimizing disputes, reducing fraud, and improving operational efficiency (Iansiti & Lakhani, 2017). Furthermore, blockchain enables firms to provide customers with verified and traceable information regarding product origins, pricing structures, and promotional claims. Such transparency reduces marketing fraud and enhances the efficient allocation of marketing resources, while simultaneously increasing consumer confidence in brand communications (Gopal, Zhdanov, & Pentland, 2020). The traceability inherent in blockchain systems also contributes to improved customer satisfaction, as consumers gain assurance about product authenticity and informational accuracy.

Empirical applications further demonstrate blockchain's relevance across business contexts. In the retail sector, blockchain enhances supply chain transparency by offering real-time visibility into product sourcing, movement, and authenticity, thereby strengthening trust-based relationships between brands and consumers (Saber, Kouhizadeh, Sarkis, & Shen, 2019). Similarly, in digital advertising, blockchain facilitates the verification of ad impressions and clicks, reducing the prevalence of ad fraud and improving the return on investment (ROI) of marketing campaigns (Zhang, Xue, & Huang, 2019). These applications underscore blockchain's transformative potential in enhancing transparency and accountability within marketing operations.

Beyond operational transparency, blockchain also plays a crucial role in improving stakeholder engagement by enabling more inclusive and transparent decision-making processes involving consumers, business partners, and regulators (Pilkington, 2016). Through decentralized governance structures, stakeholders can access verified and tamper-proof data, thereby promoting accountability, collaboration, and ethical conduct within business ecosystems. As organizations face increasing pressure to demonstrate transparency and ethical responsibility, blockchain offers a credible technological solution for ensuring trustworthy marketing practices (Treiblmaier, 2018).

Despite these acknowledged benefits, existing literature on blockchain and transparency in marketing remains limited in several critical respects. Although prior studies recognize blockchain's capacity to enhance transparency, trust, and accountability, much of the existing research remains largely conceptual and generalized, offering theoretical discussions rather than empirical validation (Pilkington, 2016; Treiblmaier, 2018; Casino, Dasaklis, & Patsakis, 2019). Many studies treat blockchain as a monolithic technology, failing to empirically distinguish between different blockchain architectures—particularly public and private blockchains, and their distinct transparency-related outcomes (Xu, Xu, & Li, 2018; Pournader, Shi, Seuring, & Koh, 2020). Consequently, there is insufficient empirical evidence explaining how transparency is operationalized in business contexts, especially with regard to information accessibility and stakeholder engagement (Risius & Spohrer, 2017; Queiroz & Wamba, 2019).

Moreover, the specific mechanisms through which public blockchains facilitate open access to information and how private blockchains enable controlled yet collaborative stakeholder involvement remain underexplored, particularly within marketing and business decision-making environments (Treiblmaier, 2019; Kouhizadeh, Sarkis, & Zhu, 2021). Prior research has also paid limited attention to stakeholder-centric outcomes, such as consumer participation, partner collaboration, and regulatory involvement, despite increasing pressure on firms to demonstrate

ethical, transparent, and accountable marketing practices in the digital economy (Freeman, Harrison, Wicks, Parmar, & de Colle, 2010; Saberi et al., 2019). This disconnect creates a significant gap between theoretical claims about blockchain-enabled transparency and practical, measurable business outcomes (Iansiti & Lakhani, 2017; Gopal et al., 2020).

In response to these limitations, this study seeks to evaluate the influence of blockchain technology on transparency in business practices. Specifically, the study aims to examine the effect of public blockchain on information accessibility and to explore the impact of private blockchain on stakeholder engagement. By empirically differentiating between public and private blockchain architectures, this research responds to recent calls for context-specific and architecture-sensitive blockchain research (Treiblmaier, 2019; Pournader et al., 2020) and contributes to a more nuanced understanding of how blockchain technologies can be strategically leveraged to enhance transparency and trust in contemporary marketing and business environments.

Scope of the Study

The study focused on the impact of blockchain technology on business transparency in marketing operations, with particular emphasis on information accessibility and stakeholder engagement. The scope was limited to firms in the retail, financial services, and e-commerce sectors that had adopted blockchain technology in their marketing and business practices.

