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BLOCKCHAIN-BASED TAX SYSTEMS AND THE REDUCTION OF TAX EVASION FOR REVENUE BOOSTING IN SAUDI ARABIA

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ABSTRACT

This study investigates the potential of blockchain-based tax systems to reduce tax evasion and enhance revenue collection in Saudi Arabia. Given the Kingdom's growing emphasis on non-oil revenues and the persistent challenge of tax non-compliance, the research aims to evaluate the feasibility and impact of integrating blockchain technology into Saudi Arabia's tax administration. A descriptive cross-sectional survey design was employed, using a quantitative methodology to collect and analyze data. Primary data was gathered through structured questionnaires administered to 380 respondents, including public tax officials, IT professionals, blockchain developers, and tax consultants. Secondary data sources included government reports, policy documents, and international case studies. The study applied multiple linear regression analysis to assess the relationship between blockchain attributes—such as transparency, automation, security, and institutional readiness—and improvements in taxpayer compliance and government revenue. Findings indicate that blockchain has significant potential to increase transparency, reduce corruption and tax evasion, and enhance voluntary compliance, with over 70% of respondents acknowledging positive outcomes. However, substantial barriers—particularly technological infrastructure gaps, legal ambiguity, and institutional resistance—must be addressed through targeted reforms and stakeholder collaboration. The study further contributes to the Saudi economic context by aligning with Saudi Vision 2030 through supporting fiscal sustainability, strengthening non-oil revenue generation, advancing digital transformation, and improving the efficiency and transparency of tax administration. The study concludes that, with proper implementation and supporting reforms, blockchain can play a transformative role in modernizing Saudi Arabia's tax system, boosting revenue,

and strengthening public trust in tax governance. Recommendations for phased implementation and capacity-building are also presented.

KEYWORDS: Blockchain Technology, Tax Administration, Tax Evasion, Revenue Collection, Transparency, Taxpayer Compliance, And Saudi Arabia.

1. INTRODUCTION

Over the last two decades, governments worldwide have increasingly recognized the transformative power of digital technologies in modernizing public services, including taxation. In Saudi Arabia, where fiscal diversification and non-oil revenue growth are central policy priorities, leveraging technology to improve tax compliance and enhance public revenues has become a strategic imperative. The Saudi economy is increasingly focused on strengthening non-oil revenues, improving tax administration, and advancing digital government in line with Vision 2030. However, tax evasion, underreporting, and compliance gaps can still undermine the effectiveness of tax administration and reduce the efficiency of public revenue collection.

According to Saudi Ministry of Finance data, tax revenues reached approximately SAR 381 billion in FY2024, while total government revenues reached around SAR 1.259 trillion, underscoring the importance of strong tax administration to fiscal performance. At the operational level, the Zakat, Tax and Customs Authority (ZATCA) provides channels for reporting tax evasion and manipulation, reflecting the importance of compliance enforcement in protecting public resources. These fiscal realities place increasing emphasis on digital tools capable of improving transparency, reducing leakage, and strengthening tax governance.

The integration of blockchain into governmental systems, particularly tax collection and management, presents significant opportunities. These include reducing human error, curbing corruption, improving taxpayer data accuracy, and—most importantly—combating tax evasion through increased traceability and compliance enforcement (Yermack, 2017; Salah et al., 2019). Blockchain's ability to create tamper-proof records and facilitate automated processes via smart contracts enhances transparency and minimizes opportunities for fraudulent activity. Taxation is a cornerstone of Saudi Arabia's national revenue. Yet, despite multiple reforms, the tax-to-GDP ratio remains lower than the regional average. Much of Saudi Arabia's tax income is sourced from indirect taxes—such as general sales tax—which often disproportionately burden low- and middle-income citizens. This reliance on indirect taxation, compounded by a weak enforcement environment, incentivizes both individuals and corporations to underreport or completely avoid tax obligations.

The Saudi government has recognized these

systemic vulnerabilities and introduced a range of measures aimed at strengthening fiscal oversight, improving compliance monitoring, and digitizing tax administration. Within this context, the Zakat, Tax and Customs Authority has continued expanding digital compliance tools and e-invoicing requirements, while broader public-sector digital transformation efforts support more integrated and data-driven governance.

The digital transformation of the Saudi public sector has been a stated priority under Saudi Vision 2030 and the Kingdom's wider digital government agenda. This transformation includes the modernization of tax collection mechanisms and the implementation of electronic invoicing through ZATCA's Fatoora system, which converts invoicing into a structured electronic process and is being rolled out in phases across taxpayers in the Kingdom. In parallel, Saudi institutions have issued guidance and studies on blockchain adoption, reflecting growing national interest in the technology's regulatory and operational potential.

The application of blockchain in tax administration encompasses a range of possibilities. For instance, blockchain can enable secure sharing of taxpayer information between governmental agencies, reducing redundancies and opportunities for data manipulation. It can also automate the validation of tax records using smart contracts, thereby reducing manual oversight and human error (Fanning & Centers, 2016). This leads to faster, more reliable assessments and audits. Moreover, blockchain technology supports the concept of a real-time economy. In such a system, tax obligations can be automatically calculated and paid as transactions occur. This reduces tax delays and the possibility of intentional underreporting. For example, if integrated with point-of-sale systems and e-invoicing platforms, blockchain could ensure that every commercial transaction is recorded and assessed for tax in real time, making tax evasion increasingly difficult.

One of the most pressing fiscal issues Saudi Arabia faces is systemic tax evasion. Individuals and businesses exploit legal loopholes, weak enforcement, and outdated reporting systems to avoid tax liabilities. Traditional methods of combating evasion—such as audits and penalties—have proved insufficient, especially in informal sectors where transaction records are limited or falsified. Blockchain offers an innovative solution to this problem by creating an immutable, traceable, and auditable digital trail. Every financial transaction entered into the blockchain ledger is time-stamped,

cryptographically sealed, and distributed across a network, ensuring that no single actor can alter the data without detection (Yermack, 2017). This makes fraudulent behavior significantly harder to execute or conceal. Furthermore, public accessibility to blockchain records—where appropriate—can increase pressure on businesses and individuals to remain compliant, knowing their activities may be subject to digital scrutiny.

An equally important dimension of tax compliance is public trust. In Saudi Arabia, like in many other countries, citizens' willingness to pay taxes correlates with their perception of government transparency, fairness, and service delivery. Blockchain technology, by offering an open and verifiable system of record, has the potential to rebuild this trust. It allows for greater visibility into how tax revenues are collected, managed, and allocated, thus addressing long-standing concerns about mismanagement and corruption. Studies have shown that citizens are more likely to comply with tax regulations when they perceive the system to be transparent and equitable (OECD, 2021). The implementation of blockchain-based systems in Saudi Arabia could provide such transparency and thereby enhance voluntary compliance, leading to improved revenue collection without the need for coercive measures.

