



## ARTICLE

# Digital Governance in Fraud Prevention in the Free Nutritious Meal Program

## The Role of Internal Control and Government Internal Auditing

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**Abstract:** The Free Nutritious Meal (Makan Bergizi Gratis) program is a strategic national policy for strengthening human capital in Indonesia; however, its implementation is subject to significant fiscal and governance risks arising from the complexity of decentralized supply chains. This study aims to develop an integrated fraud prevention model, termed Smart-Nutri Governance, by combining digital governance architecture with continuous auditing mechanisms. This study employs a design-based policy research approach, using regulatory gap analysis and comparative policy analysis against India's Mid-Day Meal Scheme (Pradhan Mantri Poshan Shakti Nirman) and Brazil's National School Feeding Program (Programa Nacional de Alimentação Escolar). The analysis identifies three critical governance gaps: data validity (ghost recipients), price volatility, and audit detection lag. A simulation using West Java Province data estimates potential fiscal losses of up to 1.15 trillion Indonesian rupiah per year due to inefficiencies in beneficiary validation. To address these gaps, this study proposes a three-layer digital control architecture: (1) real-time biometric or QR-based validation at the point of service, (2) mandatory e-marketplace procurement to ensure price transparency and audit trails, and (3) artificial intelligence-based continuous auditing for real-time anomaly detection. The findings indicate that this model is projected to enhance control effectiveness and offer greater supervisory value compared to conventional post-audit approaches. This study contributes theoretically by integrating Fraud Diamond Theory with digital governance and continuous auditing in the public sector context. Practically, it provides an applicable and adaptive policy framework for strengthening financial accountability in large-scale social assistance programs.

**Keywords:** Free Nutritious Meal Program; Digital Governance; Fraud Diamond Theory; Continuous Auditing; Public Sector Accountability.

## 1. Introduction

The Free Nutritious Meal (*Makan Bergizi Gratis* [MBG]) program is a national strategic policy designed to strengthen human capital quality through improved child nutrition while simultaneously stimulating local economic activity through domestic supply chain development. From an economic development perspective, nutritional interventions at school age carry long-term implications for labor productivity, human resource quality, and national competitiveness (Erlyn et al., 2021). Consequently, the effectiveness of program implementation not only determines the success of social policy but also contributes to the sustainable economic development agenda.

However, food-based social assistance programs delivered as *in-kind transfers* entail considerably greater governance complexity than cash-based assistance. This complexity arises from multi-actor involvement, extended supply chains, and high dependence on the accuracy of beneficiary data and market price stability. Public sector management literature indicates that such conditions frequently generate information asymmetry between policymakers and field-level implementers, ultimately increasing the potential for inefficiency and fraud (Mardiasmo, 2018; Rose-Ackerman & Palifka, 2016). Within a political economy framework, this situation reflects an imbalance between discretion and accountability that creates space for opportunistic behavior (Klitgaard, 1988).

In this context, governance weaknesses stem not only from regulatory limitations but also from control system designs that have yet to adequately anticipate real-time operational dynamics. Fraud Diamond Theory posits that fraud occurs as a result of the interaction among four elements: opportunity, pressure, rationalization, and capability (Wolfe & Hermanson, 2004). In large-scale social assistance programs, all four elements tend to emerge simultaneously, particularly when oversight systems remain reliant on reactive post-audit approaches that are limited in their capacity for the early detection of irregularities.

The growing body of modern audit literature indicates that technology-based approaches—such as continuous auditing and data analytics—can enhance oversight effectiveness through real-time anomaly detection and strengthen transparency in public financial management (Soedarsono et al., 2019). Aligned with this, the concept of digital governance emphasizes that the application of information technology can improve efficiency, transparency, and accountability in the public sector (Janssen & Estevez, 2013). Nevertheless, most existing studies remain partial in scope and have yet to integrate data validity, procurement mechanisms, and oversight systems within a single comprehensive governance framework.

International experience demonstrates that governance design is a critical determinant of the success of food assistance programs. India's Mid-Day Meal Scheme (*Pradhan Mantri Poshan Shakti Nirman* [PM POSHAN]) faced persistent challenges related to distribution leakages and data validation weaknesses, whereas Brazil's National School Feeding Program (*Programa Nacional de Alimentação Escolar* [PNAE]) demonstrated success through the integration of digitalization and public participation in oversight (Drèze & Khera, 2017; Sidaner et al., 2013). This comparison affirms that governance innovation—particularly through the application of technology—is a strategic factor in enhancing program effectiveness.

