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Digital Financial Governance Transformation in Urban Food Supply SMEs

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Abstract

This study examines how digital financial governance transformation reshapes informal financial recording practices and strengthens governance quality within urban food supply SMEs in Malang City. Existing studies on SME digitalization predominantly emphasize technological adoption and operational efficiency, while limited attention has been given to the behavioral and organizational mechanisms through which governance transformation becomes embedded within daily operational systems. Addressing this gap, the study adopts a case-based quasi-experimental design integrating a stepped-wedge implementation strategy with interrupted time series (ITS) analysis across three embedded outlets of Omah Sayur MQS, an urban food supply SME operating within Malang City's local food distribution network. The intervention was implemented sequentially through standardized financial recording procedures, adoption of real-time digital recording systems, and continuous monitoring designed to support behavioral adaptation and procedural compliance. Data were collected longitudinally through structured observation, in-depth interviews, and financial document analysis covering pre-intervention, transition, and post-intervention phases. The findings reveal that baseline financial practices were characterized by delayed reporting, fragmented documentation, retrospective recording routines, and weak procedural standardization. Following intervention exposure, substantial improvements emerged in recording accuracy, reporting timeliness, documentation consistency, and managerial visibility. Interrupted time series patterns demonstrate both immediate level changes and sustained trend stabilization, indicating that governance transformation evolved progressively through behavioral internalization and routinized compliance across outlets. Beyond firm-level operational improvement, the findings show that governance standardization strengthened coordination, transparency, and information reliability across organizational units, thereby supporting broader urban SME ecosystem governance. The study further demonstrates that financial governance quality contributes to the reliability and coordination of urban food supply systems, particularly in relation to policy-oriented distribution initiatives such as the Free Nutritious Meal (MBG) program. This study proposes a Financial Governance Transformation Model for Urban Food Supply SMEs that conceptualizes digital governance transformation as a multi-level process operating across firm, ecosystem, and policy system dimensions. The study contributes to the literature by repositioning SME digitalization as a longitudinal governance restructuring process shaped by behavioral adaptation, organizational internalization, and ecosystem coordination rather than merely technological adoption.

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1. Introduction

Urban economic performance in emerging cities is increasingly shaped by the capability of micro, small, and medium enterprises (SMEs) to manage resources, coordinate transactions, and sustain reliable operations (Akbar et al., 2025; Sme et al., 2019). Within this landscape, SMEs engaged in urban food supply occupy a pivotal position as intermediaries that connect producers, distributors, and consumers across increasingly dynamic urban markets (Reardon et al., 2012). Their operational continuity underpins the stability of local food availability, making them integral not only to local economic activity but also to the resilience and functionality of urban food systems (Abidin, 2024; UNICEF, 2021). In rapidly urbanizing regions, food distribution systems are becoming increasingly dependent on small-scale intermediaries capable of maintaining flexible and responsive supply flows. Consequently, the managerial and governance capacities of these enterprises have become critical concerns within contemporary urban economic development discourse.

The importance of SMEs is particularly evident in Malang City, where urban economic growth is strongly supported by SME activities. Recent regional data indicate that the number of SMEs in Malang increased significantly from approximately 29,059 units in 2023 to nearly 48,000 units in 2024, reflecting rapid expansion in entrepreneurial activity and local economic participation (ABD et al., 2025). A substantial proportion of these enterprises operate within food and culinary sectors, which function as essential components of urban distribution systems and daily consumption networks (Badan Pusat Statistik Kota Malang., 2025). The expansion of food-related SMEs reflects the growing integration between local economic activity and urban food system dynamics. At the same time, this rapid growth also intensifies managerial complexity, particularly in enterprises operating with multiple operational units, decentralized transactions, and high-frequency cash circulation.

Within this context, Omah Sayur MQS represents a relevant and strategically positioned case for examining financial governance transformation in urban food supply SMEs. The enterprise operates as an intermediary within Malang's urban food distribution system, connecting upstream suppliers with end consumers through multiple operational outlets distributed across the city. During its expansion period, the enterprise operated five outlets before later consolidating into three active operational units following internal financial and operational evaluations. This trajectory reflects common challenges faced by urban food supply SMEs as operational scale expands faster than managerial system development.

Operationally, Omah Sayur MQS functions through multiple transaction points, decentralized cash handling systems, and varying recording practices across outlets. The food supply chain consists of multiple interconnected actors—including producers, distributors, and retailers—whose coor (Battersby et al., 2018). In urban food systems, intermediaries such as Omah Sayur MQS play a critical role in maintaining continuity of product flow under dynamic and time-sensitive market conditions. However, the operational complexity of multi-outlet systems often generates managerial vulnerabilities, particularly when financial recording systems remain fragmented, delayed, and insufficiently standardized.

Initial observations conducted during the preliminary phase of this study revealed that financial recording practices within Omah Sayur MQS were predominantly informal and operationally fragmented. Daily transactions were frequently recorded retrospectively at the end of operational periods, relying heavily on memory-based reconstruction and manual documentation. Recording formats varied across outlets and employees, while reconciliation processes were inconsistently implemented. As operational workloads increased, recording activities were commonly postponed in order to prioritize transaction speed and customer service. These conditions generated discrepancies between recorded and actual cash balances, delayed reporting cycles, and reduced managerial visibility over operational performance.

Importantly, these conditions were not merely technical deficiencies but reflected embedded organizational and behavioral routines. Financial recording activities were frequently perceived as supporting administrative routines rather than strategic managerial control mechanisms. Under conditions of high transaction intensity and limited human resources, delayed recording behavior gradually became normalized as part of daily operational culture. Consequently, financial information lost much of its function as a real-time governance instrument, weakening internal control and increasing exposure to financial inefficiencies.

From a management perspective, the effectiveness of urban food supply SMEs is closely tied to the quality of their financial governance (Hastutik et al., 2022). Financial recording functions as a fundamental component of managerial control by providing informational support for planning, monitoring, coordination, and decision-making processes (Hall, 2010; Romney et al., 2012). In practice, however, many SMEs continue to rely on informal and manual recording practices that are fragmented, delayed, and non-standardized. Such conditions limit the accuracy, timeliness, and comparability of financial information, thereby reducing the reliability of managerial decision-making processes razzaq 2026. Under these circumstances, managerial decisions are frequently made under informational uncertainty, increasing exposure to operational inefficiencies and financial discrepancies (Razzaq et al., 2026).

Theoretically, this condition reflects a persistent gap between financial management principles which emphasize accuracy, timeliness, standardization, and accountability and the realities of SME practices shaped by operational pressure, limited resources, and habitual routines (Brigham et al., 2004; Development, 2021). Behavioral perspectives on financial management suggest that recording practices are not merely technical processes but are socially embedded activities shaped by experience, workload, organizational culture, and repetitive operational behavior (Feldman et al., 2003). In this perspective, financial recording behavior evolves as part of organizational routines and may gradually become resistant to change despite managerial inefficiencies.

Simultaneously, institutional and systems-based perspectives highlight that the absence of standardized processes constrains SMEs' ability to integrate into broader governance and economic systems. Fragmented recording systems limit transparency, weaken comparability across units, and reduce coordination capacity within supply chain structures. In urban food supply systems, these weaknesses may propagate beyond firm-level inefficiencies into broader systemic vulnerabilities, particularly in contexts requiring operational reliability and traceability.

