

Challenges to adopt Blockchain technology in the Gulf Cooperation Council Countries

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Abstract: This study examines the challenges face blockchain technology adoption by companies operate in Gulf Cooperative Council Countries (GCC). The qualitative approach was utilized to understand the phenomenon. Accordingly, 38 interviews have been conducted with experts, businesses senior managers, professionals and analysts to deeply inquire into the reasons behind reluctance of GCC companies to adopt blockchain technology. The present study adds an original contribution to theory by concluding some very interesting information that facilitates the understanding of the challenges that prevent companies operate in GCC region from benefiting from blockchain technology. These basically come under three dimensions, namely cultural reasons, economic feasibility, and vagueness of the regulatory environment of blockchain technology and its future. This study provides some implications for industry and policymakers to help them to provide venue for proper implementation of this promising technology.

Keywords: blockchain, Gulf Cooperative Council Countries (GCC), financial technology (FinTech), accounting technology

1. Introduction

Since the beginning of the twenty-first century, there has been a noticeable increase in reliance on technology, robotics, and artificial intelligence, permeating various aspects of life [1]. This surge in information and communication technology impacted all aspects of life, rendering reliance on technology and its associated innovations indispensable for the continuity of life. As a result, the management of healthcare services, education, logistics, supply chains, communication, and interaction all became intricately interconnected through advanced and complex technologies [2]. This phenomenon later came to be known as the Fifth Industrial Revolution (5IR) [3].

Within this arena of the ongoing acceleration of technological advancements and constant advancement in information and communication technologies, which consequently opened a wide realm for businesses to leverage and employ these technologies in streamlining operations, reducing costs, increasing productivity, and enhancing their competitiveness [4]. These developments are expected to influence all facets of human life, including economic dimensions and commercial transactions, giving rise to new products and value exchange channels aligned with their advanced technological nature. Notably, one of the significant technological advancements of the present time is blockchain.

With the sheer growth of digitization and digital transformation, blockchain technology has emerged as a crucial requirement for documenting operations in digital ledgers since 2008. This was a prerequisite for launching and exchanging the world's first cryptocurrency i.e., Bitcoin [5]. Blockchain is a distributed ledger

technology that allows for secure, transparent, and tamper-proof transactions. It is a public database that is shared by all participants in a network. Each block in the chain contains a record of transactions, and each block is linked to the previous block using cryptography [6]. This makes it very difficult to change or delete data on the blockchain. Further, Blockchain allows parties unfamiliar with each other to conduct transactions without intermediaries such as banks or electronic payment service providers. Thereby, it is streamlining business operations and obviating the need for payment intermediaries such as banks and clearing houses.

Blockchain technology has the potential to revolutionize many industries, including business, economy, and accounting profession. In business, Blockchain can be used to improve efficiency and transparency in business transactions. For example, blockchain can be used to track the movement of goods and materials through a supply chain, or to record financial transactions [7]. This can help to reduce costs, improve efficiency, and increase trust between businesses. As for example, Walmart is using blockchain to track the movement of food products through its supply chain. This helps to ensure food safety and prevent fraud. Moreover, Maersk is using blockchain to track the movement of shipping containers. This helps to improve efficiency and transparency in the shipping industry.

Regarding economy, Blockchain can be used to create new financial products and services. For example, blockchain can be used to create Decentralized Finance (DeFi) applications, or to issue and trade cryptocurrencies [8]. This can help to create a more efficient and transparent financial system. For instances, IBM is using blockchain to create a platform for trade finance. This helps to reduce the cost and complexity of trade finance transactions. Likewise, Tether is a cryptocurrency that is backed by fiat currency. It is used to facilitate peer- to-peer payments and to reduce the volatility of other cryptocurrencies.

Finally, in terms of accounting and auditing profession, Blockchain can be used to improve the efficiency and accuracy of accounting processes. For example, blockchain can be used to automate the recording of transactions, or to track the ownership of assets [9]. This can help to reduce costs, improve efficiency, and increase transparency in accounting. In this regard, DeFi is a financial system that is built on blockchain technology. It allows users to lend, borrow, and invest money without the need for organizing authority. Furthermore, Initial Coin Offerings (ICOs) are a way to raise capital for new businesses using blockchain technology.

