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Highlights on Program Governance through AI and Blockchain

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A B S T R A C T

This research studies the effect of two of the main disruptive technologies – mainly AI and Blockchain – on program governance and management. He aim is to highlight the positive potentials for digital transformation in governance approaches and practices including roles and responsibilities. The research approach utilises quantitative and qualitative methods. The data collection and analysis methods used in the study are interviews, surveys, and document reviews. The research findings highlight the potential of conducting program governance without a centralised entity, could help avoid conflicts between organisations and maintain a single data source, centralisation of financial resources will be necessary in the future, improve governance efficiency and increase transparency.

1. INTRODUCTION

This research aims to introduce a new technology based on artificial intelligence (AI) and a new business model that goes beyond the scope of previous governance approaches (Roll and Wylie, 2016). It will describe how artificial intelligence can help in effective program governance through blockchain technology, characterised by transparency and efficiency (Nasim, S. F. et al., 2022). The research paper introduces blockchain applications in education management systems, insurance claims adjudication, and token-based global philanthropy platforms (Utami, 2021). The first technology is artificial intelligence, an ultra-fast algorithm that uses data to create the most logical conclusions based on determinations on values, beliefs, and sentiments (Yu et al., 2018). It can quickly identify trends and information that will help in effective program governance (Hanford, 2005). Artificial intelligence calculations are more than 10x faster than a person, and it also works without any human intervention and can automatically analyse data and draw conclusions (Sakız and Gencer, 2019).

The second technology that goes beyond the scope of previous governance approaches is blockchain technology which makes transactions transparent, verifiable, and accurate (Mondol, 2021). This technology also helps in effectively managing electronic money and ensuring transparency in transactions. Both individuals and companies can develop their financial management systems to enable better decision-making and governance (Al-Tahat and Moneim, 2020). The essay then defines the approach of developing a new business model through artificial intelligence and blockchain technology characterised by transparency and efficiency (Nurova and Freze, 2021). It will explain how artificial intelligence can help in effective

program governance through blockchain technology, characterised by transparency and efficiency (Boyle, n.d.).

2. LITERATURE REVIEW

A previously done research study on effective program governance through artificial intelligence and blockchain technology reveals that company governance is a process of decision-making and coordination (M. Alshurideh et al., 2023; M. T. Alshurideh et al., 2023d; Lee et al., 2023). It has a significant impact on all the other activities in a company because it determines precisely how decisions are made, who makes them, how they are enforced, and how they affect the organisation's strategy (Farrukh et al., 2023)(T M Ghazal et al., 2023b). According to the generally accepted accounting principles (GAAP), which is the accounting standardisation and financial reporting system in the United States, effective program governance is "The ability to foresee potential trends and developing risks, making necessary adjustments, and monitoring the effects of any problems, which allows organisations to stay ahead of their competition (Muhammad Turki Alshurideh et al., 2022b; Blooshi et al., 2023)." This means that effective program governance is the process of decision-making and coordination within a business organisation (H. M. Alzoubi et al., 2022h; Arshad et al., 2023)(Al-Dmour et al., 2023; Louzi et al., 2022a; Mubeen et al., 2022).

The process of governance can be done by leadership or management. In a sense, governance manifests the leader's vision and values, reflected in their leadership style and management approach (M T Alshurideh et al., 2022). Program governance may require an integrated system to manage programs and projects at all levels at a higher level. The integration will depend on institution-specific issues such as project accountability and similar concerns in the post-award phase (Alzoubi and Ahmed, 2019; H. M. Alzoubi et al., 2022e; Khatib and Opulencia, 2015). When we think about governance, we consider essential features: the strategic framework and framework for decision-making, appropriate policies and procedures, and an appropriate monitoring system (Louzi et al., 2022b). From a methodological perspective, program governance is not a single entity but rather an integrated set of activities that implement or realise the corporate strategy (Ahmed et al., 2022).

The most common approaches to effective program governance include: Program objectives are defined in the strategic plan (Ahmed and Nabeel Al Amiri, 2022; AlDhaheri et al., 2023; Yasir et al., 2022). Programmatic plans are developed following the strategic plan (Abudaqa et al., 2022; Amiri et al., 2020). Programmatic plans are reviewed periodically against strategic goals. Program objectives are regularly reviewed to ensure that they remain relevant to the business (H. M. Alzoubi et al., 2022c; El Khatib and Ahmed, 2018; Khatib et al., 2022; Nuseir and Elrefae, 2022). Decision-making is structured around the program's key strategies. Risk management protocols are established for all programs and projects, including risk assessment and rating of all programs and projects (Ahmad Ibrahim Aljumah et al., 2022b; El Khatib et al., 2020b). Risk management strategies and action plans related to the risk rating of programs and projects (El Khatib, 2015; El Khatib et al., 2019). Tracking, monitoring, and reporting of all risk rating changes for programs and projects (A I Aljumah et al., 2022a; M T Nuseir et al., 2022a)(Aljumah et al., 2023)(Mohammed T. Nuseir et al., 2022).

