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| RESEARCH ARTICLE

Digital Transformation and Financial Management Effectiveness: The Mediating Role of Accounting Information Quality and the Moderating Effect of Digital Finance

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| ABSTRACT
This study develops and tests an integrated model examining the association between digital transformation and financial management effectiveness, with accounting information quality as a mediating mechanism and digital finance as a boundary condition. The model responds to the practical observation that investments in enterprise systems, cloud platforms, analytics, automation, and digitally connected financial services do not automatically translate into better budgeting, working-capital control, cost management, risk oversight, or financial decision quality. A quantitative, cross-sectional survey design was used to examine manufacturing small and medium-sized enterprises in the Yangtze River Delta, China. The analytical sample comprised 412 valid responses measured with 21 five-point Likert items. Partial least squares structural equation modelling was used to assess internal-consistency reliability, convergent validity, HTMT and Fornell-Larcker discriminant validity, bootstrapped direct and indirect effects, interaction effects, effect sizes, and cross-validated predictive relevance. Digital transformation was positively associated with financial management effectiveness ($\beta = .284$, $p < .001$) and accounting information quality ($\beta = .646$, $p < .001$). Accounting information quality was positively associated with financial management effectiveness ($\beta = .553$, $p < .001$) and carried a significant indirect association between digital transformation and financial management effectiveness ($\beta = .358$, 95% CI [.299, .420]). The positive association between digital transformation and financial management effectiveness was stronger at higher levels of digital finance, as indicated by the positive interaction term ($\beta = .137$, $p < .001$). The model explained 41.8% of accounting information quality and 67.7% of financial management effectiveness, with positive predictive relevance. The study integrates digital transformation, accounting information quality, digital finance, and financial management effectiveness in a quantitative mediation-and-moderation model. The findings indicate that digital capability is associated with stronger financial management principally when it supports decision-useful accounting information and when firms complement internal digital processes with integrated payments, financing, treasury, and credit-analytics services.

| KEYWORDS
Digital transformation; financial management effectiveness; accounting information quality; digital finance; PLS-SEM; dynamic capabilities; organisational information processing

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1. Introduction

Digital transformation has moved from a specialised information-technology programme to an organisation-wide process of strategic renewal. Contemporary firms combine enterprise resource planning, cloud computing, robotic process automation, application programming interfaces, artificial intelligence, and advanced analytics to redesign how transactions are captured, how decisions are made, and how value is delivered. The literature therefore distinguishes transformation from narrow digitisation: the former changes structures, routines, responsibilities, and business models rather than merely converting analogue records into digital form (Hinings et al., 2018; Nambisan et al., 2019; Vial, 2019; Verhoef et al., 2021; Wessel et al.,

2021). Reviews further show that the results of transformation depend on coordinated changes in strategy, leadership, capabilities, governance, and organisational culture (Hanelt et al., 2021; Kraus et al., 2022; Nadkarni & Prügl, 2021).

The finance function is a particularly consequential arena for this transformation. Financial management effectiveness refers in this study to the extent to which finance processes support accurate and timely planning, disciplined resource allocation, working-capital control, cost management, risk and compliance oversight, and high-quality managerial decisions. Digital tools can automate repetitive entries and reconciliations, shorten the closing cycle, support continuous forecasting, and make financial information available across functional boundaries. Yet the same tools may also generate fragmented databases, uncontrolled spreadsheets, opaque algorithms, cyber exposure, and role ambiguity when implementation is weak (Appelbaum et al., 2017; Andreassen, 2020; Knudsen, 2020; Quattrone, 2016). Consequently, the key research question is not whether firms own digital technologies but how those technologies are converted into effective financial management.

Prior evidence generally links digital capability with innovation, operational agility, and organisational performance, but the pathway is neither automatic nor uniform. Digital investments create value when firms can integrate data, reconfigure processes, and embed analytical routines in decision making; isolated technology acquisition can instead increase complexity and coordination costs (Correani et al., 2020; Garzoni et al., 2020; Hilali et al., 2020; Khin & Ho, 2019; Mikalef & Gupta, 2021). Research on small and medium-sized enterprises reaches a similar conclusion. Entrepreneurial commitment and flexible structures can accelerate adoption, while limited resources, legacy systems, skills shortages, and weak governance can prevent digital initiatives from becoming scalable capabilities (Eller et al., 2020; Li et al., 2018; Matarazzo et al., 2021). These tensions justify examining an information mechanism that sits between transformation and financial outcomes.

Accounting information quality is examined as the central explanatory mechanism. High-quality accounting information is relevant, faithfully represented, timely, complete, comparable, consistent, and understandable enough to support action. Digital technologies can raise these attributes by integrating source systems, enforcing validation rules, providing traceable workflows, and enabling real-time reporting. They can also undermine quality through poor master data, incompatible definitions, weak access controls, or overreliance on automatically generated outputs. Recent accounting research therefore treats data governance and system design as central to the usefulness of digital reporting (Fang et al., 2023; Hamdy et al., 2025; Phornlaphatrachakorn & Na Kalasindhu, 2021; Yang et al., 2024). If digital transformation is associated with more effective financial management partly through better information used by managers, accounting information quality should carry a significant indirect relationship.

The value of internal transformation may also depend on the external financial infrastructure available to the firm. Digital finance encompasses digitally enabled payments and collections, online banking, fintech credit, platform and supply-chain finance, digital risk assessment, and real-time treasury connectivity. These services can reduce transaction frictions, broaden financing options, and connect operating data to liquidity and credit decisions (Arner et al., 2016; Goldstein et al., 2019; Gomber et al., 2017; Lee & Shin, 2018; Ozili, 2018; Puschmann, 2017). However, digital finance brings its own requirements for interoperability, trust, cybersecurity, regulatory compliance, and managerial competence (Gomber et al., 2018; Suryono et al., 2020; Thakor, 2020). The present study therefore treats digital finance as a complementary capability that can strengthen the effect of internal digital transformation on financial management effectiveness.

Manufacturing SMEs in the Yangtze River Delta provide an analytically useful setting because finance managers must coordinate high transaction volumes, inventory, supplier credit, customer receivables, production costs, and increasingly digital sales and payment channels. SMEs are often sufficiently flexible to redesign routines but sufficiently resource constrained that the quality of implementation and access to external digital finance become decisive. Prior studies show that SME digitalisation is shaped by entrepreneurial capability, organisational readiness, ecosystem relationships, and the capacity to convert technology into customer and operational value (Eller et al., 2020; Li et al., 2018; Matarazzo et al., 2021). Evidence from China also suggests that digital transformation can improve enterprise performance when supported by innovation and enabling policy conditions (Peng & Tao, 2022).

A further motivation is the persistent gap between digital investment and realised value. Transformation programmes are often evaluated through implementation milestones, user counts, or technology budgets, even though those indicators say little about whether finance decisions have improved. A platform may be technically operational while users continue to export data to spreadsheets, reconcile conflicting reports, or delay decisions because they do not trust the outputs. Conversely, a focused transformation of a few high-value processes may substantially improve cash visibility or forecast accuracy. This implementation paradox is widely recognised in transformation research, which stresses that value depends on complementary organisational change and learning rather than technology acquisition alone (Correani et al., 2020; Hanelt et al., 2021; Sebastian et al., 2017). A mechanism-based model is therefore preferable to a simple technology-performance correlation.

The finance function also offers a useful bridge between operational and strategic outcomes. It translates transactions into measures, forecasts resource consequences, sets control thresholds, and communicates financial implications to decision makers. Improvements in finance processes can spread through the organisation because budgets, cost information, cash constraints, and risk assessments influence production, procurement, sales, and investment. At the same time, weaknesses in accounting information can neutralise otherwise sophisticated technologies. Studying financial management effectiveness therefore

captures both operational efficiency and managerial decision quality, while avoiding the attribution problems involved in linking one digital initiative directly to profitability or market value (Andreassen, 2020; Oesterreich et al., 2019; Quattrone, 2016).

Against this background, the study had four objectives. First, it assessed the association between digital transformation and financial management effectiveness. Second, it evaluated whether digital transformation was associated with accounting information quality and whether that quality, in turn, was associated with financial management effectiveness. Third, it tested the indirect role of accounting information quality. Fourth, it examined whether the digital transformation-financial management effectiveness association varied across levels of digital finance. The resulting model combines dynamic capabilities theory, organisational information processing logic, and resource complementarity. It contributes by locating accounting information quality at the centre of the value-creation process and by explaining why otherwise similar levels of digital transformation may be associated with different financial management outcomes.

1.1 Digital Transformation and Dynamic Capabilities Theory

Digital transformation is conceptualised as the purposeful reconfiguration of strategy, processes, technology architecture, employee capabilities, and inter-organisational connections through digital technologies. This definition avoids equating transformation with the number of software applications installed. It emphasises whether technology changes how work is coordinated and how the organisation senses, seizes, and responds to opportunities and threats (Gong & Ribiere, 2021; Vial, 2019). Digital transformation may include integrated enterprise platforms, automated transaction processing, data warehouses, real-time dashboards, artificial intelligence, and digitally redesigned controls, but these artefacts become strategic only when they alter routines and decision rights (Chanias et al., 2019; Sebastian et al., 2017; Wessel et al., 2021).