Despite various advantages of Blockchain technology, which includes but not limited to accelerating economic operations, enhancing accuracy, agile business transactions, and facilitating the auditing function on a timely basis, the application of this technology in GCC countries remains limited. Thus, this study aims to identify the difficulties and obstacles impeding the adoption and the implementation of blockchain technology by companies operating in GCC region.

This study represents a valuable addition to the growing body of accounting literature and FinTech. As to the researcher's best knowledge, this topic has not been researched in developing countries. Therefore, this study will fill the existing gap by shedding light on the challenges face companies in the developing countries that prevent them from adopting this contemporary technology despite its numerous benefits.

This study aims to identify the key obstacles that impede the adoption of blockchain technology by companies that operate in GCC countries. Also, aims to understanding challenges that face companies and prevent them from using blockchain technology will help in providing a solution to these issues. The current study falls within the qualitative, exploratory research category, aiming to answer research questions rather than test hypotheses.

This study is organized as follows, the second part discusses the blockchain technology and its implementation, the third part discusses the prior literature, fourth part shows the present study methodology, the data and discusses the results and finally the fifth part presents the study's conclusion.

2. Understanding Blockchain Technology

The information and communication technology revolution has brought a massive change, impacted all the aspects of our life and became a general characteristic of human and institutional environment. The concept of digital transformation, speed, and the increased volume of activities have compelled the synchronization of documentation with this exponential increase in activity. This technology hinges on the documentation of smart contracts, which facilitates the value exchange and bridge the trust gap between parties [10].

Extant literature suggests many definitions for the Blockchain. It is recognized as a modern technology for managing databases that relies on the use of a distributed ledger to verify and store data [11]. Complex algorithms are used to record and update data, and encryption ensures secure data transmission [12]. Blockchain technology is essentially an advanced mechanism for distributed databases that facilitates transparent information sharing within a network of operations [13]. Data in a blockchain is stored in linked blocks, forming a chain, and time-consistency is maintained. Once data is entered, it cannot be changed or deleted without network consensus.

The primary nature of blockchain technology is basically presented as a set of documentation procedures [14]. It is characterized by its high transparency for participants, allowing users to enter, process and monitor operations through network-connected computers [15]. It enables access to the blockchain through a specialized protocol that assigns specific permissions to participants who subscribe which referred as nodes. All processed transactions are digitally signed through authenticated peer- to-peer network. After the validation of these transactions, they are stored in the digital ledger. This “digital ledger” retains a chronological record of all transactions and allows participants to access them at any time, from anywhere as long as they have access to computers and an internet connection [16].

The distinct aspect here is that the ledger does not grant the ability to alter, amend or delete the stored information to any entity that views it. In other words, the “digital ledger” encompasses all interconnected “contracts” through the network, storing transaction information securely and in unchangeable status [17].

These are just a few of the many potential applications of blockchain technology. As technology continues to develop, we can expect to see even more innovative and exciting applications in the future. In the following section the paper presents a timeline of some of the key milestones in the development of blockchain technology [18]:

- 2008: Satoshi Nakamoto publishes the Bitcoin white paper, which introduces the concept of blockchain technology.
- 2009: The Bitcoin network is launched.
- 2013: Ethereum is launched, a blockchain platform that enables the development of decentralized applications.
- 2015: Hyperledger Fabric is released, an open source blockchain platform for business use.
- 2016: The Food and Drug Administration (FDA) launches a blockchain pilot project to track the movement of prescription drugs.
- 2017: The World Economic Forum releases a report on the potential of blockchain technology to impact the global economy.
- 2018: The International Organization for Standardization (ISO) publishes the first international standard for blockchain technology.
- 2019: The United Nations launches a blockchain initiative to improve the efficiency of its operations.
- 2020: The COVID-19 pandemic accelerates the adoption of blockchain technology for a variety of applications, including contact tracing and vaccine distribution.

Blockchain technology possesses a number of features that give this emerging technology its significance, especially in the realm of business, and specifically within the domain of accounting and auditing. The

following points summarize these characteristics.