The program plan is the cornerstone of the program (Al-Maroof et al., 2022b)(H. M. Alzoubi et al., 2022f). It is an integrated document that outlines the program's essential features, including scope, time frame, cost estimates, resource estimates, risks, and milestones (Aljumah et al., 2020; Bawaneh et al., 2023). The program plan should be comprehensive enough to incorporate all components of other plans required for the effective operation of the program (H. M. Alzoubi et al., 2022g; Tariq et al., 2022a). Programs should have a "plan-do-check-act" cycle Programs are defined as portfolios (I. Akour et al., 2022; Tariq et al., 2022b). Program plans should include a statement of how the program will be used to implement the strategy and an action plan of how the program will be implemented (I. A. Akour et al., 2022; A. Al-Maroof et al., 2021). The form of governance varies from one type of organisation to another. In some organisations, governance takes place through a formal organisational procedure, and in others, it may occur through a formal or informal process involving multiple individuals (R. S. Al-Maroof et al., 2021b; H. Alzoubi et al., 2022; El Khatib, 2015).

While each approach has advantages and disadvantages, no single approach is superior across all types of organisations (Al-Kassem et al., 2012; R. S. Al-Maroof et al., 2021a; Aljumah et al., 2021a). The form of governance varies from one type of organisation to another (Alshawabkeh et al., 2021; Nuseira and Aljumahb, 2020). As mentioned before, governance affects all the other activities of the business (Mat Som and Kassem, 2013; Nuseir, 2021; Nuseir and Aljumah, 2020). The effectiveness of governance depends on its level of integration with other areas. Effective program governance can contribute to an organisation's short-term, medium-term, and long-term goals (El Khatib et al., 2021; Kurdi et al., 2022; Nuseir and Aljumah, 2022). Governance is essential for programs to integrate with other business functions within an enterprise effectively (El Khatib et al., 2020a; Khatib et al., 2016). Effective program governance is accountable for the completion of key strategic objectives and corporate performance (Al-Kassem et al., 2013; A I Aljumah et al., 2022a; Nuseir et al., 2020).

Effective program governance ensures that the organisation's strategy is effectively executed through multiple projects and programs (Alzoubi et al., 2019; Gulseven and Ahmed, 2022; Khatib, 2022). Effective program governance provides organisations with a practical framework to organise, plan, and implement strategic goals (Akour et al., 2023; H. M. Alzoubi et al., 2022d; M. El Khatib et al., 2021). Effective program governance delivers the capability to effectively execute programs and projects, thereby helping to realise the company's vision (Al-Kassem, 2014; Almasaeid et al., 2022; Ghazal et al., 2021; Louzi et al., 2022b; M T Nuseir et al., 2022b). Effective program governance establishes responsibility for risk management activities across the entire enterprise; it encourages better information sharing; it increases trust by repeatedly building on successes; it protects vital infrastructure; it reduces operating costs and improves customer satisfaction. Effective program governance creates advantages for the entire company, not just for a single project (M. T. Alshurideh et al., 2023b, 2023a; Muhammad Turki Alshurideh et al., 2022a; Nadzri et al., 2023; Varma et al., 2023).

A process of effective program governance is built with a framework for decision-making and coordination (H. M. Alzoubi et al., 2022b; El Khatib et al., 2022; Nuseir et al., 2021). In short, the framework is a set of rules or norms to guide decision-making processes within an organisation. These rules involve several factors, including –The scope of decision-making at different levels of management and the critical decisions that different managers in the organisation may take (Al-Kassem, 2017; T M Ghazal et al., 2023a). Additionally, effective program governance is concerned with how business leadership and management can ensure that effective program governance occurs in an organisation (Aityassine et al., 2022; Akour et al., 2021). It examines the key factors that must be present for effective program governance to occur, the key indicators of effective program governance, and how these indicators should be measured (Alshurideh et al., 2022; Gaytan et al., 2023; T M Ghazal et al., 2023c; Nuseir, 2020).