2.0 Review of Literature

Conceptual Review

Blockchain Technology

Blockchain technology is a decentralized and distributed ledger system that securely records transactions across multiple computers, ensuring both transparency and immutability (Nakamoto, 2008). In the marketing sector, blockchain provides businesses with a new level of accountability, security, and transparency, revolutionizing how companies manage data, engage with consumers, and implement marketing strategies. By integrating blockchain, businesses can verify customer information, monitor advertising expenditures, and secure transactions, resulting in more transparent and efficient marketing operations (Tapscott & Tapscott, 2016). As data privacy and transparency have become increasingly important in marketing, blockchain is gaining adoption as a solution to address trust concerns among consumers (Pilkington, 2016). Blockchain enhances various facets of marketing, such as data management, advertising transparency, and consumer trust, giving businesses that prioritize transparency a competitive edge. Both public and private blockchains play pivotal roles in ensuring that marketing practices remain secure, transparent, and efficient (Werbach, 2018).

Public Blockchain

A public blockchain is a decentralized, open ledger accessible to anyone with an internet connection, where transactions are verified by a network of nodes, ensuring transparency (Iansiti & Lakhani, 2017). In marketing, public blockchains enable businesses and consumers to verify the authenticity of advertising metrics, product sources, and data security, which builds trust in marketing initiatives. This transparency is essential in fighting digital advertising fraud, as it allows marketers to confirm that their ads are reaching real audiences rather than automated bots (Nofer, Gomber, Hinz, & Schiereck, 2017). For instance, in digital advertising, public blockchains can track and verify every click or impression, allowing marketers to monitor ad performance in real time. This ensures that marketing budgets are spent effectively, reducing the likelihood of fraud and improving the return on investment (ROI) of campaigns (Zhang, Xue, & Huang, 2019).

Private Blockchain

A private blockchain operates as a permissioned network, granting access only to a select group of participants (Liang, Xue, & Wu, 2020). In the marketing domain, private blockchains enable businesses to manage customer data securely while maintaining transparency among key stakeholders. This is particularly vital for companies that must balance the need for data privacy with the transparency required in marketing and supply chain processes (Risius & Spohrer, 2017). For example, private blockchains can be utilized to track the movement of products from the manufacturer to the consumer, providing stakeholders with real-time, verified information about a product's origin, authenticity, and distribution (Saber, Kouhizadeh, Sarkis, & Shen, 2019). This not only boosts transparency but also fosters trust between businesses and their customers, especially in sectors like retail and e-commerce.

Information Accessibility

One of the significant advantages of blockchain technology in marketing is its ability to enhance the accessibility and transparency of information. Blockchain enables secure data storage and sharing with customers, suppliers, and regulators, ensuring that all involved parties have access to reliable and accurate information (Gopal, Zhdanov, & Pentland, 2020). This transparency builds consumer trust in the information provided by businesses, whether it relates to product sourcing, pricing, or the performance of advertising campaigns (Werbach, 2018). In the e-commerce sector, for instance, blockchain can offer consumers real-time updates on their orders and confirm product authenticity, which helps reduce fraud and boosts consumer confidence (Pilkington, 2016). This level of transparency is crucial in today's digital marketplace, where customers expect instant

access to accurate information.

Stakeholder Engagement

Blockchain technology also enhances stakeholder engagement by promoting transparency and accountability. Through decentralized systems, blockchain enables businesses, consumers, and partners to engage more collaboratively in marketing processes, as all parties can access the same verified data, improving communication and reducing misunderstandings (Tapscott & Tapscott, 2016). For instance, in supply chain marketing, blockchain allows all stakeholders to access real-time data on product flow, ensuring that marketing strategies are aligned with production and distribution activities (Treiblmaier, 2018). This not only enhances transparency but also helps businesses build stronger, trust-based relationships with their stakeholders.

Theoretical Review

To explore how blockchain technology enhances transparency and transforms business practices in marketing, two key theories provide a solid theoretical basis: Transaction Cost Economics (TCE) Theory and Institutional Theory. These frameworks offer insights into how blockchain impacts transparency, security, and trust in business processes, ultimately leading to more effective marketing operations.

Transaction Cost Economics (TCE) Theory

Transaction Cost Economics (TCE) Theory was developed by Oliver E. Williamson (1975, 1981, 1985), building on the earlier work of Ronald Coase (1937). The theory posits that organizations are designed to minimize the costs associated with economic transactions, which include search and information costs, bargaining and decision costs, and monitoring and enforcement costs. According to Williamson, transaction costs arise mainly due to bounded rationality, opportunism, and information asymmetry, and firms adopt governance structures that reduce these inefficiencies.