Globally, several governments have begun exploring the use of blockchain for tax administration. Estonia, for example, has implemented blockchain to secure government records, while countries like Brazil and China are experimenting with blockchain-enabled e-invoicing systems. These initiatives provide valuable insights for Saudi Arabia as it seeks to modernize its tax systems. Saudi Arabia's relatively small size and centralized governance structure present unique opportunities for piloting blockchain-based tax solutions. Moreover, its existing efforts in e-government, coupled with partnerships with international financial institutions and donors, position it well to adopt and scale blockchain technology in public finance. However, challenges remain. These include developing a robust regulatory framework, building technical expertise, and ensuring the interoperability of blockchain systems with existing government infrastructure. Additionally, public education and stakeholder engagement will be critical to ensure that new systems are adopted and trusted.

Given the critical role of tax revenues in Saudi Arabia's economic development and the country's high vulnerability to tax evasion, there is an urgent

need to explore innovative and sustainable solutions. This research is motivated by the hypothesis that blockchain integration in tax systems can significantly reduce tax evasion, increase compliance, and subsequently enhance public revenue. The remainder of this study will explore existing literature on blockchain applications in public finance, assess Saudi Arabia's digital readiness, evaluate the challenges and opportunities of implementing blockchain in tax systems, and propose a model for its integration. Empirical and case-based evidence will be used to support arguments and provide a practical roadmap for implementation.

Statement of the Problem

Tax evasion remains a significant impediment to fiscal sustainability and economic development in Saudi Arabia. Despite numerous legislative reforms and the introduction of compliance mechanisms, the country continues to face widespread underreporting, tax fraud, and inefficiencies in tax collection processes. The persistent reliance on indirect taxation, limited data integration across government agencies, and inadequate technological infrastructure have all contributed to a weak enforcement environment. According to official reports, tax evasion in Saudi Arabia has previously resulted in losses exceeding SAR 381 billion annually (The Saudi Arabia Times, 2016), placing immense strain on the national budget and limiting the government's capacity to invest in essential public services such as education, healthcare, and infrastructure.

Traditional methods of monitoring and enforcing tax compliance have proven insufficient in addressing the scale and complexity of tax evasion, especially in sectors that operate informally or rely heavily on cash transactions. These methods are often labor-intensive, susceptible to human error, and vulnerable to corruption. Moreover, public trust in the tax system remains low, fueled by perceptions of inequity and government mismanagement of public funds.

The integration of blockchain technology presents a novel opportunity to address these challenges by providing a secure, transparent, and immutable system for recording financial transactions. However, the adoption of blockchain in public tax systems in Saudi Arabia is still in its nascent stages, and there is a lack of empirical research exploring its feasibility, implementation challenges, and potential impact on tax compliance and revenue generation. Without a clear, evidence-based understanding of

how blockchain can be effectively integrated into Saudi Arabia's tax administration, policymakers risk either underutilizing a potentially transformative technology or implementing it in ways that fail to yield tangible improvements.

Therefore, the problem this study addresses is the lack of an effective, technology-driven solution to reduce tax evasion and enhance revenue collection in Saudi Arabia. Specifically, it examines how blockchain-based tax systems can improve transparency, accountability, and compliance in Saudi Arabia's tax administration and assesses the readiness of the Saudi institutional and regulatory environment to adopt such innovations.

Research Objectives

1. To examine the current state of tax administration and the extent of tax evasion in Saudi Arabia.
2. To assess the technological, legal, and institutional readiness of Saudi Arabia for implementing blockchain-based tax systems.
3. To analyze global best practices in the use of blockchain for tax administration and draw lessons applicable to Saudi Arabia.
4. To evaluate the potential impact of blockchain integration on transparency, accountability, and taxpayer compliance.

Research Questions

1. What are the main causes and consequences of tax evasion in Saudi Arabia's current tax system?
2. How can blockchain technology be utilized to enhance transparency and accountability in Saudi Arabia's tax administration?
3. What are the technological, legal, and institutional barriers to adopting blockchain in Saudi Arabia's tax system?
4. What is the potential impact of a blockchain-based tax system on taxpayer behavior and government revenue collection in Saudi Arabia?

Hypotheses

Based on the objectives and research questions outlined, this study hypothesizes the following:

H1: Blockchain technology can enhance the transparency and traceability of financial transactions in Saudi Arabia's tax system, leading to reduced opportunities for tax evasion.

H2: The adoption of blockchain-based tax systems will improve taxpayer compliance by providing more secure, automated, and tamper-proof methods of tax record-keeping.

H3: The implementation of blockchain in Saudi Arabia's tax administration will result in higher

levels of public trust and confidence in government tax systems, contributing to increased voluntary compliance.

H4: The transition to blockchain-based tax systems in Saudi Arabia will require overcoming significant technological, legal, and institutional barriers, but can be successfully implemented with appropriate reforms.

This study is also of practical relevance to Saudi Arabia because it supports the economic objectives of Saudi Vision 2030 by proposing a digital tax administration model that can strengthen non-oil revenue mobilization, improve tax transparency, raise administrative efficiency, and reinforce trust in public financial governance. In addition, the study aligns with the Fiscal Sustainability Program and the Kingdom's broader digital transformation agenda by presenting blockchain as a strategic tool for enhancing tax compliance, limiting revenue leakage, and supporting a more resilient and diversified Saudi economy.

From a scientific perspective, this study enriches the literature at the intersection of blockchain technology, tax administration, and public finance by extending the discussion to the Saudi context, which remains underexplored in empirical research. The study contributes theoretically by examining how blockchain attributes, such as transparency, traceability, automation, and institutional readiness, may explain improvements in tax compliance and revenue performance. It also contributes methodologically by offering empirical evidence from stakeholders directly connected to taxation, digital systems, and regulatory practice, thereby providing a context-specific basis for future academic inquiry in Saudi Arabia and the Gulf region.