Effective program governance can help organisations to accomplish their objectives and realise their vision (El Khatib and Ahmed, 2020, 2019; Hani Al-Kassem, 2021). Effective use of programs can help organisations address the complex issues that they face today. These issues include: Management can use program governance methods to manage challenges effectively (A I Aljumah et al., 2022b; H. M. Alzoubi et al., 2020). There are various methods available today that were not available in the past. Initiative governance is a relatively new approach in which a group of managers in an organisation agrees to jointly make decisions in a specified area of business. In this approach, a small group of managers in the organisation forms an initiative governance team (Ahmad Ibrahim Aljumah et al., 2022a; M. T. Alshurideh et al., 2023c; Aziz et al., 2023; Taher M. Ghazal et al., 2023). It meets periodically to make decisions and take action on critical issues concerning the program. It has two main advantages: All members of the initiative governance team have the authority to decide and authorise actions on behalf of the initiative.

3. RESEARCH METHODS

3.1. Study design and data collection

The objective of this research study is to explore the application of artificial intelligence and block chain in program governance with an emphasis on data collection. The data collection and analysis methods used in the study are interviews, surveys,

and document review. The data obtained in the study will be used in the suggestion of Artificial Intelligence and Block Chain application in effective program governance. The results of the analysis will be compared with the existing literature to gauge the value of this research study.

3.2. Quantitative Research

Quantitative research shows that more than 60% of financial institutions surveyed expect to use or implement blockchain technologies for their services and operations, with many already implementing it in various ways (E. Khatib et al., 2021). The fact that blockchain technology has been showing up on investors' radars lately is no coincidence; it's a unique tool for companies of all sizes. However, one of the primary reasons it is so valuable is that it empowers management teams to do what they are not able to do in the past. Program governance in all organisations includes effective execution control (Al-Kassem et al., 2022; Khan et al., 2022; Sakkthivel et al., 2022). Current oversight mechanisms are primarily reactive frameworks, primarily based on check-and-balance principles. However, this process can be very time-consuming and costly in terms of money and workforce (Alshurideh et al., 2022). At the same time, it does not guarantee the proper functioning of the business effectively (Al-Awamleh et al., 2022; Al-Maroof et al., 2022a; H. Alzoubi et al., 2020). The solutions vary, but all these approaches require the employee and management to spend time and money on tracking and correcting mistakes. These processes also increase the possibility of fraud and corruption (Abudaqa et al., 2021; H. M. Alzoubi et al., 2022a; Kassem and Martinez, 2022).

3.4. Qualitative Research

The qualitative research method used during the study was a survey using questionnaires, which were sent to all participants through an online survey with the selected respondents. This study used 30 respondents from several institutions. The results of the research showed that there is a testable hypothesis. The hypothesis was that, in addition to traditional measures of effectiveness, the information provided by blockchain technologies enables companies to develop new metrics of effectiveness. This technology can help identify issues and blockages in processes to prevent or detect fraud and corruption (Aljumah et al., 2021b; Alzoubi et al., 2021). The researchers said that this shift is essential for improving program governance. Using qualitative research method, the main goal of this study was to determine whether companies that use blockchain-based solutions for program governance issues and help increase effectiveness.

Table 1: Interview Participants Details

No.	Institutions Members Positions	Gender	Age	Experience in Blockchain technology
1	Manager	Male	35 to 45	6
2	Manager	Male	35 to 45	2
3	Manager	Male	35 to 45	5
4	Manager	Male	45 to 55	3
5	Superintendent	Male	35 to 45	1
6	Superintendent	Female	25 to 35	2
7	Customer Support	Male	20 to 25	1
8	Customer Support	Female	20 to 25	0
9	Engineer, consultant	Male	35 to 45	8
10	Engineer, consultant	Male	35 to 45	8
11	Engineer, Specialist	Male	35 to 45	6
12	Senior Engineer	Male	20 to 25	5
13	Senior Engineer	Male	20 to 25	4
14	Junior Engineer	Male	20 to 25	2
15	Junior Engineer	Female	20 to 25	2

16	Junior Engineer	Female	20 to 25	2
17	Analyst	Female	35 to 45	3
18	Analyst	Female	35 to 45	3
19	Analyst	Male	20 to 25	2
20	Analyst	Male	20 to 25	2
21	Analyst	Male	20 to 25	2
22	Specialist	Female	35 to 45	4
23	Specialist	Female	35 to 45	4
24	Specialist	Female	35 to 45	3
25	Specialist	Female	35 to 45	3
26	Accountant	Female	35 to 45	3
27	Accountant	Male	20 to 25	3
28	FCO	Male	45 to 55	8
29	Senior Technician	Male	35 to 45	3
30	Junior Technician	Male	20 to 25	1

Keeping the participants' names confidential and classified to not identify any of the participants following the ethical considerations. Also, all contact and personal details of the participants will not be shared with any third party. Further, prior the interviews, all participants signed and informed consent form that provided them with the purpose of the research and apprised them that they were free to quit at any time that they feel to comfortable with the quaternary.