In response to these gaps, this study develops an integrated governance model termed Smart-Nutri Governance, combining real-time data validation, procurement transparency through digital systems, and an artificial intelligence-based continuous auditing mechanism. Theoretically, this study contributes by integrating Fraud

Diamond Theory with digital governance concepts in the public sector context. Practically, this study offers an applicable policy framework for strengthening accountability, efficiency, and transparency in the implementation of large-scale social assistance programs.

## 2. Methods

This study employs a qualitative approach using a design-based policy research design, aimed at developing an evidence-based governance model for the MBG program (Heeks, 2006). This approach was selected because the study is not limited to describing phenomena but also focuses on the systematic and applicable design of policy solutions within the public sector context.

The analysis integrates regulatory gap analysis, comparative policy analysis, and content analysis within a systematic and replicable operational analytical framework (Bajpai & Myers, 2020; OECD, 2021; Pavliuk, 2023). This analytical framework combines Fraud Diamond Theory to identify the determinants of fraud—specifically the elements of opportunity, pressure, rationalization, and capability (Wolfe & Hermanson, 2004)—the Committee of Sponsoring Organizations of the Treadway Commission public sector internal control framework to evaluate control system weaknesses, and digital governance concepts to formulate technology-based interventions (Janssen & Estevez, 2013).

The units of analysis in this study comprise public policy regulations as the normative framework, governance risks as the governance risk dimension, and oversight mechanisms as the audit system. Through these units of analysis, this study aims to identify control weaknesses and formulate an integrated digital governance model.

The analytical process was conducted systematically through five main stages: regulatory identification, governance risk mapping, regulatory gap analysis, international comparative analysis, and policy model design. Regulatory identification involved inventorying the various regulations relevant to state financial management and government procurement of goods and services. Risk mapping was conducted by classifying potential risks according to three dimensions—beneficiary data validity, procurement mechanisms, and oversight systems—with reference to Fraud Diamond Theory to assess the level of vulnerability to fraud (Wolfe & Hermanson, 2004).

Subsequently, regulatory gap analysis was conducted to identify discrepancies between normative provisions and actual conditions in program implementation, using indicators of regulatory compliance, potential gaps, and risk impact on efficiency and accountability. To enhance external validity, this study also employed a comparative approach by examining international practices—specifically India’s PM POSHAN and Brazil’s PNAE—to derive relevant policy learning (OECD, 2024).

Data analysis was conducted using a thematic categorization-based content analysis approach, encompassing the stages of open coding, axial coding, and selective coding to identify patterns of relationship between system weaknesses and digital governance solutions. This approach ensures that the analytical process is conducted in a systematic, structured, and replicable manner within the context of public policy research.

The data used in this study consist of secondary data obtained through systematic documentation, comprising regulatory documents and reputable academic literature sourced from the Scopus, Web of Science, and SINTA databases. Data selection was

conducted purposively, with consideration given to relevance, publication quality, and recency (within the past 5–7 years), thereby ensuring the validity and reliability of the data used.

To ensure validity and credibility, this study applied source triangulation by comparing findings from regulatory documents, academic literature, and international practices, and employed audit trail procedures and theoretical validation to ensure consistency between empirical findings and the conceptual framework used (Bovens, 2007). In addition, a prescriptive approach was applied to ensure that the resulting Smart-Nutri Governance model is implementable, adaptive, and replicable across various social assistance program contexts (Bajpai & Myers, 2020).

### 3. Results and Discussion

The findings indicate that the primary vulnerabilities in the implementation of the MBG program stem not merely from budgetary constraints but from a governance design that has yet to fully anticipate the complexity of food assistance supply chains. Through regulatory gap analysis, this study identifies three critical gaps with the potential to become sources of fraud: data validity gaps, price volatility, and audit detection lag. These three gaps do not operate independently; rather, they interact with and reinforce systemic risks in program management.