Dynamic capabilities theory is the principal theoretical lens for this variable. Recent digital-transformation research uses the theory to explain how firms repeatedly identify technological possibilities, mobilise resources, and transform operating routines in uncertain environments. Digital sensing involves recognising data, automation, and platform opportunities; digital seizing involves investment and business-case choices; digital transforming involves recombining processes, structures, skills, and governance (Warner & Wäger, 2019). These capabilities are path dependent and managerial rather than purely technical. They help explain why the same cloud or analytics technology produces heterogeneous outcomes across firms (Hanelt et al., 2021; Sousa-Zomer et al., 2020).

Within financial management, dynamic digital capabilities should improve the speed and coherence with which finance staff update forecasts, detect deviations, model scenarios, and coordinate corrective action. Automated data flows reduce the delay between an operating event and its financial representation, while integrated analytics allow managers to connect revenue, cost, cash, and risk information. The outcome of interest is therefore financial management effectiveness rather than financial performance alone. Effectiveness captures the quality of the finance function's processes and decisions before those decisions appear in accounting returns, which are also affected by industry conditions and market shocks (Appelbaum et al., 2017; Oesterreich et al., 2019; Rikhardsson & Yigitbasioglu, 2018).

The dynamic-capability perspective also highlights managerial orchestration. Finance transformation normally crosses functional and organisational boundaries: accounting policies, procurement rules, production data, customer records, banking interfaces, and audit controls must be aligned. Senior leaders must prioritise use cases, resolve ownership disputes, and decide which processes should be standardised and which should remain locally adaptable. Digital transformation is therefore represented by a bundle of integration, automation, redesign, commitment, and skills rather than a single technology. This multidimensional operationalisation follows the argument that digital capability emerges from coordinated routines and microfoundations (Hanelt et al., 2021; Sousa-Zomer et al., 2020; Warner & Wäger, 2019).

1.2 Accounting Information Quality and Organisational Information Processing Theory

Accounting information quality is defined through the qualitative characteristics that make financial and managerial information useful. Relevance concerns predictive and confirmatory value; faithful representation concerns completeness, neutrality, and freedom from material error; timeliness concerns availability before a decision loses value; comparability and consistency enable patterns to be interpreted across periods and units; and understandability enables managers to use the information without unnecessary ambiguity (IFRS Foundation, 2018). In an internal management setting, these characteristics also require appropriate granularity, traceability, and alignment with operational drivers.

Organisational information processing theory provides the logic linking digital transformation, information quality, and decision effectiveness. Contemporary applications of the theory argue that uncertainty increases the amount and richness of information an organisation must process, while digital infrastructures expand information-processing capacity. Integrated data architectures, analytics, and cross-functional dashboards can reduce equivocality, improve visibility, and support faster coordination. However, processing capacity creates value only if the information is credible and connected to decisions (Cao et al., 2019; Ghasemaghaei, 2019; Sivarajah et al., 2017). Thus, accounting information quality is not simply an output of the accounting system; it is the usable informational resource through which digital capabilities influence managerial action.

Digital accounting studies reinforce this distinction. Enterprise systems and analytics can strengthen the relevance and faithful representation of reports, robotic process automation can reduce manual errors, and blockchain can improve traceability, yet

digitalisation can also make control weaknesses propagate faster across the organisation (Fang et al., 2023; Kokina & Blanchette, 2019; Saleh et al., 2023). The quality of design, data ownership, validation, and professional judgement remains essential. Accounting information quality is therefore modelled as a mediating capability: transformation changes the way information is produced, and improved information enables more effective financial management.

The information-processing view further suggests a fit requirement. Different decisions require different combinations of accuracy, timeliness, detail, and interpretability. A daily cash position may tolerate provisional classifications but cannot tolerate long delays; a capital-investment appraisal requires assumptions and scenarios rather than transaction speed alone; a compliance report requires completeness and traceability. Digital transformation increases the potential supply of information, but finance effectiveness depends on whether that supply fits the uncertainty and task demands faced by managers. Treating accounting information quality as a multidimensional construct captures this fit more effectively than using system satisfaction or data availability as a proxy (Cao et al., 2019; Ghasemaghaei, 2019; IFRS Foundation, 2018).

1.3 Digital Finance and Resource Complementarity Theory

Digital finance refers to financial products, channels, and infrastructures delivered or coordinated through digital technologies. At the firm level, it includes automated payments and collections, online bank services, platform-based lending, supply-chain finance, digitally assessed credit, electronic invoicing, and real-time treasury connections. Fintech research shows that digital footprints and automated processes can lower information and transaction costs, accelerate underwriting, and broaden access to financial services (Berg et al., 2020; Fuster et al., 2019; Gomber et al., 2017). Digital finance is consequently more than a payment channel; it is an external information and resource system that can interact with internal enterprise data.

Resource complementarity explains its moderating role. Internal digital transformation creates process visibility and machine-readable data, while digital finance converts some of that visibility into faster settlement, liquidity access, risk assessment, and financing flexibility. When the two resources are integrated, their joint contribution can exceed the sum of their separate effects. For example, real-time sales and inventory information can improve cash forecasts, but the benefit is larger when treasury systems connect to instant payment data or when supply-chain platforms convert verified transactions into working-capital finance. Similar complementarity arguments appear in research on fintech ecosystems, bank-fintech relationships, and digital lending (Cornelli et al., 2023; Gomber et al., 2018; Tang, 2019).

Digital finance may nevertheless fail to strengthen transformation when systems cannot exchange data, digital contracts are not trusted, staff lack expertise, or cyber and compliance risks outweigh transaction benefits. Adoption decisions reflect perceived usefulness, risk, and institutional conditions as well as technical availability (Jünger & Mietzner, 2020; Ryu, 2018; Suryono et al., 2020). The moderator is therefore operationalised as the firm's actual availability and integration of digital financial services, not as a national-level index. A positive interaction is expected because digitally transformed firms should be better able to exploit those services in budgeting, liquidity, credit, and risk management.

This firm-level definition also distinguishes digital finance from general financial inclusion. A firm may operate in a market with extensive mobile payments yet still rely on manual bank uploads and paper-based credit applications. Another firm may connect its enterprise resource planning system directly to bank accounts, e-invoicing, supplier-finance platforms, and automated credit analytics. The latter configuration has greater potential to complement internal transformation because information and financial action are connected. Ecosystem research similarly emphasises interfaces, standards, and partnerships as mechanisms through which fintech innovations scale (Gomber et al., 2018; Gozman et al., 2018; Haddad & Hornuf, 2019).

2. Literature Review

2.1 Digital Transformation and Financial Management Effectiveness

Digital transformation can directly improve financial management effectiveness by automating routine work and reallocating attention toward analysis. When transaction capture, invoice matching, reconciliations, and consolidation are automated, finance staff can spend more time on forecasting, scenario analysis, business partnering, and exception management. Robotic process automation research documents early gains in speed, standardisation, and auditability, while studies of the changing accounting profession identify a shift from data preparation toward interpretation and advisory work (Kokina & Blanchette, 2019; Leitner-Hanetseder et al., 2021; Moll & Yigitbasioglu, 2019). These changes should improve both the timeliness and the breadth of financial management decisions.

Integrated systems can also strengthen coordination. Financial management requires data from sales, procurement, production, logistics, human resources, and external partners. Fragmented systems can delay closing and create competing versions of results. Digital transformation can connect these domains through common data models, workflow rules, and dashboards, making variances visible earlier and enabling coordinated responses. Business intelligence and analytics research finds that information-processing capability improves decision effectiveness and that data-analytics competence is associated with higher-quality managerial decisions (Cao et al., 2019; Ghasemaghaei, 2019). In finance, this should translate into more accurate budgets, better cash planning, and faster corrective action.

Dynamic capabilities research provides an additional explanation. Firms that can sense digital opportunities, seize them through coherent investment, and transform routines are more able to adapt their financial planning and control systems. Digital

capabilities support rapid reconfiguration when demand, input prices, exchange rates, or supply conditions change. Studies link digital transformation with organisational agility, innovation, and performance, particularly when transformation is supported by strategy and culture rather than isolated applications (Khin & Ho, 2019; Martínez-Caro et al., 2020; Warner & Wäger, 2019). Finance functions embedded in such organisations should be more effective at converting signals into resource-allocation decisions.

The direct relationship is also reinforced by learning effects. Once finance staff use integrated data and automated workflows, they can identify exceptions, compare scenarios, and refine rules over repeated planning cycles. These feedback loops gradually improve process discipline and managerial attention. Digital-transformation studies describe such value creation as cumulative and path dependent: early projects build reusable data assets, governance routines, and confidence that support later applications (Chanias et al., 2019; Sebastian et al., 2017). Financial management effectiveness should therefore reflect not only immediate efficiency gains but also a growing capacity to learn from digitally captured experience.

The direct relationship is not guaranteed, because poorly governed technology can increase complexity and control risk. Nevertheless, the balance of recent evidence suggests a positive average effect when transformation is implemented as an organisational capability. Research on digital accounting, enterprise analytics, and flexible performance-management systems shows that digital tools can improve responsiveness, reporting efficiency, and the adaptive use of performance information (Abhishek et al., 2024; Appelbaum et al., 2017; Cosa & Torelli, 2024). Accordingly, the first hypothesis is stated as follows.

H1. Digital transformation is positively associated with financial management effectiveness.