Digital transformation has increasingly been proposed as a mechanism for addressing these governance limitations (Verhoef et al., 2021; Vial, 2021). Through real-time recording systems, standardized documentation formats, integrated databases, and automated monitoring mechanisms, digital financial systems are expected to enhance transparency, accountability, and operational coordination (Granlund, 2011; Rikhardsson et al., 2018). Prior studies have demonstrated that digitalization may improve operational efficiency, financial visibility, and information accessibility within SMEs (Jewer et al., 2022; Sulistyaningsih et al., 2024).

Nevertheless, much of the existing literature remains focused on adoption factors, technological readiness, or perceived usefulness of digital systems (Jewer et al., 2022; Sulistyaningsih et al., 2024). Existing studies largely conceptualize digitalization as a technological adoption issue rather than as a governance transformation process embedded within organizational behavior and operational systems. As a result, empirical evidence explaining how structured digital interventions reshape informal financial behavior and transform governance practices within real operational contexts remains limited.

This limitation becomes even more significant when viewed from the perspective of urban governance. The quality of SME financial data influences not only firm-level managerial effectiveness but also the reliability of aggregated economic information used by local governments and policy institutions (Otero et al., 2022). Inaccurate, delayed, and fragmented financial records at the enterprise level may propagate into broader systemic inefficiencies, limiting policymakers' ability to formulate responsive, targeted, and evidence-based SME development programs. Consequently, strengthening financial governance within SMEs is not solely an organizational concern but also an urban governance issue closely related to economic coordination and policy effectiveness

The urgency of this issue is further amplified by the increasing integration between local economic systems and national policy initiatives related to food provision and distribution. Programs such as the Free Nutritious Meal (MBG) initiative depend heavily on the reliability, continuity, and accountability of upstream food supply systems (UNICEF, 2021). Urban food supply SMEs, particularly those involved in aggregation and distribution activities, play a strategic role in ensuring that food flows remain stable, traceable, and operationally coordinated across local supply networks. In this context, financial governance becomes a foundational mechanism supporting supply chain reliability and policy implementation.

Despite its growing importance, the intersection between informal financial recording behavior, digital governance transformation, urban SME ecosystem coordination, and food system policy implementation remains underexplored. Existing studies tend to examine SME digitalization primarily from technological or operational perspectives while broader governance implications and behavioral transformation processes receive comparatively limited attention. Similarly, studies on urban governance and food system resilience rarely examine how micro-level financial recording practices shape broader system reliability and policy coordination.

This study addresses these gaps by positioning financial recording transformation as a governance intervention operating simultaneously at organizational, ecosystem, and policy levels. Using a stepped-wedge interrupted time series approach across multiple outlets of Omah Sayur MQS, this study examines how structured digital interventions reshape informal financial recording practices and strengthen governance quality within urban food supply SMEs. Beyond firm-level efficiency, the study seeks to explain how financial governance transformation contributes to the reliability of urban food systems and supports broader policy-oriented supply chain coordination in Malang City.

2. Methods

This study employed a case-based quasi-experimental design integrating a stepped-wedge implementation strategy with interrupted time series (ITS) analysis to evaluate digital financial governance transformation within an urban food supply SME context. Quasi-experimental approaches are appropriate for evaluating interventions in operational settings where random assignment is impractical (Creswell, 2017). The stepped-wedge structure enabled sequential intervention exposure across analytical units, while ITS analysis supported identification of immediate and sustained changes in governance practices over time (Bernal et al., 2017).

The empirical setting was Omah Sayur MQS, an urban food supply SME operating within Malang City's local food distribution system. The enterprise was selected purposively due to its strategic role in upstream food distribution and its multi-outlet operational structure, which reflects common governance challenges experienced by urban food supply SMEs. Three outlets located in Tlogomas, Dinoyo, and Lowokwaru were treated as embedded analytical units. This embedded structure strengthened internal validity by enabling cross-unit comparison under different intervention exposure periods within a single organizational environment (Yin, 2018).

The intervention was designed as a structured financial governance transformation rather than solely a technological adoption process. The intervention included: (1) standardization of financial recording procedures, (2) implementation of digital recording tools replacing manual bookkeeping, and (3) continuous monitoring to support behavioral adaptation and procedural compliance. This approach aligns with organizational change perspectives emphasizing the integration of systems, procedures, and behavioral adjustment in governance transformation processes (Kotter, 1996).

Table 1. Stepped-Wedge Implementation Across Embedded Units

Outlet	T1	T2	T3	T4	T5	T6	T7	T8
Tlogomas	O	O	X	X	X	X	X	X
Dinoyo	O	O	O	O	X	X	X	X
Lowokwaru	O	O	O	O	O	O	X	X

Note: O = observation phase; X = intervention phase

Data were collected longitudinally across pre-intervention, transition, and post-intervention phases using methodological triangulation to strengthen validity and analytical rigor (Hanson-DeFusco, 2023). The study integrated structured observation, in-depth interviews, and financial document analysis. Observations focused on recording behavior, reconciliation routines, reporting activities, and operational compliance. Interviews were conducted with management and employees to capture behavioral adaptation and organizational responses during the intervention process. Documentary analysis included transaction records, cash reports, and operational financial documents. Repeated observations enabled identification of gradual behavioral internalization and governance stabilization over time within the organizational change process (de Fátima Nery et al., 2020). Financial governance served as the primary analytical focus and was operationalized through multiple indicators representing recording quality and managerial control. The dataset followed a panel time-series structure consisting of repeated observations across outlets and observation periods. Data analysis employed interrupted time series logic to estimate changes in outcome levels and post-intervention trends (Bernal et al., 2017). Cross-unit comparison within the stepped-wedge structure strengthened interpretation of intervention effects, while repeated measurements and triangulation improved analytical rigor and reliability.

Table 2. Operationalization of Financial Governance Indicators

Variable	Indicator	Measurement Unit
Financial Recording Accuracy	Cash discrepancy	Percentage (%)
Reporting Timeliness	Reporting delay	Days
Recording Consistency	Format compliance	Index/score
Financial Governance Quality	Composite governance score	Aggregated index

3. Results and Discussion

Baseline Informality and Governance Fragmentation

Prior to the intervention, financial recording practices across the three Omah Sayur MQS outlets were characterized by informality, fragmented routines, and weak procedural control. Although the enterprise had experienced rapid operational expansion through the establishment of multiple outlets across Malang City, managerial systems did not develop at the same pace as operational growth. During the expansion period, the enterprise operated five outlets before later consolidating into three active outlets following operational and financial inefficiencies identified internally. This condition reflects a broader governance challenge commonly experienced by urban food supply SMEs, where increasing operational complexity is not accompanied by adequate financial control mechanisms.

Initial observations revealed that financial recording practices were predominantly retrospective and heavily dependent on memory-based routines. Transactions were commonly recorded at the end of operational periods rather than in real time, particularly during high customer activity. Employees consistently prioritized operational service over recording activities, resulting in delayed documentation and incomplete reconciliation processes. One employee explained:

> *"When it's busy, we focus on serving customers first. Registration is usually done later that night, so sometimes we forget or don't record things." (M, Tlogomas outlet).*

This statement illustrates that financial recording was operationally positioned as a secondary activity rather than as an integrated governance mechanism. Recording practices were therefore reconstructed retrospectively, increasing dependence on recall and exposing the process to inaccuracies and inconsistencies.

The absence of standardized procedures further intensified fragmentation across outlets. Variations in recording formats, reconciliation methods, and documentation styles were observed not only between outlets but also among employees within the same operational unit. As another respondent noted:

"Everyone has their own way of taking notes; there's no one-size-fits-all format. So when it's summarized, it often doesn't match up." (ST, Dinoyo outlet).