Scientific Significance of the Study

2. LITERATURE REVIEW

Tax Evasion and Its Impact on Saudi Arabia's Economy

Tax evasion is a significant issue in many countries, but it has particular ramifications for economies like Saudi Arabia's, where fiscal sustainability is closely linked to tax revenues. Saudi Arabia has historically struggled with tax evasion, which contributes to a large informal sector that is difficult to monitor and regulate (Alkarabsha, Alwashah & Alsharayri, 2023). In 2016, it was reported that tax evasion in Saudi Arabia cost the government over SAR 381 billion, amounting to a substantial proportion of the country's GDP (The Saudi Arabia Times, 2016). There are several factors

contributing to this persistent issue. First, the Saudi economy has a high reliance on indirect taxes, such as the General Sales Tax (GST), which tends to disproportionately burden low-income citizens (Alshira'h, Alshirah & Khassawneh, 2024). Second, the informal sector, which represents a significant part of the economy, often operates outside the scope of formal tax monitoring. Third, the public's low trust in government institutions, exacerbated by perceptions of corruption and inefficiency, encourages tax evasion (Berg, 2021). These systemic issues highlight the need for transformative solutions to combat tax evasion and improve revenue collection.

Blockchain Technology: Concept and Capabilities

Blockchain technology, a decentralized and distributed ledger system, has gained widespread attention for its potential to revolutionize various sectors, from finance to supply chain management, and more recently, public administration (Oriekhoe, Ashiwaju, Ihemereze *et al.*, 2024). Initially designed as the underlying technology for cryptocurrencies like Bitcoin, blockchain allows for secure, transparent, and tamper-resistant transaction recording, making it particularly attractive for industries that require robust and immutable record-keeping (Nakamoto, 2008). Blockchain operates by storing information across a distributed network of computers, where each transaction or data entry is recorded in a "block." These blocks are linked in a chain, forming a permanent, chronological record. Crucially, blockchain's decentralized nature eliminates the need for a central authority, thus reducing the risks of fraud, errors, and corruption (Salah *et al.*, 2019; Dong, Abbas, Li & Kamruzzaman, 2023). This makes blockchain especially relevant for sectors where transparency, security, and accountability are vital—such as public finance and tax administration.

Blockchain in Public Administration

In recent years, blockchain technology has garnered interest from public administrations seeking to streamline operations, increase transparency, and combat corruption. The potential for blockchain in public finance and taxation lies in its ability to provide a transparent, immutable, and decentralized platform for recording transactions (Javaid, Singh, Suman & Khan, 2022). Many governments have explored blockchain's use for secure voting systems, land registries, and even identity management (Pilkington, 2016). However,

one of the most promising areas of blockchain application has been in tax administration. Blockchain can enhance tax reporting by ensuring that all transactions are automatically recorded and cannot be altered, thus reducing the opportunity for tax fraud and evasion (Ariyibi, Bello & Adediran, 2024). The technology also allows for the integration of smart contracts, which are self-executing contracts that automatically trigger actions once predefined conditions are met. In the context of tax administration, smart contracts can facilitate real-time tax collection and payments, further reducing the chances of evasion (Fanning & Centers, 2016).

Blockchain and Tax Administration: Global Perspectives

Globally, several countries have explored or piloted blockchain technology in tax administration. Estonia, for example, has successfully integrated blockchain technology into various aspects of public governance, including e-residency, e-voting, and digital identity management (Peters & Panayi, 2016). The country's focus on digitalizing its public services has set a benchmark for other governments considering similar transformations (Cong, Thuy, Nhi & Anh, 2024). In China, blockchain has been used to enhance transparency in the tax system by creating an immutable ledger of transactions. This has enabled better tracking of business activities, thus making it harder for firms to underreport income or evade taxes (Wu, 2020). Brazil has also taken steps to integrate blockchain in its tax system by launching an e-invoicing system that utilizes blockchain to ensure that all invoices are recorded in real-time and cannot be manipulated (Zhang, 2022; Ariyibi, Bello, Adediran *et al.*, 2024). According to Larikaman, Salehi and Yaghubi (2024), the experiences of these countries provide valuable lessons for Saudi Arabia. Blockchain offers a transformative potential that could modernize the country's tax system and reduce opportunities for tax evasion. However, the adoption of blockchain comes with its own set of challenges, including technical, legal, and cultural barriers, which must be addressed for effective implementation.

Blockchain's Potential for Combating Tax Evasion in Saudi Arabia

The integration of blockchain into Saudi Arabia's tax administration offers several key benefits that could help combat tax evasion. First, blockchain's decentralized ledger provides a transparent, tamper-proof record of all transactions, ensuring that no actor can alter the data without detection Albatineh

(2025). This feature makes it difficult for individuals or businesses to underreport income or falsify tax records (Yermack, 2017). In addition, blockchain allows for real-time data processing, enabling immediate identification of discrepancies and discrepancies in reporting (Fanning & Centers, 2016). Second, blockchain-based tax systems could significantly reduce administrative overheads by automating tax calculations, reporting, and payment through smart contracts. This would make tax collection more efficient, reduce the burden on tax authorities, and eliminate the need for manual checks, which are often susceptible to human error and corruption (Ariyibi, Bello & Adediran, 2024). Furthermore, poised that blockchain's ability to create immutable, verifiable records would encourage greater public trust in the tax system. By making it harder for individuals and businesses to evade taxes and by providing citizens with visibility into how tax revenues are used, blockchain could strengthen voluntary compliance. This is crucial in a country like Saudi Arabia, where low levels of trust in government have contributed to persistent tax evasion.

Challenges to Blockchain Adoption in Saudi Arabia

Despite the potential benefits, there are several challenges to the adoption of blockchain in Saudi Arabia's tax system. One of the primary obstacles is the lack of technical infrastructure. Blockchain requires significant technological investment, including secure servers, training, and specialized software. Additionally, there are legal and regulatory challenges. Saudi Arabia's existing tax laws and regulations may not be compatible with blockchain-based solutions, necessitating extensive reform (Blockchain News Group, 2025). Another challenge is the need for public awareness and trust. Saudi Arabia's population may not be familiar with blockchain technology, and there may be resistance to its use due to concerns over privacy, security, and the perceived complexity of digital systems. Moreover, the transition to blockchain will require collaboration between various stakeholders, including the government, private sector, and citizens, all of whom must be convinced of the benefits of blockchain for tax administration (Berg, 2021).

The Role of Blockchain in Revenue Boosting

One of the most promising outcomes of blockchain adoption in Saudi Arabia's tax system is the potential for increased government revenue.

Blockchain can help close the revenue gap by reducing tax evasion, increasing compliance, and ensuring that all transactions are properly reported and taxed. With more accurate and timely tax reporting, the government would be able to capture a greater share of economic activity, particularly from the informal sector. Moreover, by improving the efficiency of tax administration, blockchain could reduce the cost of tax collection, freeing up resources for other important public services. Enhanced public trust in the tax system, facilitated by blockchain transparency, could also encourage greater voluntary tax compliance, leading to higher overall revenues (OECD, 2021). Blockchain technology offers a promising solution to the persistent issue of tax evasion in Saudi Arabia, as well as a potential means to modernize the country's tax administration and boost public revenues. Its ability to provide transparent, immutable, and efficient transaction records makes it an ideal tool for enhancing tax compliance and combating fraud. While there are challenges to its adoption, including technical, legal, and cultural barriers, global case studies show that blockchain can be successfully implemented in public tax systems. For Saudi Arabia, blockchain could be the key to reducing tax evasion, improving public trust in the government, and strengthening the country's fiscal position.

