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Integrating Technology and Behavioral Accounting for Public Sector Fraud Prevention in the Digital Era

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Abstract

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Changes towards the digital era have changed the paradigm of public sector accounting by strengthening efficiency, transparency, and accountability in the management of state finances. However, technological advances have not completely eliminated the risk of fraud because human behavior factors are still the main determinants that affect the effectiveness of accounting systems. This research uses a literature study method by analyzing several Google Scholar-indexed scientific articles published in the last five years. The results of the study show that the success of fraud prevention in the digital era is determined by the balance between the application of technology such as artificial intelligence, data analytics, and blockchain with strengthening aspects of behavior, ethics, and organizational culture. An effective internal control system must integrate the dimensions of technology and human behavior in order to create public governance that is transparent, accountable, and has high integrity. The main conclusion confirms that digitalization is not only a technical process, but also a transformation of organizational morals, behaviors, and values towards a public accounting system that is sustainable, adaptive to change, and free from fraudulent practices.

1. Introduction

Digital transformation in the last decade has brought major changes to public sector governance around the world. The shift towards technology-based information systems has allowed for increased efficiency, transparency, and accountability in the management of public finances (Kruskopf et al., 2019). The implementation of e-government, e-budgeting, and e-audit is the government's main strategy in strengthening the public accounting system, which functions not only as a financial recording tool but also as a mechanism for monitoring the use of public funds (Gonçalves et al., 2022). Digitalization also encourages a paradigm shift from a physical document-based manual system to an intelligent system that relies on real-time data analysis, so that the audit and reporting process can be carried out faster and more accurately.

However, although digital systems are expected to be able to minimize irregularities, fraud practices in the public sector remain a worrying phenomenon in many countries (ACFE Indonesia, 2018). Fraud in the context of public sector accounting not only causes financial losses but also erodes public trust in government institutions. The Association of Certified Fraud Examiners (ACFE) reports that more than 40% of financial abuse cases in the public sector are caused by weak internal controls and an organizational culture that is permissive to unethical behavior. Thus, the main challenge is not only on the modernization of the system, but also on strengthening individual integrity and effective internal oversight structures.

Although various anti-fraud policies have been implemented, the human factor remains a central element that determines the success of the accounting system in preventing irregularities (Trisnaningsih & Husna, 2022). Studies of behavioral theories such as fraud triangle theory and fraud diamond theory explain that fraud arises due to pressure, opportunity, rationalization, and individual ability (Utami et al., 2019). In the digital environment, these four factors have undergone a significant shift. The pressure to achieve performance targets amid high transparency demands can prompt individuals to look for loopholes in digital systems. Meanwhile, opportunities arise due to a lack of technological literacy, weak cybersecurity systems, or data authorization imbalances (Rustiarini et al., 2019). Therefore, understanding human behavior in the framework of behavioral accounting is an important key to reducing fraud risk in the digital era (Mulia & Lianti, 2022).

In addition to behavioral factors, technological developments such as artificial intelligence (AI), data analytics, and blockchain are also potential tools in detecting and preventing financial fraud (Aslam et al., 2022). This technology allows public accounting systems to automatically detect transaction anomalies, provide early warning of indications of fraud, and minimize human involvement in manipulative processes. Nevertheless, the effectiveness of technology is highly dependent on the readiness of the organization to integrate it with a strong ethical culture and internal control system (Rashid, 2022). Without being supported by ethical behavior and integrity values, even sophisticated digital systems have the potential to be abused by those who have access and the technical ability to manipulate data.

Thus, the main challenge of public sector accounting in the digital era lies not only in the modernization of the system, but also in efforts to harmonize technology, people, and organizational ethics. This study aims to analyze the literature related to fraud prevention through digital accounting systems by reviewing behavioral and technological aspects as the two main dimensions. The focus of this literature study is expected to make a conceptual contribution in developing a public accounting model that is not only efficient, but also has high integrity and is adaptive to changes in the digital environment.