These heterogeneous practices reduced the comparability of financial information and complicated consolidation processes at the managerial level. In practice, financial data functioned primarily as fragmented operational notes rather than as reliable information supporting monitoring and decision-making.

From a managerial perspective, these conditions were recognized as structural governance limitations rather than isolated operational errors. The owner acknowledged:

"We don't have a standard system yet. We've only been using books and a simple Excel spreadsheet, so control is still weak," (AT, Omah Sayur MQS).

This finding indicates that financial governance within the enterprise remained weakly institutionalized. Recording activities relied on manual routines and individual practices without standardized procedures or integrated control systems. Under these conditions, managerial visibility over transaction flows, cash positions, and outlet performance remained limited.

Behaviorally, the baseline condition demonstrates that delayed recording practices had gradually become normalized within daily operations. Financial documentation was frequently postponed until operational activities were completed, particularly under conditions of high transaction intensity and limited staffing. This pattern reflects the emergence of habitual operational prioritization, where customer service and transaction processing consistently displaced recording activities. Consequently, financial recording evolved into a reactive administrative activity rather than a proactive managerial control mechanism.

To substantiate these qualitative findings, baseline quantitative indicators were compiled from financial records across the three outlets. As presented in Table 2, discrepancies between recorded and actual cash balances ranged from approximately 5% to 10%, while reporting delays extended from two to seven days. Recording methods remained largely manual, with limited use of basic spreadsheet tools in some outlets, and documentation completeness varied substantially across operational units.

Table 3. Baseline Financial Recording Conditions (Pre-Intervention)

Indicator	Tlogomas	Dinoyo	Lowokwaru	Overall Condition
Cash discrepancy (%)	6–10%	5–8%	5–9%	High
Reporting delay (days)	3–7	2–5	3–7	Delayed
Recording method	Manual	Manual + Excel	Manual	Non-standardized
Recording timing	End-of-day	Mixed	End-of-day	Non-real-time
Documentation completeness	Low	Medium	Low	Inconsistent

Sources: Researcher Sintesis, 2025

The baseline indicators reveal substantial variability and instability across governance dimensions. High discrepancy levels, delayed reporting, inconsistent documentation, and non-standardized recording methods collectively indicate that financial governance practices were insufficient to support reliable managerial control. From an interrupted time series perspective, the pre-intervention phase reflects an unstable governance condition characterized by high variability and fragmented operational routines.

Taken together, these findings demonstrate that financial recording practices within Omah Sayur MQS were shaped by interrelated behavioral and structural conditions. Weak procedural standardization, retrospective recording culture, fragmented documentation, and limited managerial oversight collectively positioned financial recording as an informal organizational routine rather than as an integrated component of financial governance.

Immediate Operational Transformation

The introduction of the digital financial governance intervention generated a clear and observable operational transformation across the three outlets, indicating an immediate level change following implementation. In contrast to the baseline condition—characterized by delayed recording, fragmented documentation, and weak procedural control—the post-intervention phase demonstrated a rapid transition toward more structured, timely, and standardized financial recording practices.

The most immediate change was observed in the reduction of discrepancies between recorded and actual cash balances. At the Tlogomas outlet, which received the intervention during the initial implementation phase, discrepancy levels declined sharply within the first observation period after implementation. Employees reported that the digital recording system substantially reduced dependence on memory-based reconstruction and minimized errors associated with retrospective recording. One employee stated:

> *"Now it's recorded directly during the transaction, so there's no need to memorize it. The difference is also significantly reduced" (DF, Tlogomas outlet).*

This statement reflects an immediate behavioral restructuring in which financial recording shifted from retrospective documentation toward real-time operational recording. The intervention therefore altered not only the recording system itself but also the timing and organizational positioning of financial documentation within daily operational routines.

A similar pattern emerged in reporting timeliness. Prior to the intervention, reporting activities were frequently delayed for several days due to fragmented recording practices and incomplete reconciliation processes. Immediately after implementation, reporting became substantially more synchronized with transaction flows and daily operational activities. An employee from the Dinoyo outlet explained:

> *"Now, reports can be viewed the same day. No need to wait as long as before" (SR, Dinoyo outlet).*

This finding indicates that the intervention improved not only recording speed but also managerial visibility over daily financial conditions. The availability of near real-time information increased accessibility to operational data and enabled faster monitoring of transaction flows across outlets.

Despite these immediate improvements, the transition process was not entirely frictionless. Several employees initially experienced adjustment difficulties related to procedural adaptation and the shift from manual routines to standardized digital systems. During the early implementation period, some operational delays occurred as employees attempted to balance customer service activities with immediate recording requirements. However, these adjustment challenges diminished progressively as employees became more familiar with the recording procedures.

Importantly, the observed improvements did not occur simultaneously across all outlets but followed the stepped-wedge implementation sequence. During the early intervention phase, only the treated outlet demonstrated substantial reductions in discrepancies and reporting delays, while outlets that had not yet received the intervention continued to exhibit baseline patterns characterized by retrospective recording and fragmented documentation. Once the intervention was introduced to subsequent outlets, similar improvements emerged sequentially.

This temporal variation strengthens the causal interpretation of the intervention effect. If the improvements had resulted primarily from external operational factors, similar changes would likely have occurred simultaneously across all outlets rather than sequentially following intervention exposure. Instead, the stepped-wedge structure demonstrates that operational improvements consistently appeared only after implementation within each outlet.

From an interrupted time series perspective, the findings indicate a substantial level shift immediately following intervention exposure, particularly in indicators related to recording accuracy and reporting timeliness. The abrupt reduction in discrepancy levels and reporting delays suggests that the intervention generated immediate operational restructuring rather than gradual incremental adjustment.

To quantify these immediate changes, Table 3 presents a comparison of key financial governance indicators before and after the intervention.

Table 4. Immediate Changes in Financial Recording Indicators (Level Change)

Indicator	Pre-Intervention	Post-Intervention	Observed Change
Cash discrepancy (%)	5–10%	2–4%	Significant decrease
Reporting delay (days)	2–7	0–1	Immediate reduction
Recording timing	End-of-day	Real-time	Shift in practice
Recording consistency	Low	Moderate–High	Improvement
Documentation completeness	Inconsistent	Structured	Improvement

Sources: Researcher Sintesis, 2025

The immediate post-intervention indicators reveal substantial operational improvements across all dimensions of financial governance. The reduction in discrepancy levels reflects increased recording accuracy, while the transition toward real-time documentation indicates stronger integration between financial recording and operational activities. Simultaneously, improvements in consistency and documentation completeness demonstrate the emergence of procedural standardization that had previously been absent.

Taken together, these findings confirm that the intervention generated an immediate operational and behavioral transformation consistent with the concept of level change in interrupted time series analysis. More importantly, the sequential pattern of improvement observed across outlets suggests that digital financial governance transformation operated not merely as a technological adjustment but as an organizational restructuring process that altered daily recording behavior, managerial visibility, and procedural coordination within the enterprise.

Stabilization, Behavioral Internalization, and Governance Transformation

Following the immediate operational improvements observed after implementation, subsequent observation periods indicate that the intervention generated sustained changes in financial recording practices characterized by trend stabilization, behavioral internalization, and governance embedding across outlets. From an interrupted time series perspective, this phase reflects not only a maintained level shift but also a gradual reduction in variability and increasing consistency in governance indicators over time.