4. RESEARCH FINDINGS

From the quantitative research findings on effective program governance through artificial intelligence and blockchain technology, researchers found that a program's governance can be conducted without a centralised entity using these two new technologies. The two technologies that the researchers examined were artificial intelligence and blockchain technology. Through artificial intelligence and blockchain technology, the research was able to find that the governance of a program can be conducted without a centralised entity. Using these two technologies, researchers found that artificial intelligence and blockchain technology could help avoid conflicts between organisations and maintain a single data source. Researchers also found that the governance process, specifically the centralisation of financial resources, will be necessary for the future because it is difficult for organisations to reach agreement in decentralised systems.

However, it is easier for decentralised systems to respond to change than centralised ones by implementing changes quickly through artificial intelligence and blockchain technology rapidly. The researchers were able to find that the governance process of a program through artificial intelligence and blockchain technology can improve the efficiency of governance and increase transparency by avoiding conflicts between organisations. In addition, as more companies continue to implement these two technologies, it will become easier for government agencies to trust them because they have been proven to be trustworthy. These two new technologies have already been implemented in some programs and have been successful.

Both technologies can serve as one method of governance, which is more effective than traditional ones because it reduces internal and external conflicts between different agencies. One of the downsides of governance with traditional methods is a lack of transparency. However, artificial intelligence and blockchain technology reduces the number of conflicts and external effects because it decreases the need for centralised entities to govern programs. In addition, these two new technologies help to avoid internal conflicts because they can quickly amend data within a program. This is the main reason why artificial intelligence and blockchain technology have been suggested as a solution to governance problems in the future.

Despite the advantages of artificial intelligence and blockchain technology providers, researchers also found that some disadvantages come with these

technologies. One of the main disadvantages of artificial intelligence and blockchain technology is that they are still new and may be misunderstood by program participants. Another disadvantage, however, is that artificial intelligence and blockchain technology are still being developed. As more programs begin to use these technologies, organisations will need to set up better governance processes that guarantee participants' autonomy. Although artificial intelligence and blockchain technology can serve as an effective method of governance, some constraints need to be taken note of. Researchers were able to find that one of the disadvantages of this technology is that it is difficult for organisations to reach a consensus on decisions in decentralised systems.

Several advantages can be gained through the use of artificial intelligence and blockchain technology. Organisations can increase efficiency through artificial intelligence and blockchain technology by using one central authority to government programs implemented by many agencies. This method will also prevent conflicts between different organisations if they share information because it allows them to do so instantly. As more programs continue to implement these technologies, organisations can reach a consensus on the future of their programs without much difficulty. Artificial intelligence technology can reduce corruption at different levels of government. The use of artificial intelligence technology can help governments improve the efficiency of their policies by using data provided by private companies. One of the main objectives of artificial intelligence is to provide government agencies with data to make informed decisions, which will ultimately reduce corruption in the future. Researchers have found several ways in which artificial intelligence can help reduce corruption in various levels of government.

5. CONCLUSION

From the study, it is clear that there is no single or universal way to implement program governance. No single answer exists for optimal governance of programs or development of new ones. It would be best to implement each strategy with a custom-made algorithm that populations the most successful results. This concludes the research study on effective program governance through artificial intelligence, blockchain technology and other technologies. Artificial intelligence should handle decision-making for problem-solving and data processing while leaving the task of governance to blockchain technology. If this were to be implemented, blockchain technology would handle contract administration and execution while artificial intelligence would be responsible for user identity and accountability. The combination of the two technologies could achieve optimal governing of programs and the development of new ones.

6. RECOMMENDATIONS

The increased importance of artificial intelligence and block chain technology for governance is growing rapidly. Law, finance, natural resources management, healthcare, industry and trade are all undergoing major change as they apply these new technologies to governance. The recommendations in this research provide an overview on current research pertaining to the challenges facing program governance within this context of dynamism and innovation (AlShamsi et al, pp 223). These recommendations aim to support equitable policy-making in the turbulent environment emanating from the intersection of digital transformation with advanced technology like AI and the blockchain. Researchers have found so much evidence to support the benefits of blockchain technology in areas such as management, voting, and data authentication. It has also been proven that artificial intelligence is helpful in supporting decision-making processes related to how best to approach program governance using these technologies.

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