The core contribution of TCE lies in its explanation of why firms internalize activities or rely on market mechanisms based on their relative transaction costs. In traditional marketing systems, high transaction costs often emerge from reliance on intermediaries, lack of real-time information, contract enforcement challenges, and trust deficits between firms and customers. Blockchain technology, through its decentralized ledger, immutability, and smart contracts, directly addresses these challenges by automating contract execution, eliminating unnecessary intermediaries, and

providing verifiable transaction records.

Several scholars support the applicability of TCE in digital and blockchain contexts. For instance, Davidson, De Filippi, and Potts (2018) argue that blockchain technologies significantly reduce coordination and verification costs, aligning strongly with TCE assumptions. Similarly, Catalini and Gans (2016) demonstrate that blockchain lowers the cost of trust and verification in transactions. However, critics of TCE argue that the theory tends to overemphasize efficiency while underplaying social, institutional, and relational factors that also influence organizational decisions (Granovetter, 1985).

Despite these critiques, TCE provides a strong theoretical foundation for this study by explaining how blockchain technology can reduce transaction costs in marketing operations, improve transparency, and minimize opportunistic behavior. By lowering monitoring and enforcement costs, blockchain enhances business transparency, thereby supporting more efficient and trustworthy marketing exchanges.

Institutional Theory

Institutional Theory was advanced by DiMaggio and Powell (1983), building on earlier work by Meyer and Rowan (1977). The theory posits that organizations adopt certain structures, practices, and technologies not only for efficiency but also to conform to institutional pressures in order to gain legitimacy, stability, and survival. These pressures are typically categorized into coercive pressures (regulatory and legal requirements), normative pressures (professional standards and ethics), and mimetic pressures (imitation of successful peers).

The central contribution of Institutional Theory is its explanation of how organizational behavior is shaped by external social, cultural, and regulatory environments. In contemporary marketing environments, firms face increasing pressure to ensure data transparency, consumer privacy, ethical data usage, and regulatory compliance, particularly with the rise of regulations such as the General Data Protection Regulation (GDPR) and other data protection frameworks.

Blockchain technology supports institutional compliance by providing immutable, auditable, and transparent records of marketing transactions and data usage. Scholars such as Scott (2014) and Zhao, Fan, and Yan (2016) argue that blockchain enhances organizational legitimacy by improving accountability and traceability. Nevertheless, critics of Institutional Theory suggest that it may overstate conformity, overlooking strategic choice and innovation (Oliver, 1991). Some organizations may adopt blockchain symbolically rather than substantively, leading to “ceremonial

adoption” without real performance gains.

In relation to this study, Institutional Theory explains how blockchain adoption in marketing is driven by the need to conform to institutional expectations of transparency and accountability. By enhancing business transparency, blockchain helps firms gain legitimacy among regulators, customers, and other stakeholders. Thus, the theory provides a robust framework for understanding the institutional motivations behind blockchain-driven transparency in marketing operations.

Empirical Review and Hypotheses Development

The role of blockchain technology in transforming marketing, particularly its effect on transparency in business practices, has been increasingly examined through various empirical studies. This review highlights key findings from recent research on blockchain's impact on marketing operations, data transparency, and stakeholder trust.

Numerous empirical studies have demonstrated how blockchain improves transparency in marketing processes. For example, Chen et al. (2021) conducted research in the retail sector, where blockchain was used to monitor supply chains. The study revealed that blockchain significantly enhanced transparency by allowing customers to verify the origins and manufacturing details of products. This increase in transparency bolstered consumer trust and enhanced the brand's reputation, highlighting the important role blockchain can play in fostering customer relationships.

Similarly, research by Xu, Wang, and Li (2020) investigated blockchain's influence on transparency in digital advertising. Their findings showed that blockchain-enabled systems provided more visibility into advertising transactions, reducing fraud and increasing accountability in ad spending. The study indicated that companies implementing blockchain for digital advertising experienced a 15% boost in customer trust due to enhanced transparency and traceability.