1. **Distribution:** Every party involved in an economic process within the blockchain system can execute and complete operations such as money transfers and digital currency subscriptions without the requirement of validation from any other party.
2. **Decentralization:** The execution of commercial transactions or financial transfers does not necessitate validation from external parties or intermediaries, and it is not subject to the scrutiny of regional or international authorities.
3. **Transparency:** One of the distinctive characteristics of blockchain technology is complete transparency among the parties engaged in commercial transactions. This also ensures complete transparency within each individual entity, which aids in achieving higher levels of institutional governance, facilitates internal and external auditing procedures, and enhances the effectiveness of internal control systems.
4. **Traceability:** The property of traceability entails the ability to identify stages within a commercial process and define its parties or pinpoint any errors within the process swiftly and automatically. Such speed in detecting deficiencies or errors aids in rapid addressing of those deficiencies or errors.
5. **Immutability:** Once data is added to the blockchain, it cannot be changed or deleted. This is because each block is cryptographically linked to the previous block, forming a chain of data that cannot be tampered with.

Blockchain Benefits:

The initial objective that blockchain designed for was to facilitate the exchange of digital currencies (cryptocurrencies) securely, referred to as “Blockchain 1.0.” This was especially tailored to serve the Bitcoin cryptocurrency. This technology was subsequently applied to facilitate and document operations involving the mining, issuance, and exchange of various digital currencies, such as *Dogecoin* and *Ripple*, leading to the development of “Blockchain 2.0.” The aim was to expand its applications to various sectors, including auditing, control, banking services, maritime and air transport, as well as other aspects of life such as healthcare systems, statistics, and big data analysis [19]. Further developments led to “Blockchain 3.0,” which predominantly focuses on the healthcare sector. However, Blockchain technology according to [20]; [21]; [22] can be helpful in a variety of ways, and these include but are not limited to:

- **Security:** Blockchain is a very secure technology. The data is encrypted and distributed across a network of computers, making it very difficult to hack or tamper with.
- **Transparency:** Blockchain is a transparent technology. All transactions are recorded on the blockchain and are visible to everyone. This makes it a very accountable system.
- **Efficiency:** Blockchain can be used to automate transactions and processes, which can save time and money.
- **Scalability:** Blockchain can be scaled to support a large number of users and transactions.
- **Cost-effectiveness:** Blockchain can be a cost-effective way to store and manage data.
- **Immutability:** Once data is added to the blockchain, it cannot be changed or deleted. This is because each block is cryptographically linked to the previous block, forming a chain of data that cannot be tampered with.
- **Auditability:** The blockchain ledger is an auditable record of all transactions that have ever taken place on the blockchain. This makes it a valuable tool for tracking and monitoring data.
- **Trustless:** Blockchain transactions do not require a trusted third party, such as a bank or government. This can save time and money, and it can also make transactions more secure.
- **Disintermediation:** Blockchain can help to disintermediate intermediaries, such as banks and insurance companies. This can lead to lower costs and more efficient services.

- Democratization: Blockchain can help to democratize access to data and services. This can make it easier for people to participate in the economy and to make informed decisions.

3. Prior Literature

It is important to note that the subject of blockchain technology remains an area requiring extensive research and study. Up until the preparation of this study, research on the impediments of applying blockchain technology and proposing suitable solutions to address these impediments has been limited, as per the researcher's knowledge.

Despite its technical nature, blockchain technology has profound accounting implications. Its initial purpose was to document digital currency transactions, as researchers like [23] argue that blockchain technology is fundamentally an accounting matter. Its inception aimed to streamline documentation, invoicing, and facilitate commercial exchanges.

Furthermore, it's noteworthy that literature is still limited in terms of research connecting blockchain technology to accounting and finance especially in the Middle East and North Africa Region (MENA). Thus, the present study will take the burden to the existing gap in literature by conducting this exploratory study in GCC countries. [24] summarized most common challenges that face companies when they decided to adopt any new technology, and these are as follows:

- Lack of awareness: There is still a lack of awareness about blockchain technology, both among businesses and the general public. This has made it difficult for businesses to see the benefits of blockchain technology and to justify the investment required to adopt it.
- High cost: The cost of implementing blockchain technology can be high, especially for large organizations. This has made it a challenge for some businesses to adopt blockchain technology.
- Lack of trust: Some people are hesitant to adopt blockchain technology because they do not trust the technology or the people who are developing it. This is a challenge that needs to be addressed in order to gain wider adoption of blockchain technology.

Previous studies also underscore that despite its origination to meet specific accounting requirements, such as digital currencies, blockchain technology has introduced challenges for accounting and auditing professionals. This has made technological skills imperative for

accountants and auditors to stay abreast of developments in this field. Furthermore, [25], found that the regulatory landscape for blockchain technology is still evolving and this has made it difficult for businesses to adopt the technology.