2.2 Digital Transformation and Accounting Information Quality

Digital transformation should improve accounting information quality by changing how data are captured, validated, stored, reconciled, and reported. Integrated enterprise systems reduce repeated manual entry and establish common transaction identifiers. Automated controls can flag incomplete fields, duplicate invoices, unusual journal entries, and inconsistent master data before they enter reports. Cloud platforms and data warehouses can also create a shared information environment in which finance and operating units work from the same definitions. These mechanisms increase completeness, consistency, and traceability (Appelbaum et al., 2017; Phornlaphatrachakorn & Na Kalasindhu, 2021).

Analytics further enhances relevance and timeliness. Traditional periodic reporting describes what has happened, whereas digitally enabled finance can combine financial and operational data to estimate future cash flows, demand, cost drivers, and risk exposures. The ability to process larger and more varied data can improve predictive value and support more granular decisions, provided that analysts understand data provenance and model limitations. Big-data research therefore emphasises both analytical capability and data quality; more data do not improve decisions when they are noisy, poorly governed, or unrelated to the decision problem (Ghasemaghaei & Calic, 2020; Gupta & George, 2016; Saleh et al., 2023).

Newer accounting technologies can also strengthen faithful representation and comparability. Blockchain-based records can improve immutability and verification, while standardised digital reporting and integrated ledgers can make classifications more consistent across periods and entities. Empirical studies associate blockchain adoption and intelligent transformation with higher reporting transparency and better accounting information characteristics (Fang et al., 2023; Qiu et al., 2024). Recent evidence also indicates that digital transformation can improve accounting information comparability by standardising data acquisition and processing across organisational units (Yang et al., 2024).

Transformation can also improve understandability by presenting financial information in interactive and role-specific forms. Visual analytics allow users to move from aggregate variances to underlying transactions, while consistent metadata clarifies definitions and calculation logic. However, visualisation does not substitute for sound measurement; dashboards built on inconsistent data may create an illusion of precision. The expected positive relationship therefore reflects the combined effects of integrated sources, controlled processing, transparent calculation, and user-oriented presentation (Rikhardsson & Yigitbasioglu, 2018; Saleh et al., 2023).

These benefits remain conditional on governance, but that condition is part of transformation maturity rather than a reason to expect no relationship. A strategically coordinated transformation includes data ownership, access controls, reconciliation responsibilities, and professional review. Studies in private and public-sector accounting suggest that digital accounting capabilities can improve system quality and financial reporting quality when institutions develop the supporting controls and skills (Hamdy et al., 2025; Schiavi et al., 2024). The second hypothesis is therefore as follows.

H2. Digital transformation is positively associated with accounting information quality.

2.3 Accounting Information Quality and Financial Management Effectiveness

Accounting information is valuable because it reduces uncertainty surrounding resource allocation. Budgets, cash forecasts, cost reports, investment appraisals, credit assessments, and risk dashboards all depend on information that reflects economic conditions with sufficient accuracy and speed. When data are incomplete or delayed, managers may continue unprofitable activities, hold excessive inventory, overlook collection problems, or respond late to emerging risks. High-quality information therefore improves the diagnostic and interactive use of financial controls (Quattrone, 2016; Rikhardsson & Yigitbasioglu, 2018).

Relevance and timeliness are particularly important in volatile operating environments. Managers must see how changes in volume, price, mix, yield, and working-capital cycles affect cash and profitability. Real-time or near-real-time accounting information shortens feedback loops and allows forecasts to be revised before deviations become embedded. Information-processing research finds that decision-making effectiveness improves when organisations possess the capability to convert data into accessible, task-relevant knowledge (Cao et al., 2019; Ghasemaghaei, 2019). Thus, information quality should be associated with more effective planning and corrective action.

Faithful representation and comparability support control and accountability. Accurate classifications and traceable transactions enable managers to identify responsibility for variances, evaluate business units on a consistent basis, and distinguish operational problems from measurement errors. Reliable reports also reduce the time spent debating whose numbers are correct. Accounting studies connect digital reporting quality with enhanced transparency, professional judgement, and stakeholder confidence (Phornlaphatrachakorn & Na Kalasindhu, 2021; Saleh et al., 2023; Yang et al., 2024). For internal finance, these attributes should improve cost control, compliance, and risk management.

Information quality also affects organisational trust. When repeated reconciliations reveal errors or unexplained differences, managers create local spreadsheets and informal data sources. Those workarounds fragment the information environment and further weaken control. Consistently high-quality accounting information can reverse the cycle by establishing a shared basis for discussion and accountability. The result is lower coordination cost and greater willingness to use centrally produced analyses in decisions. This behavioural mechanism complements the technical information-processing mechanism and helps explain why the same report can have different organisational effects depending on its history of reliability (Andreassen, 2020; Quattrone, 2016).

The expected relationship is therefore broad rather than confined to financial reporting. Accounting information quality supports the entire financial management cycle: planning establishes targets, execution generates transactions, control compares actual and expected outcomes, and learning updates future plans. When information is useful across this cycle, finance managers can act with greater speed and confidence. This reasoning leads to the third hypothesis.

H3. Accounting information quality is positively associated with financial management effectiveness.

2.4 The Mediating Role of Accounting Information Quality

A mediation argument explains why digital transformation produces heterogeneous financial outcomes. Technology first changes the firm's information-processing architecture: transactions become more structured, data move faster across functions, validation is automated, and analytical models become available. These changes then affect the quality of accounting information used in budgets, forecasts, performance reviews, and financing decisions. Financial management improves because managers receive better information, not merely because the firm has purchased technology (Appelbaum et al., 2017; Rikhardsson & Yigitbasioglu, 2018).

The distinction is important because direct performance models can conceal failed implementation. A firm may adopt cloud software and automation while retaining inconsistent master data, duplicate processes, and weak ownership. Such a firm is digitally equipped but not informationally integrated. Conversely, a modest technology investment can generate substantial value if it improves data reliability and embeds information in routine decisions. Research on big-data analytics similarly finds that analytical resources influence performance through intermediate capabilities such as information processing, knowledge sharing, and operational reconfiguration (Côrte-Real et al., 2017; Mikalef et al., 2020; Wamba et al., 2017).

Accounting information quality is a theoretically appropriate mediator because it connects a strategic capability with an operational decision resource. Dynamic capabilities explain the reconfiguration of digital routines, while organisational information processing explains how the resulting information reduces uncertainty. The combined mechanism predicts partial mediation: digital transformation can directly improve process efficiency, but a substantial part of its effect should pass through information quality. Recent accounting evidence supports the component links by associating digital transformation with reporting comparability, transparency, and system quality, and by showing that better digital accounting outputs improve decision usefulness (Hamdy et al., 2025; Qiu et al., 2024; Yang et al., 2024).

The mediator also clarifies the sequencing of benefits. Process automation may create early efficiency gains, but strategic decision benefits may appear only after data are cleaned, definitions are harmonised, and users learn to interpret new reports. Cross-sectional studies can obscure this temporal sequence by measuring technology, information, and outcomes at one point. The hypothesised indirect relationship represents a theoretically ordered chain, but the cross-sectional design does not establish temporal causality. It also accommodates complementary partial mediation because some transformation benefits may arise through reduced transaction effort while others are associated with improved information (Mikalef et al., 2020; Sousa-Zomer et al., 2020).

Testing mediation also creates actionable knowledge. A significant indirect effect implies that managers should evaluate transformation programmes using data-quality and information-use indicators rather than implementation milestones alone. It further implies that weak financial outcomes may be diagnosed by examining relevance, timeliness, accuracy, comparability, and completeness. The fourth hypothesis is consequently stated as follows.

H4. Accounting information quality carries a positive indirect association between digital transformation and financial management effectiveness.

2.5 The Moderating Role of Digital Finance

Digital finance can strengthen the financial value of internal transformation by connecting enterprise processes with external payments, credit, and treasury services. A digitally transformed firm may possess real-time receivables, inventory, purchase, and sales data. When digital finance is available, these data can support automated collections, dynamic cash positioning, faster credit assessment, and platform-based working-capital finance. Without such services, the same internal visibility may improve monitoring but leave settlement delays and financing constraints unchanged (Gomber et al., 2017; Ozili, 2018).

Fintech research documents several channels of complementarity. Digital footprints can improve credit scoring, technology can accelerate loan processing, and online platforms can match borrowers and funders more efficiently (Berg et al., 2020; Fuster et al., 2019; Tang, 2019). For a firm with integrated internal data, these channels are easier to use because financial records are timely, machine readable, and verifiable. Digital finance can therefore amplify the effect of transformation on cash forecasting, liquidity management, supplier relations, and investment flexibility.

The moderation is expected on the direct transformation-effectiveness path because digital finance changes the practical return to internal digital capability. It gives finance managers more ways to act on information. For example, a forecast indicating a short-term cash gap becomes more valuable when the firm can quickly access an online credit facility or adjust payment timing through an integrated treasury platform. Resource complementarity predicts that the slope of digital transformation will be steeper at higher levels of digital finance adoption. Evidence that financial support strengthens digital transformation and innovation is consistent with this logic (Cornelli et al., 2023; Du & Wang, 2024).

The interaction may be especially important for SMEs because financing and settlement frictions can prevent good internal decisions from being executed. A digitally informed production plan may identify a profitable order, yet the firm may be unable to fund materials quickly enough. Integrated supply-chain finance or digitally assessed working-capital credit can convert the information into action. Likewise, automated receivables and electronic invoicing can shorten the cash-conversion cycle, increasing the practical return to real-time internal data. These examples illustrate complementarity at the level of concrete finance processes rather than abstract technology adoption (Cornelli et al., 2023; Ozili, 2018).