Across the post-intervention periods, discrepancy levels continued to decline and became progressively more stable. The sharp reductions observed during the early implementation phase were followed by gradual convergence toward consistently lower discrepancy levels across outlets. This pattern suggests that the intervention effect was not temporary but became reinforced as recording routines were repeatedly practiced and embedded within daily operational activities.

Qualitative evidence supports this interpretation. Employees described how digital financial recording gradually evolved from an externally imposed procedure into a habitual component of operational workflows. One employee explained:

> *"At first, I had to adjust, but after a few days, I got used to it. Now, if I don't write it down right away, it feels strange" (TM, Dinoyo outlet).*

This statement reflects a transition from compliance-based adaptation toward behavioral internalization. Recording activities were no longer perceived as additional administrative tasks but had begun to function as normalized operational routines integrated into transaction processes.

A similar pattern emerged in reporting timeliness and documentation consistency. While immediate improvements had already been observed during the early intervention phase, later observation periods demonstrated further refinement in procedural alignment and reporting stability. Employees increasingly followed standardized recording procedures with reduced procedural deviation between outlets. As one respondent noted:

> *"Now, reporting is not only faster, but also more organized and consistent. There's a pattern now" (VP, Lowokwaru outlet).*

This finding indicates that the intervention not only accelerated reporting activities but also strengthened the predictability and uniformity of financial documentation practices. Over time, standardized procedures became routinized, reducing variability in recording behavior across employees and operational units.

Behaviorally, the post-intervention phase demonstrates the emergence of routinized compliance and normalized real-time recording behavior. During the baseline phase, financial recording was frequently postponed and reconstructed retrospectively. However, repeated exposure to standardized procedures and continuous monitoring gradually shifted recording behavior toward immediate transaction-based documentation. Employees increasingly perceived delayed recording as operationally inappropriate, indicating that new governance norms had become internalized within organizational routines.

The stepped-wedge implementation structure further reinforces the interpretation of sustained intervention effects. Although each outlet entered the intervention phase at different periods and operated under varying transaction intensity and workload conditions, similar stabilization patterns emerged sequentially across units. Once exposed to the intervention, outlets consistently demonstrated reduced variability, improved documentation alignment, and increasingly standardized governance practices.

From an interrupted time series perspective, the post-intervention phase reflects both maintained level changes and slope changes following intervention exposure. The sustained decline in discrepancy variability and increasing consistency in reporting patterns indicate that governance practices were becoming stabilized rather than merely temporarily improved. This combination of level stabilization and trend convergence provides stronger evidence of governance transformation than immediate post-intervention improvements alone.

To illustrate these sustained changes, Table 4 summarizes the trend in key financial governance indicators across the post-intervention period.

Table 5. Sustained Changes in Financial Recording Indicators (Trend Stabilization)

Indicator	Early Post-Intervention	Later Post-Intervention	Observed Trend
Cash discrepancy (%)	2–4%	<2–3%	Gradual decrease and stabilization
Reporting delay (days)	0–1	Consistently <1	Stabilized at low level
Recording timing	Real-time (inconsistent)	Real-time (consistent)	Behavioral stabilization
Recording consistency	Moderate–High	High	Progressive improvement
Documentation completeness	Structured	Fully standardized	Full alignment

Sources: Researcher Sintesis, 2025

The sustained post-intervention indicators demonstrate that improvements were not only maintained but also progressively consolidated over time. The transition from partially consistent recording practices toward fully routinized and standardized procedures reflects a deeper organizational transformation in governance behavior. Financial recording gradually evolved from fragmented administrative activity into an embedded operational control mechanism integrated within daily routines.

Taken together, these findings demonstrate that the intervention produced sustained governance transformation characterized by behavioral internalization, procedural stabilization, and routine compliance across organizational units. The results suggest that digital financial governance transformation operates not merely through technological adoption but through the gradual embedding of standardized recording behavior into organizational practice. Consequently, governance improvement emerged as a longitudinal organizational process rather than as a temporary operational adjustment.

Cross-Unit Governance Transformation and Urban Ecosystem Implications

The stepped-wedge implementation structure enabled comparison of intervention effects across outlets under different temporal exposure conditions. Because each outlet functioned sequentially as both a comparator and an intervention unit, the design allowed observation of governance transformation patterns across organizational units operating within the same enterprise but under different implementation stages. This structure strengthens the robustness of the findings by demonstrating that operational improvements consistently emerged following intervention exposure rather than simultaneously across all outlets.

Cross-unit observations reveal that governance improvements followed a relatively similar trajectory despite differences in transaction intensity, customer flow, and operational workload. Outlets that received the intervention earlier demonstrated immediate reductions in discrepancy levels and reporting delays, followed by gradual stabilization over subsequent observation periods. Meanwhile, outlets that had not yet entered the intervention phase continued to exhibit baseline characteristics, including delayed recording, fragmented documentation, and inconsistent reconciliation practices. Once the intervention was introduced, these outlets subsequently displayed comparable governance improvements.

This sequential convergence across outlets indicates that the observed changes were systematically associated with the intervention rather than with outlet-specific contextual factors. From a quasi-experimental perspective, the consistency of these patterns strengthens the causal interpretation of the intervention effect. More importantly, the findings demonstrate that digital financial governance transformation is transferable across organizational units operating under comparable operational conditions.

From an organizational governance perspective, the intervention substantially reduced variability in financial practices between outlets. Prior to implementation, each outlet demonstrated different recording styles, reconciliation routines, and documentation structures, limiting comparability and complicating centralized managerial oversight. Following the intervention, recording procedures became increasingly standardized across units, improving consistency in transaction documentation and strengthening coordination between operational and managerial functions.

The convergence of governance practices across outlets also improved managerial visibility over organizational performance. Managers were able to access more timely and comparable financial information across operational units, enabling faster identification of discrepancies and improved monitoring of cash flow conditions. In this sense, the intervention transformed financial recording from fragmented outlet-based routines into a more integrated governance system operating across the enterprise.

These improvements carry broader implications for the urban SME ecosystem. Reliable and standardized financial recording practices enhance transparency, accountability, and comparability of operational information, which are essential for strengthening economic coordination within urban SME environments. When SMEs operate with more structured governance systems, they contribute to the availability of more reliable economic data that can support evidence-based policy formulation and local economic monitoring.

The findings are particularly significant within the context of urban food supply systems. As an intermediary operating within Malang City's food distribution network, Omah Sayur MQS plays a role in maintaining continuity of product flow between suppliers and urban consumers. In such systems, operational reliability depends not only on physical distribution capacity but also on organizational governance quality. Improved financial governance strengthened the enterprise's ability to monitor transactions, maintain operational discipline, and reduce uncertainty in cash flow management, thereby supporting more stable supply chain coordination.

The intervention also demonstrates potential relevance for policy-oriented food distribution systems such as the Free Nutritious Meal (MBG) program. The implementation of MBG depends on local supply actors capable of operating with consistent, transparent, and accountable governance systems. SMEs lacking structured financial documentation may experience difficulties in meeting requirements related to traceability, monitoring, and operational accountability. Conversely, enterprises with more standardized financial governance practices are better positioned to integrate into coordinated policy-driven supply systems.

From a broader governance perspective, these findings suggest that digital financial transformation contributes not only to firm-level efficiency but also to ecosystem-level coordination and policy readiness. The intervention improved organizational reliability while simultaneously strengthening the quality of operational information circulating within the local SME ecosystem. Consequently, financial governance functions as a strategic interface linking micro-level organizational practices with broader urban economic coordination and policy implementation mechanisms.