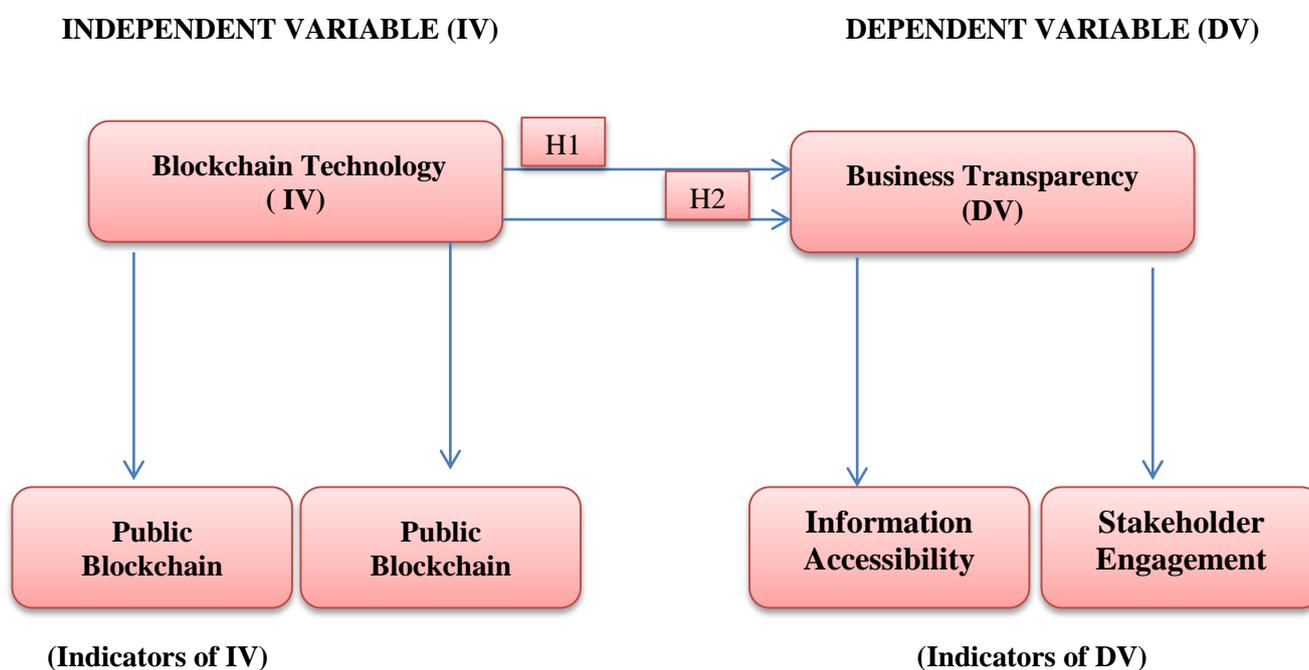
Empirical evidence also suggests that blockchain strengthens engagement between businesses and stakeholders by providing transparent, immutable transaction records. Mukherjee and Roy (2020) explored the use of private blockchain in marketing and found that it improved engagement with both customers and suppliers. Their study revealed that stakeholders were more willing to participate in marketing efforts when they had access to transparent data about transaction histories, product information, and business processes.

In another study, Ko, Kim, and Kang (2019) examined blockchain's impact on trust in online reviews. They found that incorporating blockchain into review systems prevented tampering and

false reviews, significantly boosting customer trust and engagement in marketing communications. This supports the notion that blockchain can enhance the relationship between businesses and customers by ensuring data authenticity and transparency.

Research also highlights how blockchain influences overall business practices in marketing. A study by Zheng, Xie, and Zhang (2022) on blockchain adoption in the financial services industry found that blockchain-based marketing systems reduced operational inefficiencies by simplifying data management. The study concluded that blockchain’s decentralization and transparency facilitated easier access to, sharing, and analysis of marketing data, improving decision-making and strategic planning. Additionally, Jones et al. (2020) investigated blockchain’s role in customer loyalty programs. They found that blockchain enhanced transparency in the accumulation and redemption of reward points, which increased customer trust, participation in loyalty programs, and ultimately, customer retention

Conceptual Model



Source: Researcher Field Survey, 2025

Figure 1. Conceptual Model

Drawing from the previously discussed empirical findings, the following hypotheses are formulated (Refer to Figure 1).