The first gap concerns the validity of beneficiary data. Reliance on periodically updated administrative data creates opportunities for the emergence of ghost recipients—that is, discrepancies between recorded beneficiaries and actual conditions in the field. From the perspective of Fraud Diamond Theory, this condition amplifies the opportunity element due to the weakness of real-time verification mechanisms (Wolfe & Hermanson, 2004). Operationally, this reflects an information asymmetry between data providers and program implementers, which ultimately creates space for manipulation.

A simulation based on data from West Java Province, assuming a deviation rate of 5%, estimates that potential fiscal losses could reach approximately 1.15 trillion Indonesian rupiah (IDR) per year. The potential fiscal loss was estimated using a simple quantitative formula:  $Loss = N \times C \times \alpha$ , where  $N$  represents the number of beneficiaries,  $C$  is the average cost per beneficiary per year, and  $\alpha$  is the data deviation rate. Based on an assumed beneficiary count of 10 million individuals, an average cost of IDR 2.3 million per year, and a deviation rate of 5%, the estimated loss amounts to IDR 1.15 trillion per year. These findings affirm that data validity is not merely an administrative concern but a strategic issue with direct consequences for the efficiency of public budget utilization. Within the accountability theory framework, this condition reflects weaknesses in the mechanisms of answerability and enforceability within the governance system (Bovens, 2007).

The second gap concerns price volatility in food procurement. The mismatch between market price dynamics and the static Standard Unit Price (*Standar Satuan Harga*) creates economic pressure on suppliers. Under such conditions, actors tend to rationalize cost adjustments, which frequently results in a reduction in food ingredient quality. This phenomenon reflects the interaction between the pressure and rationalization elements of Fraud Diamond Theory and is consistent with Klitgaard's (1988) corruption model, in which corruption arises from a combination of monopoly, discretion, and lack of accountability.

Furthermore, this price mismatch also reflects the limitations of conventional procurement systems that have yet to adapt adequately to market dynamics. In the

context of digital governance, price transparency and real-time access to information are key factors in reducing distortions and improving efficiency (Janssen & Estevez, 2013). Accordingly, the digitalization of procurement functions not only as an administrative instrument but also as an internal control mechanism capable of curbing potential markup and enhancing transaction accountability.

The third gap is the limited effectiveness of oversight mechanisms that remain dominated by post-audit approaches. This approach has a fundamental limitation in the form of a time lag between transactions and examination, thereby reducing the probability of early detection of irregularities. From the perspective of modern auditing, this approach is no longer adequate for managing risk in complex and dynamic systems (Power, 1997).

Research indicates that technology-based continuous auditing approaches have the capacity to enhance oversight effectiveness through real-time anomaly detection (Kahyaoglu et al., 2020). Consequently, the transformation of oversight systems from a reactive model to a preventive model has become an unavoidable necessity in the context of modern governance. In practice, this mechanism enables the integration of transaction data, beneficiary validation, and procurement within a single system capable of automatically detecting irregularity patterns through a data analytics-based approach.

These findings are further corroborated by international empirical experience. India's PM POSHAN demonstrated that supply chain complexity without adequate oversight systems has the potential to generate distribution leakages and data manipulation (Drèze & Khera, 2017). By contrast, PNAE's success demonstrated that the integration of digitalization and public participation can significantly enhance transparency and accountability (Sidaner et al., 2013). This comparison affirms that governance design adaptive to operational risk is a determining factor in program success.

On the basis of these collective findings, this study proposes Smart-Nutri Governance as an integrated digital governance framework. This model is designed to address structural weaknesses in the existing system through a technology- and data-based approach. The Smart-Nutri Governance model architecture is presented in Figure 1.