2. Literature Review

2.1. Digital Transformation in Public Sector Accounting

Digital transformation has significantly changed the paradigm of public sector accounting management. Digitization allows for the efficiency of the recording process, increased transparency, and acceleration of data-driven decision-making (Kruskopf et al., 2019). In this context, systems such as e-budgeting, e-auditing, and digital financial reporting are key elements in strengthening public accountability and encouraging transparency in the management of state funds. According to Gonçalves et al. (2022), the implementation of digital systems in public accounting improves the quality of financial information, reduces the opportunity for data manipulation, and accelerates the audit process through transaction automation and database integration.

However, digitalization also raises new risks such as cybercrime, data breaches, and lack of technological competence among public officials. This change

requires the adaptive ability of human resources to be able to manage the technology-based financial information system optimally. In a report by the Association of Certified Fraud Examiners (ACFE Indonesia, 2018), it is stated that digital systems will only be effective if they are accompanied by strengthening internal controls, work ethics training, and implementing strict data security policies.

In addition to the technical aspect, digital transformation also demands a change in work culture and public bureaucratic mindset. Integration of technology without being accompanied by ethics, accountability, and leadership with integrity has the potential to open up new, more complex fraud opportunities. Thus, the success of digital transformation in public sector accounting is determined not only by technological sophistication, but also by institutional commitment to the values of transparency, integrity, and public accountability.

2.2. Behavioral Accounting and Fraud Theory

The concept of behavioral accounting plays an important role in understanding the causes of fraud in the public sector. This approach emphasizes that individual behavior in the organization is not only influenced by systems and policies, but also by motivations, pressures, and social norms that apply in the work environment (Trisnaningsih & Husna, 2022). In the framework of the fraud triangle theory, Cressey explained that fraudulent acts arise due to pressure, opportunity, and rationalization. This theory was then developed by Utami et al. (2019) into a fraud diamond theory by adding the individual capability factor as the fourth element that explains a person's ability to exploit the weaknesses of the system.

Mulia and Lianti (2022) emphasized that the effectiveness of the internal control system depends on the human behavior that runs it. Even a sophisticated accounting system will lose its function if it is run by individuals with low integrity or in a work environment that is permissive to deviations. Therefore, understanding behavioral aspects is the main key in building effective supervision mechanisms in the public sector.

The integration between behavioral theory and digital systems provides new opportunities in detecting potential fraud through user behavior analytics in accounting information systems. For example, data access patterns, transaction frequency, or changes in activity logs can be used as indicators of high-risk behavior. Thus, behavioral accounting not only serves to explain the motivation behind fraud, but also serves as a conceptual foundation in designing a public accounting system that is technology-based and oriented towards ethical behavior.

2.3. Technology and Fraud Prevention Mechanisms

The development of information technology has created new opportunities in fraud prevention efforts in the public sector. The use of artificial intelligence (AI), blockchain, and data analytics allows for the fast, accurate, and continuous detection of suspicious transaction patterns (Aslam et al., 2022). This technology is able to identify anomalies in financial data and provide an early warning system for internal auditors to prevent potential irregularities early on. Demirkan et al. (2020) explain that blockchain plays an important role in creating a transparent accounting system because every transaction is permanently recorded and cannot be modified without

leaving a digital footprint, thus minimizing the chance of manipulation of financial statements.

Furthermore, Rashid (2022) highlighted that the implementation of a technology-based internal control system can reduce the chances of fraud if supported by human resource training, strong organizational ethics policies, and managerial commitment to transparency. Unfortunately, many public institutions still face serious challenges in terms of technology adoption due to the limitations of digital infrastructure, data literacy, and analytical capacity of the government apparatus.

Therefore, the success of technology in preventing fraud is not only determined by technical aspects, but also by the readiness of organizations in building an anti-fraud culture and an adaptive digital audit system. The combination of technological innovation and strengthening the integrity of the public apparatus is the most effective strategy to realize transparent, accountable, and sustainable public financial governance in the digital era.