To synthesize the longitudinal governance transformation observed across outlets, Table 5 summarizes the progression of key governance indicators from baseline conditions through immediate post-intervention effects and sustained stabilization phases.

Table 6. Summary of Financial Governance Transformation Across Observation Phases

Indicator	Baseline Phase	Immediate Post-Intervention	Sustained Post-Intervention	Transformation Pattern
Cash discrepancy (%)	5–10%	2–4%	<2–3% (stable)	Level reduction + stabilization
Reporting delay (days)	2–7	0–1	Consistently <1	Immediate synchronization
Recording timing	Retrospective	Real-time (partial)	Real-time (consistent)	Behavioral routinization
Recording consistency	Fragmented	Moderately standardized	Fully standardized	Governance convergence
Documentation completeness	Inconsistent	Structured	Fully aligned	Organizational integration

Sources: Researcher Sintesis, 2025

The synthesis table demonstrates that governance transformation occurred progressively across operational, behavioral, and organizational dimensions. Immediate operational restructuring was followed by stabilization and routinization of standardized practices, ultimately producing convergence in governance quality across outlets. These findings indicate that digital financial governance transformation operates as a longitudinal organizational process that strengthens not only internal managerial control but also broader ecosystem coordination and policy readiness within urban food supply systems.

Discussion

Financial Governance Transformation as Behavioral Restructuring

The findings of this study demonstrate that digital financial governance transformation within urban food supply SMEs extends beyond technological adoption and operational improvement. Instead, the intervention functioned as a process of behavioral restructuring through which previously informal, fragmented, and retrospective recording practices were gradually transformed into routinized governance behavior embedded within daily organizational activities. This finding suggests that financial governance transformation in SMEs should not be interpreted merely as a technical accounting adjustment but rather as an organizational and behavioral process shaped by routines, operational pressures, and institutional adaptation.

Prior to the intervention, financial recording practices across MQS outlets were characterized by delayed reporting, memory-based reconstruction, fragmented documentation, and inconsistent reconciliation routines. These findings are consistent with behavioral accounting perspectives suggesting that accounting practices are socially and organizationally embedded rather than purely technical procedures. In small organizational settings, operational activities frequently dominate administrative control processes, causing financial recording to evolve into habitual routines shaped by situational pressures and organizational culture rather than standardized governance principles. Recent SME governance studies further demonstrate that limited digital capability and informal managerial structures frequently contribute to weak financial control and inconsistent reporting practices within small enterprises.

The normalization of delayed recording practices observed during the baseline phase also reflects the influence of routineized operational behavior within SMEs. Employees consistently prioritized customer service and transaction flow over immediate documentation activities, reinforcing retrospective recording culture across outlets. Such behavior aligns with organizational routine theory, which explains that repetitive practices gradually become institutionalized within organizational processes and resistant to change over time (Feldman et al., 2003). Contemporary organizational studies additionally emphasize that behavioral persistence during digital transformation processes is strongly influenced by pre-existing routines, employee adaptation capacity, and organizational learning mechanisms (Bertassini et al., 2021). In this context, fragmented financial recording practices were not isolated operational weaknesses but manifestations of embedded organizational routines shaped by operational constraints and informal managerial structures. Similar conditions are frequently identified in SME governance environments where limited formalization and resource constraints influence administrative discipline and financial control quality (Mazzarol, 2015).

The intervention altered these routines by introducing standardized recording procedures, real-time digital documentation, and continuous monitoring mechanisms. Importantly, the findings indicate that governance transformation did not occur instantly through system implementation alone. Instead, repeated exposure to standardized procedures gradually shifted employee behavior from reactive retrospective recording toward proactive real-time documentation practices. This transition is consistent with organizational change perspectives suggesting that sustainable governance transformation requires behavioral adaptation and procedural internalization rather than solely technological substitution (Kotter, 1996; Verhoef et al., 2021). Recent digital transformation studies further emphasize that organizational adaptation processes are strongly influenced by employee learning, managerial reinforcement, and continuous procedural engagement during system implementation (Vial, 2021).

The findings further demonstrate that digital financial systems functioned not only as recording tools but also as behavioral control mechanisms that reshaped organizational discipline and procedural consistency. As employees repeatedly interacted with standardized procedures, recording practices became increasingly routinized and normalized within operational workflows. This supports institutional perspectives emphasizing that governance systems become effective when formal procedures are embedded into daily organizational behavior and gradually internalized as accepted operational norms (Meyer et al., 1977). Contemporary governance research similarly highlights that digital control systems can reinforce organizational accountability and behavioral compliance when integrated into repetitive operational activities and monitoring structures (Troise et al., 2022).

This behavioral restructuring process also explains why governance improvements were sustained beyond the initial intervention phase. Immediate post-intervention changes reflected operational adjustment, while later stabilization phases indicated deeper internalization of standardized governance behavior. The observed reduction in variability and increasing consistency across outlets suggest that governance transformation evolved into an embedded organizational practice rather than a temporary compliance response. Similar longitudinal findings in digital organizational transformation studies indicate that sustained governance improvement typically emerges after procedural routines become normalized and reinforced through repeated organizational practice (Sjödin et al., 2020).

The findings contribute to the literature on SME digitalization by extending existing discussions beyond technological adoption factors and operational efficiency outcomes. Previous studies have predominantly focused on digital readiness, perceived usefulness, or adoption intention within SME contexts. While such perspectives are important, they often overlook the behavioral and organizational mechanisms through which governance transformation actually occurs within daily operational environments. The present findings therefore support emerging perspectives arguing that SME digitalization should be understood as a socio-organizational transformation process involving behavioral adaptation, institutional reinforcement, and procedural restructuring rather than merely technological implementation (Bouwman et al., 2018).

This study demonstrates that governance transformation in SMEs is strongly influenced by behavioral adaptation processes involving routinization, monitoring, procedural reinforcement, and organizational normalization. Consequently, digitalization should not be conceptualized merely as technological implementation but as a governance restructuring process operating through behavioral modification and organizational learning.

From a theoretical perspective, the findings support the integration of behavioral accounting perspectives, organizational routine theory, and institutional governance approaches in explaining governance transformation within SMEs. Behavioral accounting explains how financial practices are shaped by operational behavior and organizational routines (Luft et al., 2003). Organizational routine theory explains how repetitive actions become stabilized over time (Feldman et al., 2003), while institutional perspectives explain how formalized governance structures gradually become embedded within organizational systems (Meyer et al., 1977). The integration of these perspectives provides a broader explanation of how informal financial behavior can be transformed into standardized governance practices through structured intervention processes.

The findings indicate that digital financial governance transformation within urban food supply SMEs should be understood as a longitudinal behavioral restructuring process through which informal operational routines gradually evolve into embedded governance practices. This interpretation shifts the focus of SME digitalization from technology-centered implementation toward governance-centered organizational transformation.

Longitudinal Governance Transformation and Organizational Internalization

The longitudinal findings of this study indicate that financial governance transformation within urban food supply SMEs should be understood as a temporal organizational process rather than as an immediate outcome of technological implementation. Although substantial operational improvements emerged directly after intervention exposure, the interrupted time series patterns demonstrate that governance transformation evolved progressively through stabilization, repetition, and organizational internalization over subsequent observation periods. This finding reinforces the argument that sustainable governance improvement in SMEs depends not only on initial adoption but also on the gradual embedding of standardized practices into everyday organizational routines.