A positive interaction must nevertheless be empirically tested because digital finance also introduces cyber, privacy, platform-dependence, and regulatory risks. Trust and perceived risk influence fintech adoption, and households and firms may avoid services that appear opaque or insecure (Jünger & Mietzner, 2020; Ryu, 2018; Suryono et al., 2020). The hypothesis therefore concerns effective availability and integration rather than nominal access. When digital financial services are securely embedded in finance routines, they should strengthen the contribution of digital transformation to financial management effectiveness.

H5. The positive association between digital transformation and financial management effectiveness is stronger at higher levels of digital finance.

3. Research Gap

The literature leaves five related gaps. First, digital transformation studies commonly use broad organisational performance outcomes, while the finance function is treated as one of many administrative areas. This makes it difficult to determine whether transformation improves the specific capabilities that precede performance, including budgeting, working-capital control, cost allocation, risk management, and financial decision speed. Accounting studies, meanwhile, often focus on a single technology or on external reporting rather than the integrated effectiveness of financial management (Knudsen, 2020; Moll & Yigitbasioglu, 2019).

Second, accounting information quality is frequently modelled as a direct outcome of information systems, but less attention is given to its role as the transmission mechanism between enterprise-wide transformation and managerial effectiveness. The distinction matters because digital projects can be technically completed without producing decision-useful information. Recent studies establish links between digitalisation and accounting transparency, comparability, or system quality, yet an integrated mediation test remains limited, especially in SME settings (Hamdy et al., 2025; Qiu et al., 2024; Yang et al., 2024).

Third, digital finance is usually examined as an antecedent of inclusion, credit access, bank competition, or fintech adoption. Its interaction with internal digital transformation is underdeveloped. Firms increasingly combine enterprise platforms with external payment, banking, lending, and treasury ecosystems, suggesting that internal and external digital resources should be studied jointly (Gomber et al., 2018; Thakor, 2020). Fourth, existing evidence is concentrated either in listed companies with archival measures or in technology-adoption surveys without detailed accounting constructs. Manufacturing SMEs provide a setting where information quality and liquidity coordination are both operationally salient. Fifth, the methodological literature calls for predictive assessment and explicit evaluation of measurement quality rather than reliance on path significance alone (Hair et al., 2019; Shmueli et al., 2019).

A related measurement gap concerns the level of abstraction. Digital transformation is sometimes proxied by text counts, technology expenditure, or a binary adoption indicator, while financial outcomes are measured at the firm level. Such proxies are

useful in archival research but do not reveal whether finance workflows, data integration, or managerial skills actually changed. Similarly, broad fintech indices may describe regional infrastructure without showing whether a particular firm connects payments, credit, and treasury services to its internal systems. The present scales therefore measure organisational practices and perceived effectiveness at the same level of analysis. This alignment reduces interpretive ambiguity and makes the mediation and moderation mechanisms directly testable.

The research framework also clarifies the distinction among efficiency, information, and financial access. Efficiency concerns the amount of time and effort required to execute finance processes; information quality concerns whether outputs are suitable for decisions; and digital finance concerns whether the firm can transact, fund, and manage liquidity through connected channels. These dimensions are related but not interchangeable. Automation may improve efficiency without improving classification accuracy, high-quality reports may exist without rapid access to external finance, and digital credit may be available to a firm whose internal records remain fragmented. By modelling the dimensions separately, the study avoids attributing every benefit to a general notion of digital maturity. It also creates testable managerial priorities: process problems call for redesign and automation, information problems call for data governance and accounting control, and action constraints call for secure integration with financial-service ecosystems. The framework is explanatory and diagnostic. Its contribution is not a claim that one technology determines effectiveness, but a structured account of how organisational transformation, accounting information, and digital financial infrastructure are associated with the quality of financial management. This separation also supports more precise empirical interpretation. A weak direct association with a strong indirect association would indicate that the relationship is carried principally through information quality; a strong direct association with weak mediation would point toward process efficiency or coordination mechanisms; and a significant interaction would indicate that the association between internal capability and effectiveness varies with external financial connectivity. Such distinctions are valuable for theory because they identify mechanisms and boundary conditions, and for practice because they direct attention to the specific capability that requires improvement.

This study addresses these gaps through an integrated mediation-and-moderation model. Digital transformation is modelled as being associated with financial management effectiveness directly and indirectly through accounting information quality, while digital finance is modelled as a boundary condition on the direct association. The model treats information quality as the mechanism consistent with converting digital capacity into usable financial knowledge and digital finance as complementary infrastructure that broadens the actions available to finance managers. Figure 1 presents the theoretical model.

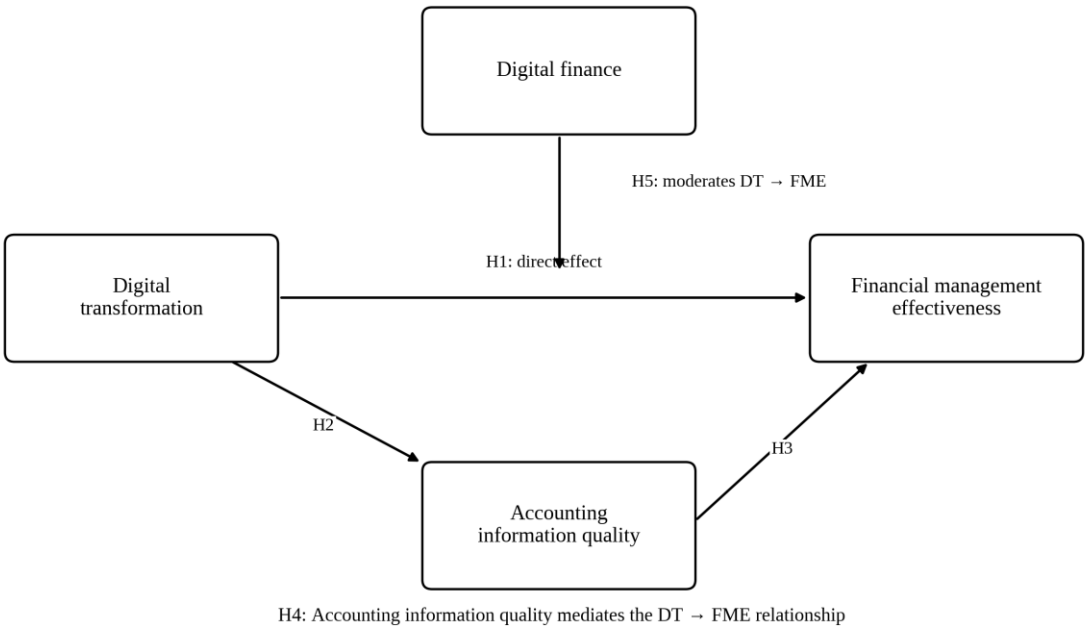

Figure 1. Theoretical Model

4. Methodology

This study used a quantitative, cross-sectional survey design to examine finance and accounting professionals working in manufacturing SMEs in Shanghai, Jiangsu, and Zhejiang. Participants occupied roles including chief financial officers, finance directors, controllers, chief accountants, financial planning and analysis managers, management accountants, treasury managers,

and internal audit or risk managers. These roles were appropriate because the respondents had direct knowledge of their firms' digital systems and financial management processes.

Data were collected through an anonymous online survey. The final analytical sample comprised 412 valid responses and 21 five-point Likert indicators. The survey measured digital transformation, accounting information quality, digital finance, and financial management effectiveness at the organisational-practice level.

The study focused on manufacturing SMEs across the Yangtze River Delta. The final sample size of 412 exceeded common minimum-sample recommendations for a model with four main predictors and supported stable bootstrapped estimation (Hair et al., 2022; Kock & Hadaya, 2018).

The questionnaire began with respondent and firm characteristics, followed by the construct measures. All substantive items used a five-point agreement scale ranging from 1 = strongly disagree to 5 = strongly agree. Digital transformation was measured with six items capturing system integration, automation, real-time cross-functional data, digital process redesign, managerial commitment, and employee digital capability. The items were adapted from contemporary conceptualisations and measures of digital capability and transformation (Gong & Ribiere, 2021; Khin & Ho, 2019; Sousa-Zomer et al., 2020; Verhoef et al., 2021).

Accounting information quality was measured with five items covering relevance, faithful representation and accuracy, timeliness, comparability and consistency, and completeness and understandability. The item content followed the qualitative characteristics in the Conceptual Framework and recent digital-accounting studies (Hamdy et al., 2025; IFRS Foundation, 2018; Phornlaphatrachakorn & Na Kalasindhu, 2021; Yang et al., 2024). Digital finance was measured with five items covering digital payments and collections, online bank or fintech financing, platform or supply-chain finance, digital credit and risk analytics, and real-time treasury integration. These items drew on fintech and digital-finance research (Gomber et al., 2017; Lee & Shin, 2018; Ozili, 2018; Thakor, 2020).

Financial management effectiveness was measured with five items assessing budget and forecast quality, working-capital control, cost management and resource allocation, risk and compliance oversight, and the speed and quality of financial decisions. The scale was informed by research on analytics-enabled management accounting, decision effectiveness, and digital financial performance (Appelbaum et al., 2017; Cao et al., 2019; Liu et al., 2023; Rikhardsson & Yigitbasioglu, 2018). Table 1 summarises the construct domains and source foundations.