3. Methods

This study uses a literature study approach as the main method in analyzing the phenomenon of fraud in the public sector in the digital era. This method was chosen because it provides a strong conceptual basis through a systematic review of relevant previous research results. The literature study allowed researchers to explore in depth how digital transformation affects public accounting systems, individual behavior within organizations, and the effectiveness of internal control systems in

preventing financial fraud. With this approach, the research not only describes factual conditions, but also identifies patterns of theoretical relationships between technology, behavior, and organizational ethics.

The research stage begins with the process of collecting secondary data sourced from scientific journals, academic books, and reports of professional institutions such as ACFE (Association of Certified Fraud Examiners) published between the last five years. The selection of the time range aims to keep the results of the study relevant to the latest developments in the field of digitization of accounting and public financial management. The literature selection criteria include: (1) the suitability of the topic with digital transformation and fraud prevention in the public sector, (2) the use of behavioral theory frameworks such as fraud triangle and fraud diamond, and (3) publications indexed in Google Scholar to ensure academic validity and credibility.

After the literature is collected, the next stage is the content analysis process with a descriptive-critical approach. Each scientific paper is analyzed based on its contribution to three main themes, namely: (a) digital transformation in public sector accounting, (b) behavioral accounting and fraud theory, and (c) technology and fraud prevention mechanisms. This analysis aims to identify how the integration between technology and human behavior can form an effective public accounting system in preventing fraud. In addition, the analysis is directed to find research gaps that are still open, especially related to the synergy between the implementation of digital systems and the formation of organizational ethics culture.

To maintain objectivity, each literature source is verified based on the publisher's credibility, relevance of context, and consistency with the research objectives. The data obtained is then arranged in the form of an argumentative narrative to produce a coherent conceptual synthesis. The results of this literature study are expected to be able to make a theoretical contribution to the development of a public sector accounting model that is adaptive to digitalization, as well as a foothold for future empirical research in strengthening public financial governance that is transparent, accountable, and free from fraudulent practices.

4. Results

The results of the literature review show that the phenomenon of digital transformation has fundamentally changed public sector accounting practices, both in terms of operations, supervision, and organizational ethics. Over the past five-year period, there has been a significant increase in the adoption of technology-based accounting information systems such as e-budgeting, e-auditing, and digital reporting aimed at increasing transparency and strengthening public accountability (Kruskopf et al., 2019). However, this digitization does not completely eliminate the risk of fraud. On the contrary, new forms of fraud have emerged related to electronic data manipulation, system engineering, and misuse of digital access.

Digital transformation has proven to provide great benefits for the efficiency of public financial reporting, but on the other hand it creates a high dependence on system reliability and user integrity. According to Gonçalves et al. (2022), the success of the implementation of a digital accounting system is highly dependent on the

readiness of human resources and the organization's commitment to technology governance. Many public institutions in developing countries face obstacles in the form of low digital literacy and weak IT-based supervision. As a result, even if a digital system is implemented, the risk of fraud is still high due to behavioral factors and organizational culture that have not changed significantly.

A literature review also found that the application of a digital accounting system cannot be separated from the concept of behavioral accounting. Individual behavioral factors in the organization play an important role in determining the effectiveness of the internal control system (Trisnaningsih & Husna, 2022). Fraud in the public sector often arises not because of weaknesses in the system, but because of pressure and rationalization of individuals to commit irregularities. Based on the fraud triangle and fraud diamond theory, unethical behavior arises as a result of a combination of financial pressure, available opportunities, rationalization, and the ability of actors to exploit the system (Utami et al., 2019).

In the digital context, the element of "opportunity" has become increasingly complex because it relates to system access and data security. Rustiarini et al. (2019) emphasized that the more sophisticated the accounting information system, the more complex the risk of data manipulation, especially if it is not balanced with adequate technology-based controls. Therefore, the role of the internal control system is crucial. Research by Rashid (2022) shows that effective internal controls are able to significantly reduce the rate of fraud in public institutions, especially when combined with a digital data-based audit system.