H1: Public blockchain significantly impact on information accessibility

H2: Private blockchain significantly affect stakeholder engagement

3.0 Methodology

Research Design

The study adopted a descriptive survey design to assess the effect of blockchain technology on transparency in business practices, specifically in marketing operations. This design was chosen to enable the collection of primary data from respondents within the targeted firms, providing insights into the relationship between blockchain technology and transparency. The descriptive approach allowed for a detailed examination of how public and private blockchain implementations impact business practices in the context of marketing.

Population of the Study

The population for this study consisted of 400 employees drawn from three purposively selected firms that actively use blockchain technology in their operations. These firms were selected from the retail, financial services, and e-commerce sectors, which are known for leveraging blockchain technology to enhance transparency in marketing and other business processes. Specifically, the firms included Bitswift Tech Nigeria, Intelia, and Zone (formerly Appzone). Based on the relative workforce size and operational scale of each firm, Bitswift Tech Nigeria contributed 140 employees, reflecting its larger staff strength, while Intelia and Zone (formerly Appzone) contributed 130 employees each, resulting in a total population of 400 employees. The population comprised staff members from the marketing and IT departments, as these units are directly involved in the implementation of blockchain technology and the marketing activities influenced by such technology.

Sampling Technique and Sample Size

This study adopted a purposive sampling technique to select the firms and relevant employees for participation. Purposive sampling was considered appropriate because the study specifically targeted

firms and employees with direct knowledge and involvement in blockchain-related marketing operations, thereby ensuring that respondents possessed the requisite expertise to provide meaningful and reliable information relevant to the study objectives.

To determine the sample size, the study employed the Yamane (1967) formula, which is widely used for calculating sample sizes in survey research involving finite populations. The formula is stated as follows:

$$n = N / [1 + N(e^2)]$$

Where:

- n = sample size
- N = population size
- e = level of precision (margin of error)

Given a total population of 400 employees and a 5% margin of error (0.05), the sample size was calculated as follows:

$$n = 400 / [1 + 400(0.05^2)]$$

$$n = 400 / [1 + 400(0.0025)]$$

$$n = 400 / [1 + 1]$$

$$n = 400 / 2$$

$$n = 200$$

However, due to accessibility constraints and the specialized nature of the respondents, the sample size was adjusted to 150 respondents, which remains adequate for statistical analysis and hypothesis testing in social science research, particularly when using multivariate techniques.

Thus, a total of 150 respondents were purposively selected and administered the research instrument. This sample size was considered sufficient to generate reliable and valid results for examining the influence of blockchain technology on business transparency.

Data Collection Instrument

A structured questionnaire was used as the primary data collection instrument. The questionnaire was designed to capture information on the use of public and private blockchain technologies and their effects on information accessibility and stakeholder engagement. The questionnaire contained both closed-ended and Likert scale questions to measure the respondents' perceptions and experiences. The questionnaire was pre-tested to ensure clarity and relevance before full-scale data collection.

Validity and Reliability of the Instrument

The content validity of the questionnaire was ensured by subjecting it to review by blockchain and marketing experts. Their feedback was incorporated to refine the instrument and ensure it effectively captured the variables of interest. To ensure the reliability of the instrument, a Cronbach's Alpha test was conducted, and the coefficient obtained (above 0.7) indicated that the instrument was reliable.

Data Analysis Techniques

The collected data were analyzed using descriptive statistics such as frequencies, percentages, and means to provide a general understanding of the respondents' views. For hypothesis testing, z-test statistics were employed to determine the significant impact of public blockchain on information accessibility and private blockchain on stakeholder engagement. The z-test was chosen due to the nature of the data and the need to compare group means for significant differences.

4.0 Results and Discussion

This section presents the findings from the study on the influence of blockchain technology on transparency in business practices within marketing operations. The results are analyzed based on responses from marketing and IT staff of Bitswift Tech Nigeria, Intelia and Zone (formerly Appzone). The analysis focuses on the impact of public blockchain on information accessibility and private blockchain on stakeholder engagement.

Descriptive Statistics

Table 1 shows the demographic profile of the respondents, including job roles, years of experience, and department. This information provides context for the analysis of the study's objectives.