From an interrupted time series perspective, the intervention generated two important transformation dynamics: immediate level change and subsequent trend stabilization. The level change observed immediately after intervention exposure reflects the direct operational impact of introducing standardized digital recording systems, particularly in reducing discrepancy levels and reporting delays. However, the post-intervention slope changes and reduced variability across observation periods indicate a deeper organizational process in which governance practices gradually became stabilized and routinized.

This distinction between immediate operational adjustment and sustained governance internalization is theoretically significant. Organizational change literature emphasizes that short-term compliance does not necessarily indicate institutionalized transformation (Kotter, 1996). In many organizations, new procedures may initially be adopted formally while underlying routines and behavioral patterns remain unchanged. Consequently, governance stabilization becomes a critical indicator of whether organizational transformation has genuinely occurred.

The findings of this study suggest that repeated exposure to standardized procedures and continuous monitoring gradually altered employees' perceptions of financial recording activities. During the baseline phase, recording practices were largely viewed as secondary administrative tasks that could be postponed under operational pressure. Over time, however, real-time documentation became increasingly normalized as part of routine operational behavior. Employees no longer perceived immediate recording as an externally imposed requirement but as an expected component of daily workflow.

This process reflects the concept of organizational internalization, in which formal governance procedures become embedded into operational routines through repetition and behavioral reinforcement (Feldman et al., 2003). Organizational routine theory explains that repeated practices gradually generate stable behavioral patterns that structure organizational action over time. In the context of this study, repeated interaction with digital recording procedures gradually reduced dependence on memory-based reconstruction and fragmented reporting behavior, replacing them with routinized real-time documentation practices. Recent organizational digitalization studies similarly demonstrate that sustained interaction with standardized digital systems contributes to behavioral stabilization, procedural discipline, and routinized operational compliance within SMEs and operational organizations (Troise et al., 2022).

The stabilization process observed across outlets also aligns with organizational learning perspectives. Organizational learning theory suggests that repeated procedural interaction and feedback mechanisms enable organizations to refine routines, reduce variability, and improve consistency over time. The reduction in governance variability observed during later post-intervention periods indicates that employees increasingly adapted to standardized procedures and developed shared operational expectations across outlets. Contemporary organizational learning research further emphasizes that continuous feedback, experiential adaptation, and repetitive system interaction are critical mechanisms through which digital governance capabilities become institutionalized within organizations (Brix, 2020). These findings therefore suggest that governance stabilization emerged not merely from technological implementation, but from cumulative organizational learning processes that reinforced procedural consistency and collective behavioral alignment over time.

Importantly, the findings demonstrate that governance transformation occurred sequentially and cumulatively rather than simultaneously. Because each outlet entered the intervention phase at different periods, stabilization patterns emerged progressively following intervention exposure within each unit. This sequential convergence strengthens the interpretation that governance stabilization resulted from organizational adaptation processes rather than from external operational fluctuations.

The observed decline in variability across outlets further indicates that governance transformation contributed to stronger procedural alignment and coordination within the enterprise. Prior to the intervention, each outlet operated with relatively autonomous recording practices characterized by varying documentation methods and inconsistent reconciliation routines. Over time, however, standardized procedures became increasingly harmonized across units, enabling greater comparability and managerial oversight.

This finding supports institutional perspectives suggesting that governance systems become organizationally effective when formal procedures are consistently reproduced through routine practice and shared operational norms (Meyer et al., 1977; Scott, 2013). In this study, digital recording systems alone did not automatically generate governance transformation. Instead, transformation emerged through the interaction between technological systems, monitoring mechanisms, repeated practice, and organizational adaptation. Recent institutional and digital governance studies similarly argue that digital transformation effectiveness depends not only on technological infrastructure but also on organizational capability to embed formalized practices into everyday operational behavior (Troise et al., 2022; Verhoef et al., 2021). Continuous procedural reinforcement and managerial monitoring therefore functioned as critical mechanisms supporting the institutionalization of governance routines within the SME environment.

The findings also contribute to existing discussions on SME digitalization and governance sustainability. Prior studies frequently conceptualize digital transformation as a technological adoption issue measured through implementation success or operational efficiency (Development, 2021; Verhoef et al., 2021). However, the present findings indicate that the sustainability of governance transformation depends heavily on the ability of organizations to internalize standardized practices into stable operational routines. Without behavioral stabilization, digital adoption may remain superficial and vulnerable to procedural reversal under operational pressure. This argument aligns with recent SME digitalization literature emphasizing that long-term digital transformation sustainability requires organizational learning, employee adaptation, procedural routinization, and continuous governance reinforcement rather than one-time technology implementation alone (Kraus et al., 2022). Accordingly, the present study extends SME digital governance literature by demonstrating that behavioral institutionalization represents a critical intermediary mechanism linking digital system implementation and sustainable governance improvement.

From a governance perspective, the longitudinal stabilization observed in this study suggests that digital transformation strengthens not only operational efficiency but also organizational reliability. The emergence of consistent recording behavior, reduced reporting variability, and improved procedural alignment indicates that governance practices became increasingly predictable and controllable over time. Such predictability is essential for strengthening managerial visibility, improving accountability, and supporting coordinated organizational decision-making.

Overall, the findings demonstrate that digital financial governance transformation operates as a longitudinal organizational learning and internalization process. Immediate operational improvements represent only the initial phase of transformation, while sustained governance stabilization reflects deeper behavioral embedding within organizational routines. This interpretation extends current SME digitalization literature by emphasizing that governance transformation is fundamentally temporal, behavioral, and organizational in nature rather than purely technological.

Financial Governance Transformation across Organizational and Ecosystem Levels

The findings of this study indicate that digital financial governance transformation within urban food supply SMEs generates implications that extend beyond firm-level operational improvement. While the intervention initially functioned as an organizational governance restructuring process within Omah Sayur MQS, the resulting standardization, transparency, and stabilization of financial practices also contributed to broader ecosystem-level coordination and governance readiness. This suggests that financial governance transformation should be interpreted not merely as an internal managerial intervention but as part of a wider urban economic governance infrastructure.

At the organizational level, the intervention strengthened managerial visibility, procedural consistency, and operational control across outlets. Prior to the intervention, fragmented recording routines and inconsistent documentation limited the enterprise's ability to monitor cash flow conditions, compare outlet performance, and coordinate operational decision-making. Following the implementation of standardized digital recording systems, governance practices became increasingly integrated across organizational units. This integration enabled managers to access more timely, structured, and comparable operational information, thereby improving coordination capacity and reducing informational uncertainty.

These findings align with financial governance perspectives emphasizing that reliable financial information constitutes a critical foundation for organizational control, accountability, and strategic decision-making (Brigham et al., 2004; Development, 2021). Financial governance systems function not only as accounting mechanisms but also as organizational coordination structures that shape communication, monitoring, and managerial responsiveness within firms (Bedford et al., 2019). In this study, the intervention strengthened the enterprise's governance capacity by transforming fragmented financial information into a more integrated and operationally usable managerial system. Recent governance literature further suggests that integrated financial information systems improve organizational responsiveness by enabling more consistent monitoring, operational transparency, and data-driven managerial decision-making within SMEs.

Importantly, the convergence of governance practices observed across outlets demonstrates that standardized recording systems contributed to stronger organizational coordination and procedural harmonization. Prior to intervention, each outlet operated with relatively autonomous recording behavior characterized by varying formats, reporting timing, and reconciliation procedures. Such fragmentation reduced comparability and weakened managerial oversight across operational units. Following intervention exposure, however, governance practices became progressively standardized, reducing operational variability and enabling more consistent managerial monitoring.