3. RESEARCH METHODOLOGY

Research Design

This study adopts a descriptive cross-sectional survey design, aimed at empirically examining the potential impact of blockchain technology on tax administration and evasion reduction in Saudi Arabia. A quantitative research approach was employed, allowing for statistical analysis of measurable variables and objective assessment of the relationships between blockchain adoption and key tax-related indicators.

Sources of Data

The study utilized both primary and secondary sources of data to ensure a comprehensive and multidimensional analysis.

- **Primary Data:** Data was gathered through a structured questionnaire administered to selected respondents from tax-related public institutions, private sector organizations, and professionals engaged in finance and technology in Saudi Arabia. Where feasible, in-depth interviews were also conducted with key stakeholders to gather expert insights on blockchain readiness and perceived barriers to adoption.

- Secondary Data: This included policy documents, reports from the Zakat, Tax and Customs Authority (ZATCA), Saudi Ministry of Finance publications, academic journals, government publications, international case studies and white papers on blockchain technology and public finance.

Area of the Study

The study was conducted in Riyadh and key urban centers in Saudi Arabia, where the majority of governmental financial agencies and private sector tax contributors are located. These areas were selected based on their strategic importance in national tax collection and digital infrastructure development.

Population of the Study

The target population comprised public sector tax officials, IT professionals in governmental financial systems, blockchain developers, SMEs, and tax consultants. This population was chosen for its relevance to both the implementation and impact assessment of blockchain-based tax systems.

Sample Size and Sampling Technique

A sample size of 200 respondents was determined using the Krejcie and Morgan (1970) formula for finite populations. The sampling technique was multi-staged:

- Stage 1: Stratified sampling was used to divide respondents into relevant sectors (public administration, IT/technology, private businesses, and tax professionals).
- Stage 2: Proportionate random sampling ensured

fair representation of each group based on their estimated size in the broader population.

- Stage 3: Simple random sampling was employed to select individual participants within each stratum.

This approach ensured that the sample was both representative and diverse, capturing the views of key stakeholders in Saudi Arabia's tax and tech ecosystems.

Research Instrument

Data was collected using a researcher-designed instrument titled "Blockchain Adoption and Tax Compliance Questionnaire" (BATCQ). The questionnaire was divided into two sections:

- Section A: Collected demographic information (age, occupation, sector, digital literacy).
- Section B: Contained Likert-scale items measuring constructs such as perceived blockchain benefits, tax compliance behavior, institutional readiness, and public trust in government systems.

Validity of the Instrument

To ensure content and face validity, the questionnaire was reviewed by subject matter experts in public finance, blockchain technology, and policy analysis. Revisions were made based on their feedback to ensure clarity, relevance, and alignment with research objectives.

Reliability of the Instrument

Reliability was assessed using the test-retest method, followed by analysis via Cronbach's Alpha in SPSS. A reliability coefficient of 0.83 indicated high internal consistency across the instrument's items.

Construct	Number of Items	Cronbach's Alpha	Interpretation
Blockchain Transparency & Security	5	0.84	High
Taxpayer Trust	5	0.81	High
Compliance Behavior	5	0.82	High
Institutional Readiness	5	0.85	High

Data Collection Procedure

Questionnaires were distributed in-person and electronically, with participants receiving a letter of introduction detailing the study's purpose and ensuring confidentiality. On-site distribution was facilitated with the cooperation of officials in tax departments and chambers of commerce.

Ethical Considerations

The study adhered to strict ethical standards. Participants were fully informed of their rights, including voluntary participation and the ability to

withdraw at any time. Consent was obtained prior to data collection. Confidentiality and anonymity were strictly maintained, and data was used solely for academic purposes.

Scoring and Data Measurement

A 5-point Likert scale was used to score respondents' agreement with statements in Section B:

- Strongly Agree (5)
- Agree (4)
- Neutral (3)
- Disagree (2)
- Strongly Disagree (1)

Negatively worded items were reverse-scored to maintain consistency.

Model Specification

The study utilized multiple linear regression models to evaluate the impact of blockchain system variables (transparency, automation, security, traceability) on tax compliance and revenue collection:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \mu$$

Where:

- Y = Taxpayer compliance/revenue boost
- X_1 = Blockchain transparency
- X_2 = System traceability
- X_3 = Automation (smart contracts)
- X_4 = Institutional readiness
- μ = Error term

Data Analysis Methods

Data was analyzed using descriptive statistics (frequencies, percentages, means) and inferential statistics. Pearson correlation and multiple regression analysis were used to test hypotheses and assess the relationship between blockchain variables and tax evasion reduction. SPSS Version 26 was employed for data coding, reliability tests, and regression modeling.

4. DATA ANALYSIS AND DISCUSSION

4.1 Analysis of Demographic Data of the Respondents

The demographic analysis of the respondents reveals that the gender distribution shows a slight majority of males (61.20%) compared to females (38.80%). In terms of age, the largest group is aged 26-35 (38.40%), indicating a youthful workforce engaged in tax-related issues. Educationally, 38.80% hold a Bachelor's degree, while 24.40% have a Master's degree, reflecting a well-educated participant pool. Regarding occupation, the representation is balanced, with government employees at 32.80% and private sector employees at 29.20%. Experience levels vary, with 35.60% having 6-10 years of experience, suggesting a mix of seasoned professionals and newer entrants. This demographic diversity contributes valuable insights into the potential impact of blockchain technology on tax compliance and the reduction of tax evasion in Saudi Arabia.

Table 4.1: Demographic Data Analysis of the Respondents

Demographic Variable	Categories	Freq	Per
Gender	Male	153	61.20%
	Female	97	38.80%
Age	18 - 25	49	19.60%
	26 - 35	96	38.40%

	36 - 45	50	20.00%
	46+	30	12.00%
Educational Level	High School	29	11.60%
	Bachelor's Degree	97	38.80%
	Master's Degree	61	24.40%
	Doctoral Degree	8	3.20%
	Other (e.g., Diploma)	26	10.40%
Occupation	Government Employee	82	32.80%
	Private Sector Employee	73	29.20%
	Self-Employed	41	16.40%
	Student	21	8.40%
	Retired/Other	22	8.80%
Years of Experience	0-5 years	67	26.80%
	6-10 years	89	35.60%
	11-15 years	45	18.00%
	16+ years	40	16.00%

Source: Field Survey, (2025)

4.2 Research Questions

Research Question 1

What are the main causes and consequences of tax evasion in Saudi Arabia's current tax system?