In addition, ethical and organizational culture aspects are also important factors that determine the effectiveness of digital systems in preventing fraud. Mulia and Lianti (2022) stated that behavioral accounting provides an understanding that individual behavior in an organization is greatly influenced by values, culture, and social environment. Thus, the application of digital systems without paying attention to ethical and integrity aspects can actually cause a new moral hazard, where technology is used to cover up traces of fraud in a more subtle and systematic way.

In terms of technology, various innovations such as artificial intelligence (AI), machine learning, data analytics, and blockchain have begun to be applied to strengthen fraud detection in the public sector. Aslam et al. (2022) emphasized that AI can be used to recognize abnormal transaction patterns in real time and provide early warning to auditors. This system helps reduce the burden of manual audits as well as improve the accuracy of fraud detection. Demirkan et al. (2020) added that blockchain provides a high level of transparency because every transaction is permanently recorded and cannot be changed without leaving a digital footprint. Thus, this system not only creates transparency but also increases public trust in the accountability of government agencies.

However, the effectiveness of the use of technology is highly dependent on the readiness of the organization and the capacity of human resources. Dagilienė and Klovienė (2019) shows that many public institutions still face limited infrastructure and data analysis skills, so advanced technology is often not utilized optimally. In cases like this, the implementation of digital systems is only a symbol of modernization without being accompanied by a substantial increase in fraud

supervision and prevention capabilities. Therefore, the strategy of strengthening the digital capacity of public apparatus needs to be a top priority in an effort to realize fraud-free governance.

Studies also show that well-designed digital systems must pay attention to the balance between technological control and behavioral awareness. Abdullahi and Mansor (2018) argues that an effective fraud prevention approach must integrate behavioral, technology, and internal control aspects in one integrated framework. By understanding the human factors behind technology, organizations can build systems that are adaptive to change, but still rooted in ethical principles and transparency.

In this context, research by ACFE Indonesia (2018) revealed that around 37% of fraud cases in the public sector occur due to weak internal supervision systems and low ethical awareness. This strengthens the argument that the existence of technology without the support of an ethical organizational culture will not be able to eliminate fraudulent practices. Therefore, public institutions must strike a balance between technological innovation and the formation of moral values in the work environment.

Furthermore, the literature shows a tendency that the integration of technology with internal audit systems provides positive results for early detection of fraud. Demirkan et al. (2020) found that organizations that adopted blockchain-based systems experienced a significant decrease in the number of cases of financial statement manipulation. This is due to the increased transparency and traceability of public financial transactions. In addition, Aslam et al. (2022) highlight that the

application of AI based on behavioral analysis is capable of detecting fraud that cannot be identified through conventional audits, such as changes in transaction patterns or deviant user activity.

Research by Rustiarini et al. (2019) also indicates that the integration of behavioral accounting and digital control systems results in a more effective supervision model than traditional approaches. This model utilizes algorithm-based monitoring combined with employee behavior analysis to recognize potential fraud early on. Thus, prevention efforts focus not only on technology, but also on the management of human behavior behind the system.

On the other hand, implementation constraints are also an important issue in the results of this study. Kruskopf et al. (2019) and Gonçalves et al. (2022) noted that resistance to change is often the main obstacle in the digitization of public accounting. Many employees are uncomfortable with the new system due to a lack of training and uncertainty in changes in work processes. This results in the application of technology often not being optimal or even passively rejected. This condition has the potential to create new loopholes for fraud due to the weak supervision of digital processes.

A comparative review of the literature also shows that the success rate of fraud prevention in the digital era is largely determined by the synergy between humans and technology. When organizations rely only on digital systems without strengthening ethical and behavioral aspects, the risk of fraud remains high (Mulia & Lianti, 2022). On the other hand, when digital systems are combined with ethical education, technology literacy training, and a transparent organizational culture, the

level of fraud risk can be significantly reduced (Rashid, 2022). From the entire literature analyzed, it can be concluded that the digital accounting system cannot stand alone as a tool to prevent fraud. Its effectiveness is largely determined by the integration between technological factors, human behavior, and organizational ethical values. The paradigm shift from "technology-driven control" to "human-centered integrity system" is the main key for the public sector to build a financial system with integrity and sustainability in the digital era.