This finding supports systems-based governance perspectives suggesting that organizational effectiveness depends on the ability to coordinate interdependent operational units through standardized informational structures and procedural integration (Scott, 2013). In multi-unit SME settings, governance standardization becomes particularly important because operational fragmentation may generate informational asymmetry and reduce coordination efficiency. The intervention therefore functioned not only as a technological adjustment but also as an organizational integration mechanism. Contemporary organizational systems research similarly highlights that standardized digital governance procedures can strengthen cross-unit coordination, reduce operational inconsistency, and improve organizational integration in decentralized operational environments (Kraus et al., 2022; Verhoef et al., 2021).

Beyond the firm level, the findings also reveal broader implications for urban SME ecosystems. Standardized financial governance practices improve the reliability, comparability, and transparency of operational information circulating within local economic systems. In urban SME environments where enterprises frequently interact through distribution networks, supplier relationships, and local market coordination, the quality of governance information directly affects ecosystem efficiency and trust formation.

These findings align with ecosystem governance literature emphasizing that local economic systems increasingly depend on coordination capacity, transparency, and information reliability among interconnected actors (Mazzucato et al., 2020). Urban governance systems rely not only on formal institutions but also on the operational reliability of local enterprises participating in supply chains and service networks. Consequently, weaknesses in firm-level governance may propagate into broader ecosystem inefficiencies, limiting the effectiveness of local economic coordination. Recent urban governance and regional resilience studies additionally demonstrate that local SMEs play an increasingly strategic role in sustaining urban economic adaptability, food accessibility, and supply-chain continuity under uncertain economic conditions (Bhutta et al., 2008; Lauar et al., 2023).

The implications become even more significant within the context of urban food supply systems. As an intermediary enterprise operating within Malang City's local food distribution network, Omah Sayur MQS contributes to maintaining continuity between upstream suppliers and urban consumers. In such systems, operational reliability depends not only on physical logistics but also on governance quality, transaction traceability, and coordination stability. Fragmented financial practices may reduce the reliability of transaction monitoring and operational accountability, thereby increasing uncertainty within supply chain coordination processes.

The findings therefore support the argument that financial governance constitutes an important component of urban food system resilience. Previous studies on food system resilience emphasize the importance of coordination, traceability, and adaptive operational systems in maintaining supply continuity under dynamic conditions This study extends those discussions by demonstrating that financial governance practices at the SME level also contribute to the stability and reliability of urban food distribution systems. In addition, recent resilience studies argue that digitally integrated governance systems improve adaptive capacity, operational continuity, and information responsiveness within urban food supply networks, particularly in rapidly changing urban environments (Tendall et al., 2015). Therefore, strengthening SME financial governance may contribute not only to firm-level efficiency but also to broader urban food system sustainability and resilience.

The relevance of governance transformation is further reinforced by emerging policy-oriented food distribution initiatives such as the Free Nutritious Meal (MBG) program. Policy-driven supply systems require participating enterprises to operate with greater accountability, reporting reliability, and operational transparency. SMEs lacking standardized governance systems may experience difficulties in meeting requirements related to monitoring, coordination, and traceability. Conversely, enterprises with stronger financial governance systems are better positioned to integrate into coordinated policy supply chains.

From a policy perspective, these findings suggest that SME digitalization programs should not focus exclusively on technological adoption but also on governance capability development and behavioral stabilization. Digital transformation initiatives that emphasize software implementation without procedural integration and organizational adaptation may produce only temporary operational improvements. In contrast, interventions integrating standardization, monitoring, and behavioral reinforcement are more likely to generate sustainable governance transformation.

The findings also contribute to broader discussions on urban governance and economic coordination by demonstrating how micro-level governance transformation within SMEs may influence ecosystem-level reliability and policy readiness. Financial governance therefore functions not only as a firm-level managerial mechanism but also as a strategic infrastructure supporting coordination, transparency, and accountability within urban economic systems.

Overall, this study demonstrates that digital financial governance transformation operates across interconnected organizational and ecosystem levels. At the firm level, the intervention strengthened managerial control, procedural consistency, and operational coordination. At the ecosystem level, governance standardization improved information reliability, comparability, and supply chain coordination. These findings suggest that financial governance transformation within SMEs has broader implications for urban economic resilience, local food system reliability, and policy-oriented supply chain governance.

Theoretical and Policy Contributions

The findings of this study contribute theoretically by proposing a Financial Governance Transformation Model for Urban Food Supply SMEs that explains how digital financial governance transformation evolves through interconnected behavioral, organizational, ecosystem, and policy processes. Unlike conventional SME digitalization perspectives that primarily emphasize technological adoption, operational efficiency, or system implementation success (Development, 2021; Verhoef et al., 2021), the present study demonstrates that governance transformation emerges through the gradual restructuring and internalization of organizational behavior supported by standardized procedures, monitoring mechanisms, and longitudinal adaptation processes. Recent digital transformation scholarship similarly argues that sustainable organizational transformation depends on socio-technical alignment, behavioral reinforcement, and institutional adaptation rather than isolated technology deployment alone (Kraus et al., 2022; Vial, 2021). The model developed in this study conceptualizes digital financial governance transformation as a multi-level governance process operating across three interconnected dimensions: firm level, SME ecosystem level, and policy system level. Figure 5 presents the proposed Financial Governance Transformation Model derived from the longitudinal findings of this study.

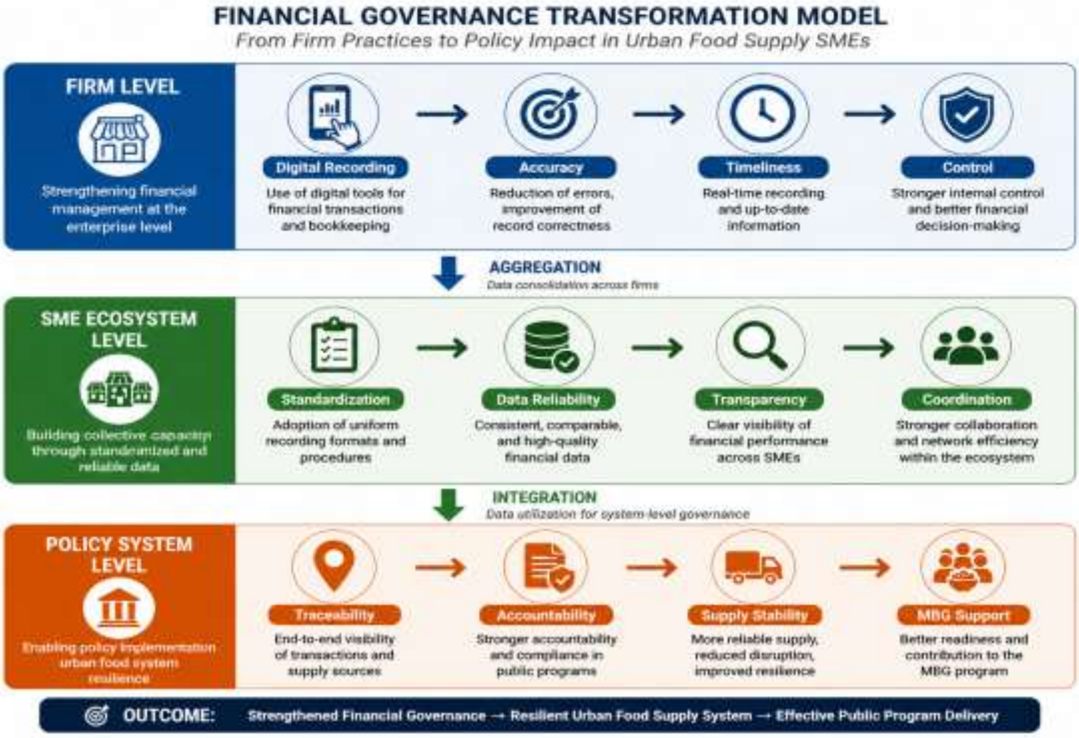

Figure 1. Financial Governance Transformation Model
Sources: Researcher Sintesis, 2025

At the firm level, the transformation process begins through the implementation of real-time digital financial recording systems that improve recording accuracy, reduce reporting delays, and strengthen managerial control. The findings indicate that governance transformation at this stage is not generated solely by technology adoption but by the routinization and behavioral internalization of standardized recording practices within daily operational activities. Consequently, digital recording functions simultaneously as a technical system and as a behavioral governance mechanism shaping organizational discipline and procedural consistency.