In a similar vein, a remarkable study by [20] reviewed prior studies focusing on the impact of blockchain technology on accounting and auditing professions. The researchers concluded that an interpretive framework is lacking, explaining the relationship between blockchain technology and the accounting discipline. Furthermore, the challenges imposed by this technology require accounting and auditing professionals to acquire advanced technological and programming knowledge to keep up with its continuous developments.

Blockchain technology faces several impediments hinder its adoption, as highlighted in the following discussion and according to previous studies. Extant literature, e.g. [26] and [12], have identified numerous obstacles and issues associated with the adoption, implementation, and utilization of blockchain technology. Some of these obstacles are intertwined with infrastructural factors, cultural environment, legislation, and the underlying framework. The subsequent elaboration delves into these barriers and challenges:

1. Economic Obstacles: Linked to the high cost of acquiring and deploying this technology within local companies.
2. Infrastructure and Communication Networks: Utilizing blockchain technology requires substantial

computational power and high-speed internet connectivity, which is not easily attainable, particularly in developing countries.

3. **Legislative and Regulatory Constraints:** While digital currencies have been fundamental to the evolution of blockchain technology, Monetary authorities in GCC countries prohibit the trading of digital currencies within the country. This measure aims to safeguard the national economy and mitigate security-related concerns associated with this technology.
4. **Environmental and Cultural Context Challenges:** The prevailing work culture is risk-averse and conservative, impeding the adoption of new technologies due to fears of potential issues arising from their implementation.

This study focuses on the GCC countries. The GCC is political and economic confederation that includes Arab countries that shares borders in the Arabian Peninsula. The GCC was established on May 25, 1981, by six Arab states in the Persian Gulf region: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates. The main goals of the GCC are to promote economic cooperation, political coordination, and security among its member states.

The total population of the GCC is about 65 million people. Saudi Arabia is the most populous member state with over 34 million people, followed by the United Arab Emirates with over 10 million people. The total area of the GCC is about 2.7 million square kilometers. Saudi Arabia is the largest member state with an area of over 2 million square kilometers, followed by the United Arab Emirates with over 83,000 square kilometers. The combined GDP of the GCC is about \$3.6 trillion. Saudi Arabia has the largest economy in the GCC with a GDP of over \$1.9 trillion, followed by the United Arab Emirates with a GDP of over \$400 billion.

The GCC is a regional organization that has been active in promoting economic cooperation, political coordination, and security among its member states. The GCC has also been involved in a number of regional initiatives, such as the development of the Gulf Cooperation Council Free Trade Area (GCCFTA) and the Gulf Security Dialogue [27]. Furthermore, The GCC is a significant economic and political player in the Middle East region. The GCC's combined GDP is larger than that of Russia and India, and its oil and gas reserves are the largest in the world. The GCC is also a major investor in the United States and Europe [28].

4. Methodology, data and discussion

This study aims to explore the obstacles that encounter the adoption of the blockchain technology in GCC countries. A qualitative inquiry based on the interpretivism worldview and inductive approach has been chosen for this research that postulates that the results of an investigation can vary in different contexts [29]. This kind of approach is appropriate for the exploration of context-dependent phenomena, such as ethnicity, region and/or specific phenomenon in specific context. Thus, the researcher has adopted the unstructured interview to collect information about this issue and the interviews has

been conducted with experts, specialist, investors and government officials to discuss with them the main issues that prevent companies works in gulf region to adopt the blockchain technology and make use of them despite its numerous benefits discussed early.

The researcher has interviewed 38 individuals from the different six countries that form the GCC and the allocation of the sample to each country is summarized in Table 1 below.

The interviews have been conducted in the period between October 3rd 2022 and April 25th 2023. The interviews lasted between 35 minutes to 55 minutes. The interviews later have been transcribed and processed through NVivo 12. To analyze the data, the researcher used thematic analysis method as a guiding path, that is, "a method for spotting, analyzing, and reporting themes "patterns within data". Accordingly, the main themes of elicited from the interviews have been summarized in the Table 2 below.

Table 1. Interviews participants

Country	Number of interviewees
Kingdom of Saudi Arabia	9
Kuwait	5
Oman	7
United Arab Emirates	8
Qatar	6
Bahrain	4

Source: prepared by author.