Table 1. Measurement Constructs and Source Foundations

Variable	*Items*	*Measurement focus*	*Scale foundations*
Digital transformation	6	System integration, automation, real-time data, process redesign, leadership commitment, digital skills	Gong & Ribiere (2021); Khin & Ho (2019); Sousa-Zomer et al. (2020)
Accounting information quality	5	Relevance, faithful representation, timeliness, comparability, completeness/understandability	IFRS Foundation (2018); Phornlaphatrachakorn & Na Kalasindhu (2021); Yang et al. (2024)
Digital finance	5	Digital payments, online finance, platform finance, digital credit analytics, treasury integration	Gomber et al. (2017); Lee & Shin (2018); Ozili (2018)
Financial management effectiveness	5	Budgeting, working capital, cost/resource allocation, risk/compliance, decision speed/quality	Appelbaum et al. (2017); Cao et al. (2019); Liu et al. (2023)

All substantive items were presented on the same five-point response scale. The reported structural model focused on the specified mediation and moderation relationships and did not include control variables.

The analytical dataset comprised 412 complete and usable responses. Descriptive statistics, reliability and validity assessment, common-method diagnostics, and structural-model estimation were conducted on the retained sample.

4.1 Ethical Considerations

The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. All participants provided informed consent prior to participating in the survey. The survey was completely anonymous, and no personally identifiable data were collected, ensuring the confidentiality and privacy of all respondents.

The research protocol ensured the protection of participant privacy. The online survey was designed to be strictly anonymous; no IP addresses, names, or contact information were collected. Participants were informed about the study objectives and their right to withdraw at any time. By submitting the completed survey, participants provided their informed consent.

The analytical procedure followed PLS-SEM reporting conventions because the model combined prediction, mediation, moderation, and multi-item composites. Indicator loadings, Cronbach's alpha, Dijkstra-Henseler's rho_A estimate, composite reliability, and average variance extracted were used to assess the measurement model. HTMT ratios and the Fornell-Larcker criterion were used to assess discriminant validity. Structural paths were estimated from standardised composite scores, and

5,000 non-parametric bootstrap samples produced standard errors, t statistics, confidence intervals, and indirect effects. Effect sizes were calculated through changes in R^2, while ten-fold cross-validation produced Q^2predict, root mean square error, and mean absolute error (Hair et al., 2019, 2022; Shmueli et al., 2019).

Potential common method bias was assessed using the unrotated first-factor share and full-collinearity variance inflation factors. The anonymous survey design reduced evaluation apprehension. Fuller et al. (2016) and Jordan and Troth (2020) caution that no single post hoc test can establish the absence of common method bias; the diagnostics were therefore interpreted as sensitivity checks rather than definitive corrections.

5. Results

The analytical sample comprised 412 finance professionals from manufacturing SMEs in Shanghai, Jiangsu, and Zhejiang. The respondents represented multiple manufacturing sectors, finance roles, experience levels, and firm sizes. Table 2 presents the sample distribution. This heterogeneity is relevant because digital transformation and digital finance can vary across organisational roles and operating contexts.

Table 2. Profile of the Analytical Sample (n = 412)

Characteristic	*Category*	*Frequency*	*Percent*
Region	Shanghai	125	30.3
	Jiangsu	139	33.7
	Zhejiang	148	35.9
Primary role	CFO/finance director	52	12.6
	Controller/chief accountant	98	23.8
	Finance manager	124	30.1
	FP&A/management accountant	82	19.9
	Internal audit/risk/treasury	56	13.6
Finance experience	Less than 5 years	54	13.1
	5–9 years	119	28.9
	10–14 years	133	32.3
	15 years or more	106	25.7
Firm employees	50–99	94	22.8
	100–299	139	33.7
	300–499	86	20.9
	500 or more	93	22.6

All 21 indicators used the full response range from 1 to 5. Item means were close to the scale midpoint, ranging from 2.93 to 3.08, and standard deviations ranged from 1.17 to 1.29. This distribution avoided severe ceiling or floor effects and provided sufficient variation for model estimation. The first unrotated factor accounted for 47.97% of indicator variance, below the frequently used 50% warning threshold, while full-collinearity VIF values for the structural predictors ranged from 1.01 to 1.84. These diagnostics did not eliminate common-method concerns but did not indicate a dominant single-factor problem in the data (Fuller et al., 2016; Jordan & Troth, 2020).

5.1 Construct Reliability and Convergent Validity

Table 3 reports reliability and convergent validity. Cronbach's alpha ranges from .907 to .922, exceeding the .70 guideline. Composite reliability ranges from .929 to .939, indicating that the indicators consistently represent their constructs without approaching the extreme values that may indicate unnecessary redundancy. The rho_A estimates range from .919 to .930. Average variance extracted is .719 for digital transformation, .736 for accounting information quality, .729 for digital finance, and .731 for financial management effectiveness. Every value exceeds .50, showing that each construct explains more than half of the variance in its indicators (Hair et al., 2019, 2022).

The results indicate especially strong measurement quality for accounting information quality and financial management effectiveness, which is important because these constructs form the central mediation chain. The high reliabilities do not imply

that the concepts are identical: discriminant-validity tests presented later evaluate whether respondents distinguish information quality from management effectiveness. At this stage, the results support internal consistency and convergence.

The composite correlations are directionally consistent with the model. Digital transformation correlates .646 with accounting information quality and .673 with financial management effectiveness. Accounting information quality correlates .773 with financial management effectiveness, while digital finance correlates .365 with digital transformation and .372 with effectiveness. None of these correlations is so high as to indicate that the constructs are interchangeable. The pattern also anticipates partial mediation: digital transformation remains associated with effectiveness, but its association with information quality and the strong information-quality–effectiveness correlation suggest a meaningful indirect route.

Table 3. Construct Reliability and Convergent Validity

Construct	*Dijkstra-Henseler's rho (ρA)*	*Jöreskog's rho (ρc)*	*Cronbach's alpha (α)*	*AVE*
Digital transformation	.930	.939	.922	.719
Accounting information quality	.921	.933	.910	.736
Digital finance	.919	.931	.907	.729
Financial management effectiveness	.920	.932	.908	.731

5.2 Estimated Model

Figure 2 presents the estimated model with indicator loadings, structural coefficients, and endogenous R^2 values. Digital transformation explains 41.8% of the variance in accounting information quality. Together, digital transformation, accounting information quality, digital finance, and the digital transformation × digital finance interaction explain 67.7% of financial management effectiveness. The measurement and structural results are therefore evaluated jointly rather than interpreting path coefficients from unreliable constructs.

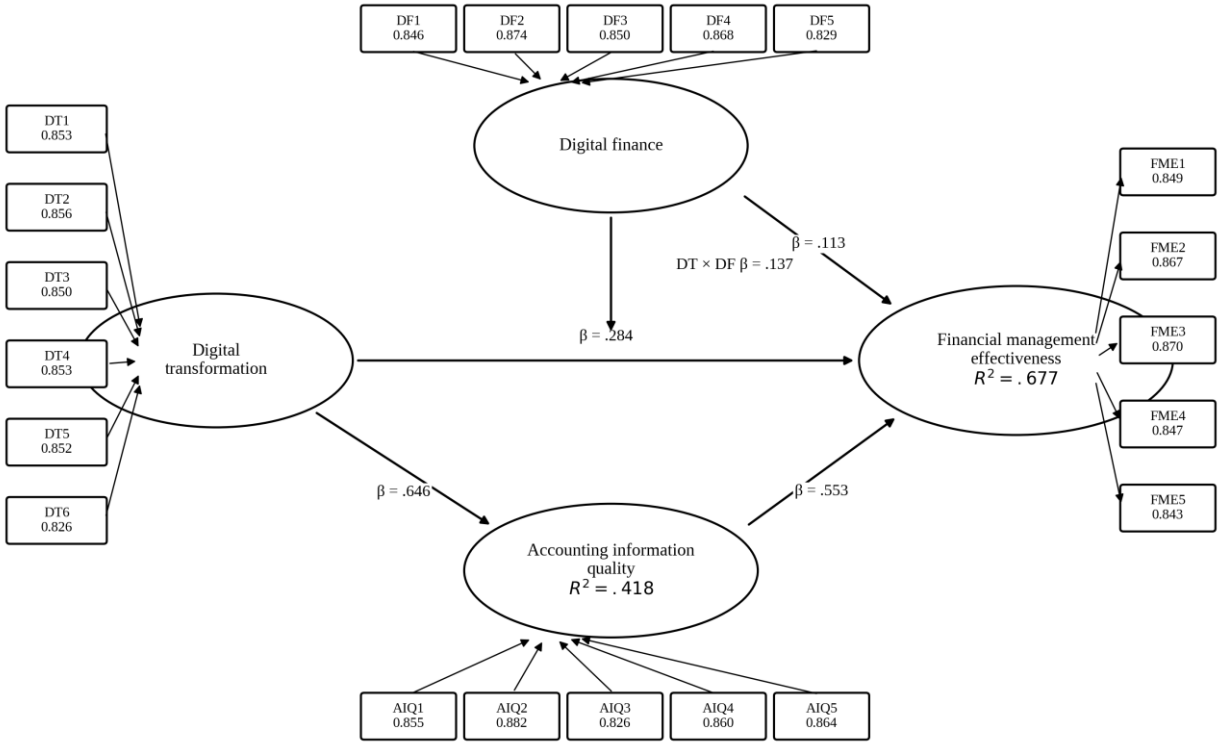

Figure 2. Estimated Model

5.3 Indicator Loadings

Table 4 presents the standardised indicator loadings. All standardised outer loadings exceeded .82. Digital transformation loadings ranged from .826 to .856; accounting information quality loadings ranged from .826 to .882; digital finance loadings ranged from .829 to .874; and financial management effectiveness loadings ranged from .843 to .870. These values indicated that

every item contributed substantially to its intended construct. No item deletion was required, preserving the content breadth of each scale.