At the ecosystem level, standardized governance practices generate broader coordination effects across interconnected organizational environments. As financial documentation becomes increasingly standardized and reliable, operational information becomes more comparable, transparent, and accessible across units and actors. These findings support governance and systems perspectives suggesting that organizational coordination depends heavily on the quality and consistency of information circulating within interconnected systems (Scott, 2013). Within urban SME ecosystems, governance standardization therefore contributes to stronger coordination capacity, reduced informational asymmetry, and improved reliability of local economic interactions. Contemporary ecosystem governance research additionally emphasizes that information transparency and interoperable governance structures are increasingly critical for strengthening resilience, collaboration, and adaptive coordination within urban economic ecosystems (Mazzucato et al., 2020).

The model further demonstrates that governance transformation generates implications extending toward policy system integration. Reliable and traceable financial governance systems improve operational accountability and strengthen supply chain reliability within urban food systems. These findings are particularly relevant for policy-oriented food distribution systems such as the Free Nutritious Meal (MBG) initiative, which depend heavily on coordinated, transparent, and accountable local supply actors. SMEs operating with fragmented financial systems may experience difficulties in meeting policy requirements related to reporting, traceability, and monitoring. Conversely, enterprises with stronger governance systems are more capable of integrating into coordinated urban food supply infrastructures.

Theoretically, this study extends existing SME digitalization literature by integrating behavioral accounting perspectives, organizational routine theory, institutional governance theory, and urban ecosystem governance into a unified analytical framework. Prior studies frequently conceptualize SME digitalization primarily through technological readiness, perceived usefulness, or adoption intention perspectives (Development, 2021). However, these approaches often underemphasize the organizational and behavioral mechanisms through which governance transformation becomes stabilized within daily operational contexts. By combining behavioral accounting and institutional perspectives, the present study demonstrates that digital governance transformation is fundamentally a process of organizational behavioral restructuring, procedural institutionalization, and ecosystem coordination reinforcement. This finding aligns with emerging interdisciplinary research arguing that digital transformation within SMEs should be understood as an ongoing organizational capability-building process involving learning, routinization, governance adaptation, and socio-organizational integration (Warner & Wäger, 2019).

While these approaches explain technology acceptance processes, they provide limited explanation regarding how governance transformation becomes organizationally stabilized over time. The present findings address this limitation by demonstrating that governance transformation operates through longitudinal behavioral adaptation and organizational embedding processes. The study therefore contributes conceptually by repositioning SME digitalization as a governance-centered organizational transformation process rather than merely a technological implementation issue. From a policy perspective, the proposed model also offers practical implications for the design of SME digitalization programs. Many SME digitalization initiatives focus primarily on technological provision without sufficiently addressing procedural standardization, monitoring systems, and behavioral adaptation mechanisms. The findings of this study suggest that sustainable governance transformation requires integrated intervention structures combining digital systems, organizational standardization, continuous monitoring, and longitudinal reinforcement. The findings additionally suggest that urban economic governance strategies should increasingly recognize SMEs as critical governance actors within urban food systems rather than solely as economic units. In rapidly urbanizing environments, the reliability of local supply systems depends significantly on the governance quality of intermediary SMEs operating across food distribution networks. Consequently, strengthening financial governance within SMEs contributes not only to firm-level efficiency but also to broader urban economic resilience and policy readiness. Overall, the Financial Governance Transformation Model proposed in this study provides a conceptual explanation of how digital financial transformation evolves from micro-level behavioral restructuring toward ecosystem coordination and policy system integration. The model highlights that governance transformation in urban food supply SMEs is fundamentally organizational, behavioral, and systemic in nature. This perspective extends current discussions on SME digitalization by demonstrating that sustainable transformation depends not merely on technological adoption but on the longitudinal embedding of governance practices across interconnected operational and policy environments.

4. Conclusion

This study demonstrates that digital financial governance transformation within urban food supply SMEs constitutes a longitudinal organizational and behavioral restructuring process rather than merely a technological adoption initiative. The findings reveal that baseline financial practices within Omah Sayur MQS were characterized by fragmented documentation, delayed reporting, retrospective recording routines, and weak procedural standardization, reflecting broader governance informality commonly experienced by urban food supply SMEs.

Through the integration of standardized recording procedures, real-time digital financial systems, and continuous monitoring mechanisms, the intervention generated substantial improvements in recording accuracy, reporting timeliness, documentation consistency, and managerial visibility across outlets. The stepped-wedge interrupted time series design further demonstrates that governance improvements emerged sequentially following intervention exposure and were subsequently stabilized through repeated organizational practice.

Importantly, the findings indicate that governance transformation was sustained not solely because of technological implementation but because standardized recording practices gradually became internalized within daily organizational routines. Repeated exposure to structured procedures reduced dependence on memory-based reconstruction and transformed financial recording from fragmented administrative activity into routinized governance behavior embedded within operational workflows.

Beyond firm-level operational improvement, the study demonstrates that governance standardization strengthened organizational coordination, transparency, and information reliability across operational units. These improvements generated broader implications for urban SME ecosystem governance by enhancing comparability, accountability, and coordination capacity within local food distribution systems. The findings further suggest that reliable financial governance systems contribute to the resilience and operational readiness of urban food supply chains, particularly in relation to policy-oriented food distribution initiatives such as the Free Nutritious Meal (MBG) program.

The study contributes theoretically by proposing a Financial Governance Transformation Model for Urban Food Supply SMEs, which conceptualizes governance transformation as a multi-level process operating across firm, ecosystem, and policy system dimensions. The model integrates behavioral accounting perspectives, organizational routine theory, institutional governance perspectives, and urban ecosystem governance into a unified analytical framework explaining how informal financial practices evolve into embedded governance systems through longitudinal behavioral adaptation and organizational internalization.

From a practical perspective, the findings suggest that SME digitalization programs should not focus exclusively on technological provision but also on procedural standardization, behavioral reinforcement, and longitudinal monitoring mechanisms. Sustainable governance transformation requires integrated intervention strategies capable of embedding standardized governance behavior within organizational routines and operational systems.

Despite these contributions, this study is limited to a single urban food supply SME context within Malang City. Future research may expand the model across broader SME sectors, comparative urban settings, or larger ecosystem structures to examine the transferability and scalability of governance transformation processes across different organizational and policy environments.

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Conflict Of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

Data Availability

The data supporting the findings of this study are available from the corresponding author upon reasonable request. Certain operational and financial data are not publicly available due to organizational confidentiality considerations.

Author Contributions

All authors contributed significantly to the conception and design of the study, data collection, analysis and interpretation of data, manuscript preparation, revision, and final approval of the published version of the manuscript.

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