Table 2. Research main themes based on interviews analysis

Theme	Appearances, repetitions in the interviews	Dimension
Cost, Economic Feasibility, Financial matters	19	Economic Challenge
Risk, Operational Risk, Safety, Security, Compliance, Threats, cyberattack.	13	Cultural Challenge
Future, vague, amateur, developing, not necessary Risk	21	Vagueness

Source: prepared by author

From the above table we can notice that the nodes highlighted by NVivo summaries the challenges and obstacles that prevent companies in GCC from adopting this technology, which are classified under three dimensions, namely economic, cultural, and vagueness. These can be discussed as follows:

1. Economic Obstacles: as this technology is costly and consumes a huge amount of energy which eventually will cause significant harm to the environment.

Under this construct some of the respondents provide interesting insightful comments e.g. “Modern technology can be expensive to purchase and implement. This can be a barrier for businesses that are on a tight budget, especially we are just recovering from the consequences of COVID-19 on economy.”

Another interviewee stated that: “adoption of new sophisticated technology like blockchain need a huge investment in IT infrastructure, training employees, installing a new measure for IT security, which cannot come without substantial costs.”

2. Cultural obstacles, in cultures with high uncertainty avoidance, people feel uncomfortable with ambiguity and change. They are more likely to adopt new technology if it is seen as a way to reduce uncertainty and risk. In cultures with low uncertainty avoidance, people are more comfortable with change and are more likely to adopt new technology even if it is unfamiliar. The risk-averse stance that prevails in the region can explain the reluctance of companies to adopt this new technology as the Arab culture is conservative and not risk taker [30].

Under this construct it is worth mentioning some quotes come across the debate with interviewees:

One respondent stated that: “Some employees may be resistant to change and may not be willing to adopt new technology. This can slow down the adoption process and make it difficult to get everyone on board “

Another interviewee said: “Businesses may be afraid of the unknown and the potential risks associated with new technology. They may not understand how the technology works or how it will impact their business lack of rust Businesses may not trust the new technology and may be concerned about its reliability and security”.

3. The vagueness of blockchain and the absence of regulatory agency worldwide, and the skepticism associated with this emerging technology still represent a concern for decision makers for GCC

companies and decision makers in the region. The vagueness of blockchain refers to the lack of clarity about the technology's potential and limitations. This vagueness is due to a number of factors, including:

- The technology is still in its early stages of development.
- There are many different types of blockchains, each with its own strengths and weaknesses.
- The technology is complex and difficult to understand for non-technical people.
- There is a lack of clear regulations governing the use of blockchain technology.

The vagueness of blockchain can make it difficult for businesses and individuals to decide whether or not to adopt the technology. It can also make it difficult to develop and implement blockchain-based applications.

Under this construct also, it is interesting to mention some quotes elicited from interviews, for example, one of the interviewees said that "This is because there are still a number of challenges that need to be addressed before blockchain can be used in a variety of applications. For example, the regulatory landscape for blockchain is still evolving, and there are concerns about the security and environmental impact of the technology."

Another added "blockchain is a relatively new technology and there is still a lot of research being done on it. There are also many different types of blockchains, each with its own strengths and weaknesses. This can make it difficult for people to understand the technology and its potential applications."

5. Conclusion

The present study has examined the challenges and obstacles that prevent companies in GCC region from adopting the blockchain technology and harvest its benefits in operations agile, efficiency and many other benefits of improving business.

Based on the information elicited from the interviews, this study concludes the following:

1. The culture that dominates GCC companies' management are generally risk averse and reluctant to embrace new technology, this contributes to their resistance to change.
2. Regulatory and legislative bodies are recommended to consider sanctioning regulations that facilitate the adoption of technological developments worldwide, meanwhile the accounting standards setters also need to consider issuing clarification on how the proper treatment of transaction conducted via distributed ledger in accounting records and how they presented in a way that fairly present the financial positions of engaged parties in such transactions.
3. The study recommends companies' managements to understand the experiences of companies that have implemented blockchain technology and achieved economic growth and substantial returns from adoption such promising technology.
4. Finally, more research effort is needed to continued examining this phenomenon in this context, especially considering that local accounting literature has largely neglected the impact of this technology on company performance and the potential for its utilization in enhancing business operations.

This study does not come without limitations, consequently, more empirical studies is needed to examine this technology and its effect on business enterprises and the relevance and usefulness of financial reports.

Conflict of Interest

The authors declare no conflict of interest.

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