Table 4.2: Causes and Consequences of Tax Evasion

Variable	Freq	(%)	M	SD
Causes of Tax Evasion				
Weak enforcement and audit systems	149	74.50%	4.20	0.85
Complex and unclear tax regulations	135	67.50%	4.05	0.92
High tax rates on businesses and individuals	130	65.00%	3.90	1.01
Low trust in government and institutions	128	64.00%	4.15	0.80
Prevalence of informal economy	123	61.50%	3.85	1.10
Consequences of Tax Evasion				
Reduction in government revenue	155	77.50%	4.40	0.70
Undermines public service delivery	145	72.50%	4.25	0.88
Increased inequality in tax burden	130	65.00%	4.10	0.90
Encourages corruption and fraud	126	63.00%	4.00	0.95
Weakens public trust in institutions	120	60.00%	3.95	1.05

Source: Field Survey, (2025)

Table 4.2 reveals the analysis of the main causes and consequences of tax evasion in Saudi Arabia's current tax system. Among the causes, "weak enforcement and audit systems" emerged as the most significant, with 74.50% of respondents highlighting its impact, reflected in a mean score of 4.20. "Complex and unclear tax regulations" (67.50%) and "high tax rates on businesses and individuals" (65.00%) were also prominent concerns. Additionally, low trust in government (64.00%) and the prevalence of the informal economy (61.50%) contribute to the issue.

On the consequences side, the "reduction in government revenue" was identified by 77.50% of respondents as the most pressing outcome, indicating a strong consensus on its importance. Other significant consequences include the undermining of public service delivery (72.50%) and increased inequality in tax burden (65.00%). These findings reveal the nature of tax evasion in Saudi Arabia and highlight areas where blockchain technology could potentially improve the tax administration system.

Research Question 2

How can blockchain technology be utilized to enhance transparency and accountability in Saudi Arabia's tax administration?

Table 4.3: Utilization of Blockchain Technology in Saudi Arabia's Tax Administration

Blockchain Application Area	Freq	%	M	SD
Real-time transaction tracking	151	75.50%	4.35	0.78
Automated tax collection through smart contracts	139	69.50%	4.20	0.83
Elimination of data manipulation/fraud	131	65.50%	4.10	0.89
Public accessibility to financial records (where applicable)	124	62.00%	4.00	0.95
Improved inter-agency data sharing	115	57.50%	3.95	1.00
Tamper-proof audit trails	132	66.00%	3.90	1.05
Boosting public trust in tax processes	127	63.50%	3.85	1.08

Source: Field Survey, (2025)

Table 4.3 shows the analysis of how blockchain technology can enhance transparency and accountability in Saudi Arabia's tax administration revealing several key applications. The highest-rated application is "real-time transaction tracking," with 75.50% of respondents recognizing its potential, reflected in a mean score of 4.35. This indicates a strong consensus on the effectiveness of blockchain for monitoring transactions as they occur. "Automated tax collection through smart contracts" also garnered significant support (69.50%), highlighting its role in streamlining tax processes. Other notable applications include the "elimination of data manipulation/fraud" (65.50%) and "public accessibility to financial records" (62.00%), both of which enhance trust and accountability. Additionally, "improved inter-agency data sharing" (57.50%) and "tamper-proof audit trails" (66.00%) are seen as vital for fostering collaboration among governmental entities. Thus, the findings highlight the potential for blockchain to transform tax administration in Saudi Arabia, making it more transparent and accountable, thereby boosting public trust in the system.

Research Question 3

What are the technological, legal, and institutional barriers to adopting blockchain in Saudi Arabia's tax system?

Table 4.4: Barriers to Adopting Blockchain in Saudi Arabia's Tax System

Barrier Category	Specific Barrier	Freq	%	M	SD
Technological	Lack of technical infrastructure	152	76.00%	4.40	0.72
	Shortage of blockchain-skilled personnel	139	69.50%	4.25	0.79
	System integration difficulties	131	65.50%	4.10	0.88
Legal/Regulatory	Absence of a regulatory framework	147	73.50%	4.30	0.81
	Legal uncertainty around smart contracts	125	62.50%	4.15	0.90
	Data privacy concerns	130	65.00%	3.95	0.96
Institutional	Resistance to change among tax authorities	123	61.50%	3.85	1.01
	Lack of inter-agency coordination	114	57.00%	3.80	1.07
	Limited funding and resource allocation	116	58.00%	3.70	1.12

Source: Field Survey, (2025)

Table 4.4 shows the analysis of barriers to adopting blockchain in Saudi Arabia's tax system highlights significant technological, legal, and institutional challenges. Among the technological barriers, the most pressing issue identified is the "lack of technical infrastructure," with 76.00% of respondents acknowledging its impact, accompanied by a high mean score of 4.40. The "shortage of blockchain-skilled personnel" (69.50%) and "system integration difficulties" (65.50%) further complicate the adoption process. On the legal and regulatory front, the "absence of

a regulatory framework" is noted by 73.50% of participants as a major barrier, indicating a critical need for legislative support to facilitate blockchain implementation. Concerns regarding "legal uncertainty around smart contracts" (62.50%) and "data privacy" (65.00%) also emerge as significant hurdles. Institutional barriers, including "resistance to change among tax authorities" (61.50%) and "lack of inter-agency coordination" (57.00%), underline the challenges of implementing new technologies in established systems. Hence, these findings reveal the nature

of barriers to blockchain adoption in Saudi Arabia's tax system, highlighting areas that require targeted intervention to foster effective implementation.

Research Question 4

What is the potential impact of a blockchain-based tax system on taxpayer behavior and government revenue collection in Saudi Arabia?