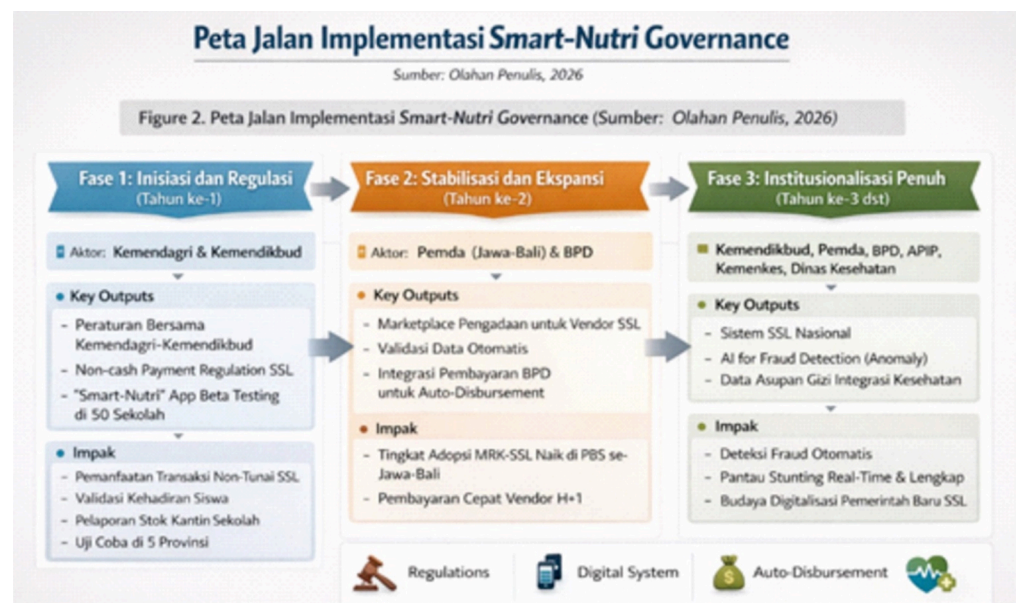


Figure 1. Smart-Nutri Governance Implementation Roadmap

The model comprises three mutually integrated main components. First, a real-time validation system that functions to ensure the accuracy of beneficiary data through digital-based identification. Second, e-marketplace-based procurement that enhances price transparency and creates a digital audit trail. Third, artificial intelligence-based continuous auditing that enables automatic and continuous anomaly detection. Operationally, the system functions through the integration of three primary layers—beneficiary data input, procurement transaction processing, and an audit monitoring system—within a single interconnected real-time digital platform.

The integration of these three components creates a paradigm shift from sampling-based oversight to full population monitoring. Within the digital governance framework, this approach enables simultaneous improvements in efficiency, transparency, and accountability (Bajpai & Myers, 2020; Janssen & Estevez, 2013).

Furthermore, this model carries implications for the transformation of the role of the Government Internal Oversight Apparatus (Aparat Pengawasan Intern Pemerintah), shifting from its traditional function as a passive overseer to that of a strategic actor within an early warning system. This transformation aligns with the development of risk-based auditing concepts that emphasize prevention over enforcement.

Thus, the findings of this study affirm that the governance reform of social assistance programs cannot be achieved solely through regulatory approaches but requires integrated, technology-based systems engineering. Smart-Nutri Governance offers a framework that is not only conceptually relevant but also carries strong implementation potential for enhancing public sector accountability and efficiency.

#### 4. Conclusion

This study demonstrates that the primary challenges in implementing the MBG program lie not in fiscal resource constraints but in a governance design that has yet to adapt adequately to operational complexity and systemic fraud risk. Through regulatory gap analysis, this study identifies three critical gaps: weaknesses in beneficiary data validity, price volatility in procurement, and the limited effectiveness of post-audit-based oversight. These three gaps simultaneously create conditions that are susceptible to inefficiency and public budget leakage.

In response to these challenges, this study develops Smart-Nutri Governance as an integrated digital governance framework that combines real-time validation, e-marketplace-based procurement transparency, and artificial intelligence-based continuous auditing. This model represents a paradigm shift from reactive oversight approaches toward a technology-based preventive control system, enabling early detection of anomalies and comprehensive improvements in accountability in the management of social assistance programs.

Theoretically, this study contributes by integrating Fraud Diamond Theory and digital governance concepts within the public sector context, thereby enriching the literature on fraud prevention in large-scale social assistance programs. Practically, the proposed model offers an applicable and adaptive policy framework for strengthening transparency, efficiency, and accountability, particularly within complex fiscal decentralization environments.

Nevertheless, this study is limited by the absence of empirical testing of the model's implementation at an operational scale. Future research is therefore recommended to examine the model's effectiveness through quantitative approaches or field-based case studies, as well as to explore further technological integration within public oversight systems.

This study thus affirms that governance reform in social assistance programs cannot be achieved solely through the addition of regulations but requires integrated, technology-based systems engineering. Smart-Nutri Governance is anticipated to serve as a strategic reference in the formulation of more transparent, accountable, and sustainable public policy in Indonesia.

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