The pattern also supports the conceptual definitions. For digital transformation, integration, automation, process redesign, leadership commitment, and digital skills operate as a coherent capability. For accounting information quality, relevance, accuracy, timeliness, comparability, and completeness remain distinct attributes while loading on one overall quality construct. Digital finance items capture multiple services rather than a single payment technology, and the financial management items represent planning, liquidity, cost, risk, and decision effectiveness.

Table 4. Indicator Loadings

Indicator	*Digital transformation*	*Accounting information quality*	*Digital finance*	*Financial management effectiveness*
DT1	.853			
DT2	.856			
DT3	.850			
DT4	.853			
DT5	.852			
DT6	.826			
AIQ1		.855		
AIQ2		.882		
AIQ3		.826		
AIQ4		.860		
AIQ5		.864		
DF1			.846	
DF2			.874	
DF3			.850	
DF4			.868	
DF5			.829	
FME1				.849
FME2				.867
FME3				.870
FME4				.847
FME5				.843

5.4 Discriminant Validity

Discriminant validity was assessed first with the heterotrait-monotrait ratio. Table 5 shows HTMT values from .325 to .850. The highest ratio is between accounting information quality and financial management effectiveness (.850), which is at the conservative .85 boundary and below the more liberal .90 threshold. The result is theoretically plausible because high-quality accounting information is a central input to effective financial management, yet the constructs remain conceptually and empirically distinguishable. All other ratios are comfortably below .85 (Hair et al., 2019).

Table 5. Discriminant Validity: Heterotrait-Monotrait Ratio of Correlations (HTMT)

Construct	*1*	*2*	*3*	*4*
Digital transformation	—			
Accounting information quality	.706	—		
Digital finance	.399	.325	—	
Financial management effectiveness	.736	.850	.410	—

Table 6 presents the Fornell-Larcker matrix. The square root of AVE for each construct appears on the diagonal and exceeds its correlations with other constructs. For example, the diagonal value for accounting information quality is .858, exceeding its .773 correlation with financial management effectiveness. The corresponding diagonal for financial management effectiveness is .855. Taken with the HTMT results and the distinct item content, the measurement model demonstrates acceptable discriminant validity.

Table 6. Discriminant Validity: Fornell-Larcker Criterion

Construct	*1*	*2*	*3*	*4*
Digital transformation	.848			
Accounting information quality	.646	.858		
Digital finance	.365	.295	.854	
Financial management effectiveness	.673	.773	.372	.855

5.5 Direct, Indirect, Total, and Effect-Size Estimates

Table 7 summarises direct, indirect, total, and effect-size estimates. Digital transformation showed a large association with accounting information quality (β = .646; f^2 = .717). Its direct association with financial management effectiveness was positive (β = .284; f^2 = .136), and the indirect effect through accounting information quality was .358. The resulting total effect was .642, indicating that information quality carried more than half of the overall statistical relationship. Accounting information quality showed the strongest direct association with financial management effectiveness (β = .553; f^2 = .544).

Digital finance has a smaller positive direct effect on effectiveness (β = .113; f^2 = .034), while the interaction contributes an additional β = .137 with f^2 = .057. Small interaction effect sizes are common because moderation explains variance beyond already substantial main effects. The positive sign indicates complementarity: digital transformation is more strongly associated with financial management effectiveness when digital finance is more available and integrated.

The ratio of the indirect effect to the total digital-transformation effect was approximately 55.7% (.358/.642). This variance-accounted-for statistic is descriptive rather than a separate significance test, but it illustrates the substantive importance of the mediator. More of the total statistical relationship was carried through accounting information quality than through the remaining direct path. At the same time, the significant direct path indicated that automation, workflow integration, and other process benefits were not exhausted by the information mechanism. The pattern was therefore consistent with complementary partial mediation rather than complete mediation.

Table 7. Direct, Indirect, Total, and Effect-Size Estimates

Effect	*Beta*	*Indirect effect*	*Total effect*	*Cohen's f^2*
Digital transformation → Accounting information quality	.646	—	.646	.717
Digital transformation → Financial management effectiveness	.284	.358	.642	.136
Accounting information quality → Financial management effectiveness	.553	—	.553	.544
Digital finance → Financial management effectiveness	.113	—	.113	.034
Digital transformation × Digital finance → Financial management effectiveness	.137	—	.137	.057

5.6 Explanatory and Predictive Assessment

Table 8 reports explanatory and predictive statistics. The adjusted R^2 values were .416 for accounting information quality and .674 for financial management effectiveness, indicating little shrinkage relative to the unadjusted values. Ten-fold cross-validation yielded Q^2predict of .413 for accounting information quality and .667 for financial management effectiveness. Both were above zero, indicating prediction of held-out observations beyond a mean-only benchmark. The cross-validated RMSE values were .766 and .577, and the MAE values were .632 and .461, respectively. These results supported positive predictive relevance while avoiding the claim that explanatory fit alone guarantees prediction (Shmueli et al., 2019).

The R^2 values should be interpreted in relation to the study's purpose and measurement level. Accounting information quality is associated with factors beyond digital transformation, including professional competence, governance, organisational complexity, and regulatory requirements; explaining 41.8% through one transformation construct was therefore substantial. Financial management effectiveness was modelled with four predictors, and its 67.7% R^2 indicated that the combined model captured a large share of the observed variation. Nevertheless, high explanatory power can arise from closely related perceptual measures, so predictive cross-validation and discriminant validity remain important. The lower prediction errors for financial management effectiveness relative to accounting information quality reflected the richer predictor set, not proof that individual firms can be forecast without error.

Table 8. Explanatory and Predictive Assessment

Construct	R^2	Adjusted R^2	Q^2predict	RMSE	MAE
Accounting information quality	.418	.416	.413	.766	.632
Financial management effectiveness	.677	.674	.667	.577	.461

5.7 Structural Model Results

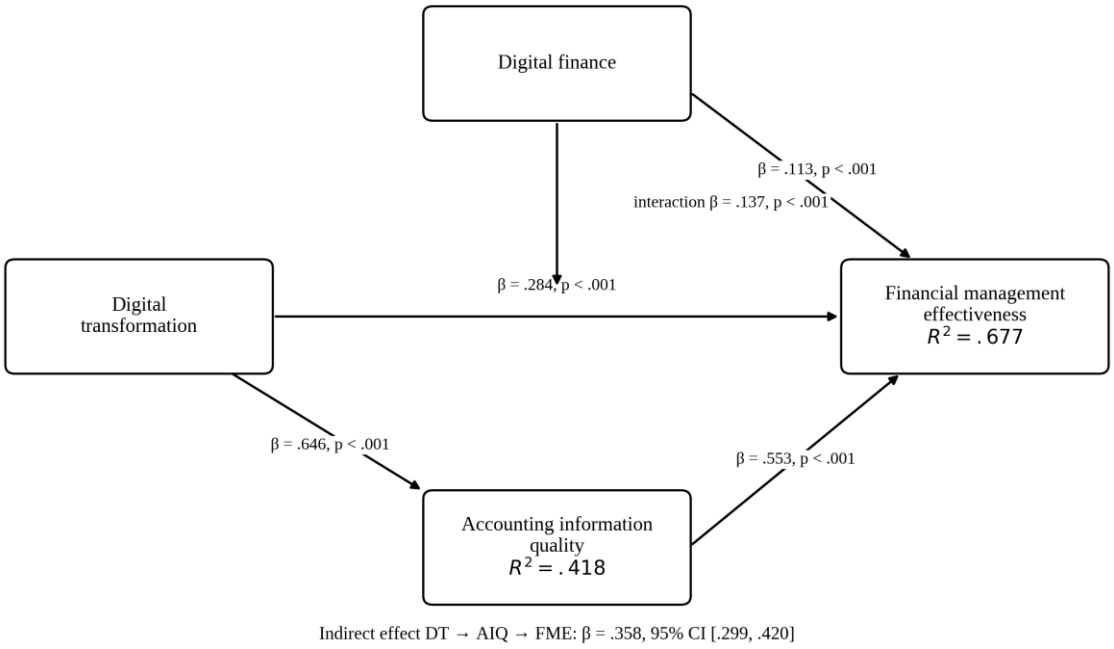

Figure 3. Structural Model Results

5.8 Hypothesis Testing

Figure 3 and Table 9 present the bootstrapped path analysis. Hypothesis 1 was supported: digital transformation was positively associated with financial management effectiveness (β = .284, t = 6.991, p < .001, 95% CI [.205, .362]). The direct association remained significant after accounting for accounting information quality, the main effect of digital finance, and the interaction term, a pattern consistent with partial rather than full mediation.

Hypothesis 2 was supported because digital transformation was positively associated with accounting information quality (β = .646, t = 18.397, p < .001, 95% CI [.574, .712]). Hypothesis 3 was also supported: accounting information quality was positively associated with financial management effectiveness (β = .553, t = 14.053, p < .001, 95% CI [.475, .631]). The magnitude of this path indicated that accounting information quality was a major correlate of financial management effectiveness.