Table 4.5: Potential Impact of a Blockchain-Based Tax System

Impact Area	Indicator/Statement	Freq	%	M	SD
Taxpayer Behavior	Increased voluntary compliance	154	77.00%	4.35	0.69
	Improved trust in tax administration	139	69.50%	4.20	0.76
	Better understanding of tax obligations via real-time records	132	66.00%	4.18	0.82
	Reduced fear of corruption and manipulation	128	64.00%	4.05	0.89
Revenue Collection	Reduction in tax evasion	145	72.50%	4.32	0.75
	Increase in total tax revenues	130	65.00%	4.15	0.80
	Enhanced efficiency in tax collection	125	62.50%	4.10	0.85
	Improved audit and fraud detection capabilities	120	60.00%	3.95	0.92

Source: Field Survey, (2025)

Table 4.5 shows the analysis of the potential impact of blockchain-based tax system on taxpayer behavior and government revenue collection in. A notable 77.00% of respondents indicated that such a system would lead to "increased voluntary compliance," which is further supported by a high mean score of 4.35, reflecting strong agreement. Additionally, 69.50% felt that it would improve trust in tax administration, while 66.00% acknowledged a better understanding of tax obligations through real-time records. The perceived reduction in fear of corruption (64.00%) also points to a shift in taxpayer sentiment. On the revenue collection front, 72.50% of respondents anticipated a reduction in tax evasion, with 65.00% expecting an increase in total tax revenues. Enhanced efficiency in tax collection (62.50%) and improved audit capabilities (60.00%) further underscore the transformative potential of blockchain technology in the tax sector. Overall, these findings suggest that implementing a blockchain-based tax system could significantly enhance taxpayer compliance and boost government revenue, thereby strengthening the overall tax framework in Saudi Arabia.

4.3 Hypotheses Testing

Hypothesis 1

H1: Blockchain technology can enhance the transparency and traceability of financial transactions in Saudi Arabia's tax system, leading to reduced opportunities for tax evasion. To test the hypothesis, multiple linear regression was conducted on the data.

Table 4.6a: Analysis of Blockchain Technology's Impact on Transparency and Tax Evasion

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.782	0.612	0.608	0.415

Table 4.6b: ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	54.028	1	54.028	313.705	0.000
Residual	34.172	198	0.173		
Total	88.200	199			

Table 4.6c: Coefficients

Model	Unstandardized co-efficient		Standardized co-efficient Beta	t-cal.	Sign
	B	Std. Error			
(Constant)	1.215	0.213	0.782	5.705	0.000
Blockchain Transparency	0.765	0.043		17.709	0.000

*Significant at $p < 0.05$

The analysis of Hypothesis 1 demonstrates that blockchain technology significantly enhances the transparency and traceability of financial transactions in Saudi Arabia's tax system, which is associated with reduced opportunities for tax evasion. The results from the multiple linear regression analysis indicate a strong correlation, with an R value of 0.782 and an R Square value of 0.612, suggesting that approximately 61.2% of the variance in tax evasion can be explained by blockchain transparency. The ANOVA results reveal that the regression model is statistically significant ($F = 313.705$, $p < 0.000$), confirming the robustness of the findings. Furthermore, the coefficients table shows that the unstandardized coefficient for blockchain transparency is 0.765, with a t-value of 17.709, indicating a highly significant contribution to the model ($p < 0.000$). These findings collectively support the hypothesis that implementing blockchain technology can effectively enhance transparency and traceability in financial transactions, thereby mitigating tax evasion in Saudi Arabia's tax system.

Hypothesis 2

H2: The adoption of blockchain-based tax systems will improve taxpayer compliance by providing

more secure, automated, and tamper-proof methods of tax record-keeping. To test the hypothesis, multiple linear regression was conducted on the data.

Table 4.7a: Analysis of Blockchain Technology's Impact on Taxpayer Compliance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.748	0.560	0.556	0.431

Table 4.7b: ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	49.560	1	49.560	266.296	0.000
Residual	38.640	198	0.195		
Total	88.200	199			

Table 4.7c: Coefficients

Model	Unstandardized co-efficient		Standardized co-efficient	t-cal.	Sign
	B	Std. Error	Beta		
(Constant)	1.073	0.222	0.748	4.833	0.000
Blockchain Adoption & Security	0.799	0.049		16.314	0.000

*Significant at $p < 0.05$

The analysis of Hypothesis 2 indicates that the adoption of blockchain-based tax systems significantly enhances taxpayer compliance by offering more secure, automated, and tamper-proof methods of tax record-keeping. The results from the multiple linear regression reveal a strong relationship, with an R value of 0.748 and an R Square value of 0.560, suggesting that approximately 56.0% of the variance in taxpayer compliance can be attributed to blockchain adoption and security features. The ANOVA results further confirm the model's statistical significance ($F = 266.296, p < 0.000$). Additionally, the coefficients table shows an unstandardized coefficient of 0.799 for blockchain adoption and security, with a t-value of 16.314, indicating a highly significant impact ($p < 0.000$). These findings collectively support the hypothesis that implementing blockchain technology in tax systems can significantly improve taxpayer compliance by ensuring greater security and reliability in record-keeping processes.

Hypothesis 3

H3: The implementation of blockchain in Saudi Arabia's tax administration will result in higher levels of public trust and confidence in government tax systems, contributing to increased voluntary compliance. To test the hypothesis, multiple linear regression was conducted on the data.

Table 4.8a: Analysis of Blockchain Technology's Impact on Public Trust and Tax Compliance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.715	0.511	0.507	0.457

Table 4.8b: ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	52.720	1	52.720	252.612	0.000
Residual	50.980	198	0.257		
Total	103.700	199			

Table 4.8c: Coefficients

Model	Unstandardized co-efficient		Standardized co-efficient	t-cal.	Sign
	B	Std. Error	Beta		
(Constant)	0.964	0.225	0.715	4.284	0.000
Blockchain Implementation & Trust	0.802	0.050		15.888	0.000

*Significant at $p < 0.05$

The analysis of Hypothesis 3 demonstrates that the implementation of blockchain technology in Saudi Arabia's tax administration significantly enhances public trust and confidence in government tax systems, which contributes to increased voluntary compliance. The multiple linear regression results indicate a strong correlation, with an R value of 0.715 and an R Square value of 0.511, suggesting that approximately 51.1% of the variance in voluntary compliance can be explained by blockchain implementation and its effects on public trust. The ANOVA results confirm that the regression model is statistically significant ($F = 252.612, p < 0.000$). Furthermore, the coefficients table reveals an unstandardized coefficient of 0.802 for blockchain implementation and trust, accompanied by a t-value of 15.888, indicating a highly significant contribution to the model ($p < 0.000$). These findings collectively support the hypothesis that integrating blockchain technology into tax administration can foster higher levels of public trust, thereby encouraging greater voluntary compliance among taxpayers in Saudi Arabia.

Hypothesis 4

H4: The transition to blockchain-based tax systems in Saudi Arabia will require overcoming significant technological, legal, and institutional barriers, but can be successfully implemented with appropriate reforms. To test the hypothesis, multiple linear regression was conducted on the data.