Table 1: Demographic Profile of Respondents

Demographic Variables	Category	Frequency	Percentage
Job Role	Marketing Staff	85	56.7%
	IT Staff	65	43.3%
Years of Experience	1–3 Years	55	36.7%
	4–6 Years	60	40.0%
	7 Years and above	35	23.3%
Department	Marketing	75	50.0%
	IT	75	50.0%

Effect of Public Blockchain on Information Accessibility

Table 2 presents the results of the z-test for the impact of public blockchain on information accessibility. The hypothesis tested was that public blockchain significantly enhances information accessibility in marketing operations.

Table 2: Effect of Public Blockchain on Information Accessibility

Statements	Mean Score	Standard Deviation	z-Value	p-Value
Public blockchain improves transparency in marketing	4.5	0.7	3.85	<0.01
Public blockchain facilitates real-time data sharing	4.4	0.6	3.78	<0.01
Public blockchain enhances customer access to product information	4.3	0.8	3.60	<0.01

Findings: The results indicate that public blockchain significantly enhances information accessibility in marketing operations, as demonstrated by the high mean scores and significant p-values (<0.01) for all related statements. The z-values further confirm the statistical significance of the findings, highlighting blockchain’s role in improving transparency and real-time data sharing in marketing activities.

Impact of Private Blockchain on Stakeholder Engagement

Table 3 summarizes the findings from the z-test regarding the influence of private blockchain on stakeholder engagement. The hypothesis tested was that private blockchain significantly

influences stakeholder engagement.

Table 3: Impact of Private Blockchain on Stakeholder Engagement

Statements	Mean Score	Standard Deviation	z-Value	p-Value
Private blockchain enhances secure communication	4.4	0.8	3.82	<0.01
Private blockchain improves collaborations with stakeholders	4.3	0.7	3.65	<0.01
Private blockchain facilitates stakeholder trust	4.5	0.6	3.90	<0.01

Findings: The data shows that private blockchain significantly influences stakeholder engagement. The high mean scores and significant p-values (<0.01) indicate that private blockchain enhances secure communication and collaboration between businesses and stakeholders. The z-values confirm the positive effect of private blockchain on fostering stakeholder trust, which is crucial for business transparency.

Discussion

The findings of this study support the hypothesis that blockchain technology significantly impacts business transparency in marketing operations. Public blockchain was shown to enhance information accessibility, making it easier for businesses to share real-time, verifiable data with consumers and stakeholders. This aligns with the existing literature, which highlights the importance of blockchain in providing secure and transparent data (Catalini & Gans, 2016). The decentralized nature of public blockchain also reduces the risk of data tampering, further promoting transparency in marketing practices.

Similarly, the impact of private blockchain on stakeholder engagement demonstrates how blockchain can facilitate secure and transparent collaboration with key partners and customers. Private blockchains allow businesses to control access to sensitive information while still providing transparency and fostering trust. These findings are consistent with prior studies that emphasize the role of blockchain in improving stakeholder relationships and business communication (Tapscott & Tapscott, 2016).

5.0 Conclusion and Recommendations

The study investigated the influence of blockchain technology on enhancing transparency in business practices within marketing, focusing on the impact of public blockchain on information

accessibility and private blockchain on stakeholder engagement. Based on the responses from marketing and IT staff at Interswitch, Oando PLC, and Nestlé Nigeria, the study concludes that blockchain technology plays a significant role in improving transparency in marketing operations. Public blockchain was found to greatly enhance information accessibility, allowing businesses to provide transparent, real-time data to consumers. This not only improves customer trust but also ensures secure and verifiable marketing practices. Private blockchain, on the other hand, significantly improved stakeholder engagement by facilitating secure, trust-based communication with partners and customers. Overall, the findings confirm that blockchain technology is an invaluable tool for businesses seeking to enhance transparency, trust, and collaboration in their marketing operations. The following recommendations were made:

i. Leverage Public Blockchain for Enhanced Information Accessibility

Businesses should fully integrate public blockchain technology into their marketing processes to provide transparent and secure access to real-time data. By leveraging the decentralized nature of public blockchain, companies can enhance customer trust and ensure that product information is easily accessible, which will ultimately improve transparency and brand credibility.

ii. Utilize Private Blockchain to Improve Stakeholder Engagement

Companies should invest in private blockchain solutions to improve communication and trust with key stakeholders. By enabling secure and transparent collaboration with partners and customers, businesses can strengthen relationships and ensure that sensitive information is protected while still promoting transparency.

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