Hypothesis 4 concerned the indirect association. The product of the digital transformation → accounting information quality and accounting information quality → financial management effectiveness paths was .358. The bootstrap confidence interval [.299, .420] excluded zero, and the t statistic was 11.339 ($p < .001$). Accounting information quality therefore carried a significant indirect association. Because the direct path also remained significant, the result was consistent with complementary partial mediation.

Hypothesis 5 was supported by the positive interaction between digital transformation and digital finance ($\beta = .137$, $t = 5.162$, $p < .001$, 95% CI [.086, .189]). At one standard deviation below the mean of digital finance, the estimated marginal association between digital transformation and financial management effectiveness was approximately .147 (.284 - .137). At the mean, the association was .284, and at one standard deviation above the mean, it rose to approximately .421 (.284 + .137). The pattern indicated that the positive association was stronger at higher levels of digital finance. The non-hypothesised direct effect of digital finance was also significant ($\beta = .113$, $t = 3.730$, $p < .001$).

The moderation result can also be interpreted in predicted-score terms. Holding accounting information quality and the direct digital-finance effect constant, a one-standard-deviation increase in digital transformation is associated with a .147-standard-deviation increase in effectiveness when digital finance is low, a .284 increase at the mean, and a .421 increase when digital finance is high. The difference between the low and high conditions is .274, approximately the size of the direct effect itself. This comparison shows why an interaction can be substantively important even when its incremental f^2 is classified as small.

Robustness checks support the interpretation. Predictor VIF values are well below common concern thresholds, so the direct and interaction effects are not driven by problematic multicollinearity. Re-estimating the financial management equation without the direct digital-finance path leaves the signs and substantive conclusions unchanged, although retaining the path is theoretically preferable because an omitted main effect can bias interaction estimates. The total transformation effect is .642, with a bootstrapped 95% confidence interval of [.573, .707].

Table 9. Hypothesis Testing Results

Hypothesis path	*Original sample*	*STDEV*	*T statistics*	*P values*	*Decision*
H1: Digital transformation is positively associated with financial management effectiveness.	.284	.041	6.991	< .001	Supported
H2: Digital transformation is positively associated with accounting information quality.	.646	.035	18.397	< .001	Supported
H3: Accounting information quality is positively associated with financial management effectiveness.	.553	.039	14.053	< .001	Supported
H4: Accounting information quality carries a positive indirect association between digital transformation and financial management effectiveness.	.358	.032	11.339	< .001	Supported
H5: The positive association between digital transformation and financial management effectiveness is stronger at higher levels of digital finance.	.137	.027	5.162	< .001	Supported

6. Discussion

This study examined how digital transformation was associated with financial management effectiveness rather than treating technology ownership as an outcome in itself. The results supported all five hypotheses and revealed a coherent pattern: digital transformation showed a positive direct association, a larger information-mediated association, and a stronger association when digital finance was integrated with internal processes. The discussion interprets these findings through dynamic capabilities, organisational information processing, and resource complementarity while maintaining the claim boundary imposed by the cross-sectional design.

6.1 H1. Digital Transformation and Financial Management Effectiveness

The positive association between digital transformation and financial management effectiveness was consistent with the view that digitally reconfigured routines support the finance function even after accounting information quality is considered. Automation can reduce cycle time, integrated workflows can improve coordination, and dashboards can make deviations visible earlier. The result was consistent with accounting research showing that enterprise systems, analytics, and digital labour change the speed and scope of finance work (Abhishek et al., 2024; Appelbaum et al., 2017; Kokina & Blanchette, 2019). It also aligned with studies associating digital capability with organisational agility and performance (Khin & Ho, 2019; Peng & Tao, 2022).

The effect size was moderate rather than dominant, which is theoretically meaningful. Digital transformation can have direct process benefits, but software alone cannot determine whether the resulting numbers are relevant, accurate, or trusted. Finance

departments may close accounts faster while still producing reports that managers contest. The estimate therefore supported a dynamic-capability interpretation in which transformation is associated with the capacity to reconfigure work, while decision effectiveness also depends on the informational resource linked to that reconfiguration (Sousa-Zomer et al., 2020; Warner & Wäger, 2019).

For practitioners, the finding means that transformation programmes should specify finance-process outcomes at the design stage. Useful indicators include forecast-cycle time, reconciliation exceptions, days required to close, percentage of automated transactions, frequency of scenario updates, and time from variance detection to corrective action. These indicators are closer to the mechanism than broad profitability measures and allow managers to detect value creation before market outcomes are visible.

6.2 H2. Digital Transformation and Accounting Information Quality

The strong digital transformation → accounting information quality path was consistent with transformation as an information-architecture change. Integrated capture and validation can reduce inconsistent records, while real-time processing can improve timeliness. Standard data definitions and digital audit trails can enhance comparability and faithful representation. The result was consistent with evidence linking digital accounting systems with reporting quality, comparability, and transparency (Fang et al., 2023; Phornlaphatrachakorn & Na Kalasindhu, 2021; Qiu et al., 2024; Yang et al., 2024).

The finding also clarifies why governance belongs inside the definition of mature transformation. If a firm merely digitises uncontrolled processes, errors can be reproduced at greater speed and scale. A positive quality effect requires master-data ownership, access controls, interface reconciliation, model validation, and professional review. Institutional research on accounting information systems emphasises that technologies become reliable through rules, responsibilities, and accepted practices rather than technical features alone (Schiavi et al., 2024). Public-sector evidence similarly shows that the quality effects of transformation depend on readiness and supporting controls (Hamdy et al., 2025).

The large coefficient suggests that information quality is an appropriate leading indicator for finance transformation. Management should monitor data lineage, exception rates, report latency, reconciliation breaks, duplicate records, and user assessments of relevance. These measures can identify whether a technology programme is producing a shared information environment or merely adding another system layer.

6.3 H3. Accounting Information Quality and Financial Management Effectiveness

Accounting information quality showed the largest direct association with financial management effectiveness. This result reinforced the proposition that financial management is an information-intensive activity. Budgets and forecasts become actionable when they contain relevant and timely driver information; working-capital decisions improve when receivables, inventory, and payment data are accurate; and risk oversight improves when exposures are complete and comparable. The result mirrored information-processing research in which decision effectiveness depends on both analytical capability and usable data (Cao et al., 2019; Ghasemaghaei, 2019).

The distinction between data volume and information quality is particularly important. Organisations can collect extensive operational data without improving finance decisions. Too many poorly defined indicators can increase cognitive load, obscure responsibility, and create false precision. Research on big data warns that more data are not always better and that analytical value depends on relevance, competence, and governance (Ghasemaghaei & Calic, 2020; Gupta & George, 2016; Sivarajah et al., 2017). The strong path in the present model is therefore an argument for disciplined information design, not unrestricted data accumulation.

From a management-accounting perspective, high-quality information also supports constructive dialogue. When business units trust the numbers, performance reviews can focus on causes and actions rather than reconciliation disputes. Finance personnel can move toward business-partner roles because they spend less time defending data and more time interpreting implications. This complements research on the changing controller and accountant roles in digitally enabled organisations (Andreassen, 2020; Leitner-Hanetseder et al., 2021; Oesterreich et al., 2019).

6.4 H4. Mediating Role of Accounting Information Quality

The significant indirect effect provided the central theoretical contribution. Accounting information quality carried a substantial portion of the statistical relationship between digital transformation and financial management effectiveness. The pattern integrated dynamic capabilities and organisational information processing: transformation is associated with reconfigured routines and infrastructure, those changes are associated with accounting information quality, and information quality is associated with financial decision effectiveness. Similar mediated-capability arguments appear in analytics research, where technological resources are linked to performance through information processing and operational capabilities (Côrte-Real et al., 2017; Mikalef et al., 2020; Wamba et al., 2017).

The complementary partial-mediation pattern was theoretically plausible because digital transformation may also be associated directly with process efficiency. Automated approval workflows, electronic documents, and digital collaboration can reduce time and cost even before the informational content of reports changes. At the same time, the indirect effect being larger than the direct effect showed why technology-centred evaluation is incomplete. A firm that measures only implementation time and budget may miss whether the transformation is associated with relevant, faithful, and timely information.

The mediation result creates a diagnostic sequence for managers. When financial management outcomes fail to improve, leaders should first determine whether the digital programme changed data capture and process integration. They should then evaluate whether those changes improved information quality. If information quality improved but decisions did not, the remaining issue may be user capability, decision rights, incentives, or management routines. If information quality did not improve, further investment in dashboards is unlikely to solve the problem until data foundations and controls are repaired.

6.5 H5. Moderating Role of Digital Finance

The positive interaction indicated that digital finance complemented internal digital transformation. At high levels of digital finance integration, finance managers can act on internal information through faster payments, automated collections, connected treasury services, and digitally enabled financing. The result extended fintech research beyond adoption and inclusion by showing that external financial infrastructure was associated with variation in the return to an internal organisational capability (Gomber et al., 2017, 2018; Thakor, 2020).

The simple-slope pattern had practical significance. Where digital finance was low, the association between digital transformation and effectiveness remained positive but was smaller because information may not translate into immediate liquidity or financing actions. Where digital finance was high, real-time operating data could be connected to settlement, credit, and cash-management decisions. Evidence that digital footprints improve credit scoring and that technology accelerates lending provides micro-level support for these mechanisms (Berg et al., 2020; Fuster et al., 2019; Tang, 2019).