Table 4.9a: Analysis of Barriers to Blockchain Implementation and Reform Impact

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.693	0.480	0.477	0.476

Table 4.9b: ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	61.920	1	61.920	273.185	0.000
Residual	66.560	198	0.336		
Total	128.480	199			

Table 4.9c: Coefficients

Model	Unstandardized co-efficient		Standardized co-efficient	t-cal.	Sign
	B	Std. Error	Beta		
(Constant)	1.182	0.208	0.693	5.683	0.000
Barriers & Reform Impact	0.739	0.045		16.522	0.000

*Significant at $p < 0.05$

The analysis of Hypothesis 4 indicates that while the transition to blockchain-based tax systems in Saudi Arabia faces significant technological, legal, and institutional barriers, successful implementation is feasible with appropriate reforms. The results from the multiple linear regression show a strong relationship, with an R value of 0.693 and an R Square value of 0.480, suggesting that approximately 48.0% of the variance in the effectiveness of transitioning to blockchain can be attributed to the identified barriers and the impact of necessary reforms. The ANOVA results further confirm the model's statistical significance ($F = 273.185$, $p < 0.000$). Additionally, the coefficients table presents an unstandardized coefficient of 0.739 for barriers and reform impact, along with a t-value of 16.522, indicating a highly significant effect ($p < 0.000$). These findings collectively support the hypothesis that overcoming the outlined barriers through targeted reforms can facilitate the successful implementation of blockchain technology in Saudi Arabia's tax system, ultimately enhancing its efficiency and transparency.

5. DISCUSSION OF FINDINGS

Main Causes and Consequences of Tax Evasion in Saudi Arabia

The analysis identified critical causes and consequences of tax evasion within Saudi Arabia's existing tax framework. Table 4.2 reveals that "weak enforcement and audit systems" are the most frequently cited cause (74.5%), with a mean score of 4.20, indicating a systemic gap in regulatory monitoring. This aligns with findings by Alm and Martinez-Vazquez (2021), who emphasize that

inefficient enforcement contributes significantly to non-compliance in developing economies. Other major causes include "complex and unclear tax regulations" (67.5%) and "high tax rates" (65.0%), consistent with studies indicating that tax complexity and burden exacerbate evasion (OECD, 2023). A significant portion of respondents also highlighted "low trust in government" (64.0%) and the "prevalence of the informal economy" (61.5%) as contributing factors, confirming prior assertions that public confidence and shadow economies are crucial variables in tax behavior (Torgler, 2020). In terms of consequences, the most pronounced impact is a "reduction in government revenue" (77.5%), followed by the "undermining of public service delivery" (72.5%) and "increased inequality in tax burden" (65.0%). These outcomes support the economic theory that tax evasion distorts revenue collection and compromises fiscal equity (Bird & Zolt, 2022).

The study's hypothesis that blockchain technology can enhance transparency and traceability, thereby reducing tax evasion, is strongly supported by empirical evidence. Multiple linear regression analysis revealed an R value of 0.782 and an R^2 of 0.612, meaning 61.2% of the variation in tax evasion could be explained by blockchain-enabled transparency. The statistical significance ($F = 313.705$, $p < 0.000$) and the high t-value of 17.709 ($p < 0.000$) for blockchain transparency as a predictor further reinforce the reliability of these results. These findings align with recent research indicating that blockchain implementation improves audit trails, reduces manipulation, and increases trust in tax systems (Gupta et al., 2022; Nakamoto, 2008). Saudi Arabia, facing persistent challenges in enforcement and public trust, stands to benefit substantially from blockchain integration, offering immutable records and real-time monitoring of transactions. Thus, this study substantiates the hypothesis and provides a compelling case for adopting blockchain to mitigate tax evasion and enhance revenue generation.

Role of Blockchain in Enhancing Transparency and Accountability

The analysis from Table 4.3 demonstrates that blockchain technology holds significant promise for enhancing transparency and accountability in Saudi Arabia's tax administration. "Real-time transaction tracking" was the most highly rated application, supported by 75.5% of respondents, with a mean score of 4.35. This suggests strong public perception of blockchain's ability to provide continuous, tamper-proof visibility into financial flows, aligning with literature emphasizing blockchain's

effectiveness in delivering transparent and real-time audits (Yermack, 2017; Tapscott & Tapscott, 2018). "Automated tax collection through smart contracts" also received strong support (69.5%), underscoring its potential to eliminate human error and corruption by embedding tax rules directly into code, as also proposed by McKinney *et al.* (2020). Additional noteworthy applications include "elimination of data manipulation/fraud" (65.5%) and "public accessibility to financial records" (62.0%), both of which directly address historical issues of mistrust and opacity in Saudi Arabia's tax system. These features are crucial, particularly in environments where tax morale is low (Torgler, 2020). Moreover, the roles of "improved inter-agency data sharing" (57.5%) and "tamper-proof audit trails" (66.0%) highlight blockchain's capacity to facilitate seamless collaboration and traceability across institutions, consistent with findings by Chohan (2019).

The statistical results from the multiple linear regression strongly support the hypothesis that blockchain-based tax systems can significantly improve taxpayer compliance. The model yielded an R value of 0.748 and an R² of 0.560, indicating that 56% of the variability in taxpayer compliance is explained by blockchain adoption and its security features. The regression model was statistically significant ($F = 266.296$, $p < 0.000$), and the unstandardized coefficient of 0.799 with a t-value of 16.314 ($p < 0.000$) further confirmed the robustness of blockchain's impact on compliance. These results are in line with recent studies showing that blockchain's decentralization and immutability increase trust, reduce fraud, and improve tax compliance (Gupta *et al.*, 2022; OECD, 2023). In Saudi Arabia's context, where enforcement gaps and trust deficits are well documented, blockchain implementation could redefine tax governance by providing a transparent, secure, and accountable system that encourages voluntary compliance.

Technological, Legal, and Institutional Barriers

The findings presented in Table 4.4 identify significant technological, legal, and institutional barriers to adopting blockchain in Saudi Arabia's tax system. Technologically, the "lack of technical infrastructure" is the most critical constraint, acknowledged by 76.0% of respondents, with a mean score of 4.40. This finding reflects the broader challenge in many developing nations, where outdated systems and limited digital infrastructure hinder emerging technology adoption (World Bank, 2022). The "shortage of blockchain-skilled personnel" (69.5%) and "system integration difficulties" (65.5%)

further complicate implementation, consistent with studies by Crosby *et al.* (2016), which note that blockchain requires highly specialized skills and seamless compatibility with legacy systems. On the legal and regulatory side, the "absence of a regulatory framework" (73.5%) is a prominent concern, underscoring the urgent need for clear legislative guidance. Respondents also highlighted "legal uncertainty around smart contracts" (62.5%) and "data privacy" concerns (65.0%), which mirror international apprehensions about blockchain's compliance with data protection laws (Zetsche *et al.*, 2018). Without regulatory clarity, the adoption of blockchain in tax administration remains risky and ambiguous. Institutional barriers such as "resistance to change among tax authorities" (61.5%) and "lack of inter-agency coordination" (57.0%) suggest systemic inertia and a lack of cohesive vision across governmental bodies. As identified by Janssen *et al.* (2020), institutional rigidity is a major hurdle in digital transformation efforts, especially in public finance sectors.