5. Discussion

The results of the literature review show that digital transformation in the public sector accounting system has had a significant impact on increasing transparency, efficiency, and accountability in public financial management. However, digitalization also poses new challenges that are multidimensional, especially related to aspects of human behavior and organizational ethics. Although technology-based accounting information systems are able to strengthen internal controls, their success depends heavily on the integrity of the individuals who manage them (Kruskopf et al., 2019). This means that technology is only a means of support, while the human factor remains the main determinant in preventing fraud and ensuring that the system runs according to good governance principles.

Changes in the digital environment demand the adaptation of new behaviors in public governance. According to Trisnaningsih and Husna (2022), a behavioral accounting approach is needed to understand how work pressure, opportunities, rationalization, and individual abilities can trigger unethical behavior in the

organizational environment. This is in line with the fraud diamond theory put forward by Utami et al. (2019), that the four factors interact to form a risk of fraud that is difficult to eliminate with just technological intervention. Therefore, an effective fraud prevention strategy should not only rely on technology-based audits, but should also prioritize building a culture of integrity, ethical leadership, and incentive systems that encourage honest behavior across all layers of the public bureaucracy.

In addition to behavioral aspects, the integration of technologies such as artificial intelligence (AI), blockchain, and data analytics provides positive prospects for increasing fraud detection (Demirkan et al., 2020). This technology enables automated surveillance systems that can quickly and accurately recognize suspicious transaction patterns, allowing auditors to focus on strategic analysis rather than administrative checks. However, the effectiveness of this technology will only be optimal if it is balanced with human resource training and organizational commitment to implement the principles of transparency and accountability. Aslam et al. (2022) assert that without adequate digital literacy, the implementation of advanced systems will only create the illusion of surveillance, not real protection against fraud.

Another interesting finding comes from the research of Rashid (2022), which shows that digital-based internal control is most effective when accompanied by a participatory audit mechanism. This means that fraud prevention will be stronger if the technology system is combined with the active involvement of employees in supervising, reporting, and evaluating every financial process. This participatory

model increases a sense of shared responsibility and creates a social mechanism that supervises each other among the organization's actors. Thus, technology-based supervision should be designed as a collaborative, adaptive, and learning-oriented system, not just authoritative or repressive.

Conceptually, the results of this study confirm that the balance between technological aspects and human behavior is the main key in creating a resilient public accounting system in the digital era. When these two aspects go hand in hand, public organizations can build financial governance that is efficient, transparent, and has high integrity. However, if you focus only on one dimension, such as technology, without paying attention to human behavior, the risk of fraud will remain high and even more difficult to detect because it is disguised by the complexity of digital systems. Therefore, the development of a public sector accounting system in the future must prioritize a holistic approach that places technology, behavior, and ethics as an inseparable unit. The synergy of the three will determine a new direction of public governance that is more adaptive, responsible, and sustainable in the midst of global digital disruption.

6. Conclusion

Based on the results of the literature review, it can be concluded that digital transformation has brought fundamental changes in the public sector accounting system, both in terms of efficiency and transparency. However, technological developments do not automatically guarantee a reduction in fraud practices. The risk of deviation remains because human factors, particularly behavior, ethical values,

and organizational culture, play a dominant role in determining the effectiveness of the internal control system. Therefore, fraud prevention approaches in the digital era must combine technological aspects with behavioral understanding and individual integrity development. The application of technologies such as artificial intelligence, data analytics, and blockchain opens up great opportunities for improved early detection and supervision of public finances.

However, the implementation of this technology will only be optimal if it is accompanied by strengthening the capacity of human resources and establishing a work culture based on ethics and public responsibility. Thus, the development of a digital accounting system in the public sector cannot be seen solely as a technical modernization, but as a transformation of values and behaviors towards transparent and integrity governance. Conceptually, the synergy between technology, human behavior, and organizational ethics is the main foundation for sustainable management of public finances. By building a system that balances digital surveillance and individual moral awareness, the public sector can create a work environment that is not only efficient but also free from fraudulent practices.

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