The hypothesis that blockchain implementation fosters greater public trust and voluntary compliance is supported by robust statistical findings. The multiple linear regression produced an R value of 0.715 and R² of 0.511, indicating that 51.1% of the variance in voluntary compliance is explained by blockchain-induced trust. The regression model was statistically significant ($F = 252.612$, $p < 0.000$), and the unstandardized coefficient of 0.802 with a t-value of 15.888 ($p < 0.000$) further confirms the hypothesis. These results are consistent with studies asserting that blockchain's transparency and immutability enhance citizens' trust in public institutions (Atzori, 2017; OECD, 2023). In a context like Saudi Arabia—where public skepticism toward tax administration is prevalent—blockchain could play a transformative role in rebuilding institutional credibility and encouraging tax compliance through enhanced trust mechanisms.

Potential Impact on Taxpayer Behavior and Revenue Collection

The findings from Table 4.5 underscore the transformative potential of a blockchain-based tax system on both taxpayer behavior and government revenue collection in Saudi Arabia. A significant 77.0% of respondents affirmed that such a system would lead to "increased voluntary compliance," with a high mean score of 4.35, reflecting strong public confidence in blockchain's capacity to instill a sense of fairness and accountability. This supports prior research suggesting that increased

transparency and automation reduce perceived inequality and enhance taxpayer morale (Torgler, 2020; Hashim et al., 2022). Additionally, 69.5% indicated improved trust in tax administration, while 66.0% acknowledged better understanding of tax obligations through real-time access to tax records, aligning with blockchain's core advantage of immutable and accessible financial information (Tapscott & Tapscott, 2018). Further, 64.0% of respondents noted a reduced fear of corruption—highlighting how blockchain can help mitigate discretionary power and manipulation within the tax system (Atzori, 2017). In terms of revenue collection, 72.5% of participants expected a reduction in tax evasion, and 65.0% anticipated increased tax revenues. This reflects global evidence from countries like Estonia, where digital-led reforms, including blockchain, improved revenue mobilization (OECD, 2023). Additionally, enhanced efficiency (62.5%) and audit capabilities (60.0%) further reinforce blockchain's role in streamlining administrative tasks and reducing operational redundancies.

The regression results support the hypothesis that while technological, legal, and institutional barriers exist, blockchain adoption is feasible with the right reforms. The analysis yielded an R value of 0.693 and R² of 0.480, meaning 48.0% of the variation in implementation effectiveness can be explained by overcoming these barriers through targeted reforms. The model is statistically significant ($F = 273.185$, $p < 0.000$), and the unstandardized coefficient of 0.739 ($t = 16.522$, $p < 0.000$) confirms a substantial effect. This is consistent with global studies emphasizing that successful blockchain integration in public systems depends not just on technology, but also on institutional readiness, legal clarity, and stakeholder engagement (Crosby et al., 2016; Janssen et al., 2020). For Saudi Arabia, this indicates a pathway forward—combining infrastructure development with governance reforms to unlock blockchain's full potential in tax administration.

6. CONCLUSION

This study explores the potential of blockchain technology to address the persistent issue of tax evasion in Saudi Arabia, ultimately boosting government revenue and enhancing the efficiency of the country's tax administration system. The research findings indicate that blockchain can significantly improve transparency, reduce opportunities for tax evasion, and foster greater taxpayer compliance through secure, automated, and tamper-proof record-keeping methods. The implementation of

blockchain technology could potentially lead to higher levels of public trust in the government's tax systems, thereby promoting voluntary tax compliance.

However, despite the promising benefits, the adoption of blockchain in Saudi Arabia's tax system faces several technological, legal, and institutional barriers. These include a lack of adequate infrastructure, the absence of specific legislation to govern blockchain-based systems, and resistance to change within established government institutions. Overcoming these challenges will require coordinated efforts from all stakeholders, including the government, regulatory bodies, technology providers, and the public.

7. Recommendations

Based on the findings and conclusions of this study, the following recommendations are made:

1. The Saudi government should introduce legislation that specifically addresses the use of blockchain in tax administration. This includes creating legal provisions for digital signatures, decentralized ledgers, and secure electronic tax record-keeping. Clear legal guidelines would provide the necessary support for blockchain adoption and foster trust among taxpayers and institutions.
2. The government should prioritize the development of the necessary digital infrastructure, such as secure blockchain platforms, high-speed internet connectivity, and integrated systems for tax reporting. This infrastructure will ensure that blockchain solutions can be effectively deployed and maintained across various regions of Saudi Arabia.
3. Collaboration between the government and technology companies should be encouraged to harness the expertise and resources needed for blockchain adoption. Public-private partnerships can facilitate the design and implementation of user-friendly blockchain solutions while ensuring that technology remains up-to-date and secure.
4. A nationwide training program for tax administrators is essential to equip them with the skills and knowledge required to manage blockchain-based tax systems effectively. Additionally, educating taxpayers on the benefits of blockchain technology—such as transparency, security, and ease of use—will encourage voluntary compliance and reduce resistance to the new system.
5. Before full-scale implementation, the government

should consider launching pilot programs in selected regions or industries to test the effectiveness of blockchain in real-world tax administration. This phased approach will allow for the identification of potential challenges and necessary adjustments before nationwide deployment.

6. Saudi Arabia should seek collaboration with international organizations, blockchain experts, and other countries that have successfully implemented blockchain in their tax systems. Sharing knowledge and best practices will provide valuable insights and help avoid common pitfalls.
7. The adoption of blockchain technology should be accompanied by stringent data privacy and

security measures to protect taxpayer information. Ensuring that sensitive financial data is kept secure and private will build trust in the system and reduce fears of misuse.

8. The implementation roadmap for blockchain-based tax systems should be explicitly aligned with Saudi Vision 2030 and its objectives related to digital transformation, fiscal sustainability, transparency, and non-oil revenue growth. Positioning blockchain-enabled tax administration within these national priorities would strengthen institutional commitment, improve policy coordination, and enhance the contribution of the tax system to the long-term development of the Saudi economy

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