The finding does not imply that more digital finance is always beneficial. The moderator is effective integration, which requires cybersecurity, access control, vendor governance, business continuity, and regulatory compliance. Fintech adoption studies show that risk perceptions and trust influence willingness to use digital financial services (Jünger & Mietzner, 2020; Ryu, 2018). Firms should therefore evaluate service resilience and data-sharing arrangements alongside speed and convenience. The strongest complementarity is likely when digital finance is securely connected to well-governed internal data.

Taken together, the findings help explain why digital-transformation outcomes vary across firms. Differences in technology spending matter, but differences in information quality and ecosystem integration also matter. A firm may have modern applications but weak data definitions, or high-quality internal reports but limited ability to mobilise cash and credit through digital channels. The integrated model indicated that effective financial management was associated with alignment among internal capabilities, information characteristics, and external financial services. This alignment perspective is consistent with the broader transformation literature, which emphasises strategic coherence rather than isolated technology deployment (Hanelt et al., 2021; Kraus et al., 2022; Verhoef et al., 2021).

The combined mediation-and-moderation pattern also has a strategic interpretation. Accounting information quality indicates how transformation is associated with a reliable basis for action, while digital finance indicates when the organisation has a wider set of actions available. A firm with high information quality but weak digital finance can identify cash and credit needs accurately yet may still face slow settlement or limited funding options. A firm with extensive digital finance but weak information quality may gain speed without sound decision inputs, increasing the risk of inappropriate borrowing or payment errors. The strongest financial management is expected when internal information quality and external digital-finance integration develop together. This joint condition is not represented by a single path coefficient, but it is consistent with the combined mediation and moderation results.

Alternative explanations should nevertheless be considered. Effective finance departments may be more likely to initiate transformation, creating reciprocal relationships; strong leadership may be associated with both information quality and digital-finance adoption; and successful firms may have more resources for all three capabilities. The cross-sectional design does not eliminate these possibilities. The findings therefore support the specified association pattern but do not establish temporal ordering or rule out competing explanations. Longitudinal, multi-source, or quasi-experimental designs are required for stronger causal inference.

The study also contributes to the accounting literature by positioning the finance function as an active site of digital capability development. Accountants are not only users of systems; they define data meanings, design controls, interpret model outputs, and connect information to resource decisions. Digital transformation therefore increases rather than eliminates the importance of professional judgement. The role changes from manual production toward data governance, analytical interpretation, and cross-functional influence (Knudsen, 2020; Moll & Yigitbasioglu, 2019).

7. Conclusion

This study examined the association between digital transformation and financial management effectiveness through accounting information quality and across levels of digital finance. The integrated model was supported in an analytical sample of 412 valid responses. Digital transformation showed a positive direct association with financial management effectiveness, a strong association with accounting information quality, and a substantial indirect association through accounting information quality. Accounting information quality showed the strongest direct association with effectiveness, while digital finance positively moderated the digital transformation-financial management effectiveness relationship. The model explained 67.7% of financial management effectiveness and demonstrated positive predictive relevance.

The central conclusion is that digital transformation is associated with stronger financial management when it functions as both an information and an action capability. Internal systems need to generate relevant, faithful, timely, comparable, and understandable accounting information, while external digital financial services need to allow managers to use that information in payments, liquidity, credit, treasury, and risk decisions. Technology acquisition without these complementary conditions is less likely to deliver its expected value.

8. Implications of the Study

Theoretical implications. First, the study refines dynamic capabilities theory by identifying accounting information quality as an organisational information outcome through which digital reconfiguration is associated with financial management effectiveness. Digital sensing, seizing, and transforming are difficult to observe directly in financial results. Information quality provides a more proximal mechanism linking changes in systems and routines to decisions. Second, the model joins dynamic capabilities with organisational information processing. The combination explains both the supply of processing capacity and the quality of the information produced. Third, the positive interaction extends resource complementarity to the boundary between internal enterprise systems and external digital financial infrastructure. Digital finance is not treated as a substitute for transformation but as a resource associated with variation in its marginal value.

Accounting implications. The findings position accounting information quality as a strategic capability rather than a compliance attribute. Finance leaders should define target information characteristics for each major decision process. A cash forecast, for example, requires timeliness and completeness; product-cost decisions require faithful allocation and comparability; investment decisions require relevance and scenario sensitivity. Transformation governance should therefore assign accountable data owners, establish lineage from source transactions to reports, and monitor quality metrics alongside implementation milestones. Professional accountants should be involved in system design because classification, materiality, control, and judgement cannot be delegated entirely to technical teams (Andreassen, 2020; Leitner-Hanetseder et al., 2021).

Managerial implications. Organisations should manage finance transformation as a portfolio of connected capabilities. The first layer is process simplification: unnecessary approvals and duplicate data entry should be removed before automation. The second layer is a governed data foundation with common definitions, identifiers, access rights, and reconciliation controls. The third layer is analytical use, including rolling forecasts, driver-based planning, scenario modelling, and exception dashboards. The fourth layer is digital-finance integration, such as payment APIs, electronic invoicing, bank connectivity, supply-chain finance, and digital credit services. Progress at each layer should be evaluated with process, information-quality, and decision-effectiveness indicators rather than software deployment alone.

SME implications. Resource-constrained firms should prioritise high-value use cases instead of attempting a comprehensive transformation at once. Receivables visibility, inventory-cost accuracy, cash forecasting, and automated bank reconciliation often provide a clear connection between data quality and financial outcomes. Cloud services and fintech platforms can reduce initial infrastructure requirements, but SMEs should avoid dependence on vendors that restrict data portability or provide limited audit trails. Contractual service levels, cyber controls, backup arrangements, and staff training are essential to prevent convenience from creating new operational risk.

Policy and ecosystem implications. Banks, fintech firms, software vendors, industry associations, and public agencies can increase the effectiveness of digital transformation by supporting interoperability and trustworthy data exchange. Standard electronic invoices, open but secure interfaces, transparent credit models, and affordable training can help SMEs connect internal records with external finance. Policies should not evaluate digital-finance development only by transaction volume or user counts; they should also consider whether services improve the quality, security, and usefulness of financial information. Programmes that jointly support accounting digitalisation, data governance, cyber resilience, and access to finance are more likely to create durable benefits than isolated technology subsidies.

People and governance implications. The model should not be interpreted as an argument for replacing finance professionals with automated systems. The quality mediator depends on judgement about classification, estimation, materiality, controls, and the meaning of unusual events. The digital-finance moderator also creates responsibilities for vendor selection, access management, model challenge, and incident response. Finance leaders should therefore develop hybrid capabilities: accounting knowledge, data literacy, process design, cyber awareness, and the ability to communicate uncertainty. Training should be linked to real decisions rather than generic software functions. Governance forums should bring together finance, operations, information technology, risk, internal audit, and external financial-service providers, with clear escalation paths for data-quality and control failures. Such arrangements support the professional transition identified in recent accounting research and help prevent transformation from becoming solely an IT project (Andreassen, 2020; Leitner-Hanetseder et al., 2021; Oesterreich et al., 2019).

Implementation implications. A staged roadmap can translate the model into practice. Stage one maps critical financial decisions and identifies the information attributes each decision requires. Stage two simplifies and standardises source processes. Stage three establishes data governance, automated controls, and traceability. Stage four deploys analytics and embeds them in recurring planning and review routines. Stage five connects trusted internal data to selected digital-finance services. Each stage

should have an explicit owner, benefit measure, risk assessment, and adoption plan. This sequencing reduces the common tendency to deploy dashboards or fintech interfaces before the underlying information is dependable.

Methodological implications. The study illustrates why measurement and prediction should accompany hypothesis testing. Strong path coefficients are not persuasive when constructs lack reliability or discriminant validity, and explanatory R^2 does not guarantee predictive usefulness. Reporting loadings, rho_A, composite reliability, AVE, HTMT, effect sizes, confidence intervals, and Q^2predict provides a more complete assessment (Hair et al., 2019, 2022; Shmueli et al., 2019). Further research can complement survey measures with system logs, report-latency measures, forecast errors, working-capital indicators, and other objective records to reduce dependence on a single method.

9. Limitations and Future Research Directions

First, the study focused on manufacturing SMEs in Shanghai, Jiangsu, and Zhejiang. The regional and sectoral scope provided a coherent context for examining digitally enabled financial management but limits generalisability to other industries, firm sizes, and institutional settings.

Second, the cross-sectional design limits temporal and causal inference. The reported paths are interpreted as theory-guided associations rather than proof of causality. Digital transformation and accounting information quality may evolve together, effective finance functions may attract further digital investment, and digital-finance adoption may respond to existing performance. Longitudinal or quasi-experimental evidence is needed to establish temporal ordering more directly.

Third, the measures were perceptual and were obtained through the same survey instrument. Experienced finance professionals were appropriate informants, but common method variance, self-enhancement, and key-informant limitations remain possible. Multi-source research can combine perceptions with objective indicators such as closing days, forecast accuracy, reconciliation exceptions, days sales outstanding, inventory turns, cost-variance resolution time, and digital transaction shares (Fuller et al., 2016; Jordan & Troth, 2020).

Fourth, the model simplifies the boundary conditions. Cybersecurity maturity, data-governance quality, environmental uncertainty, firm size, ownership, digital skills, and regulatory pressure may shape the observed relationships. Digital finance may moderate not only the direct path but also the association between accounting information quality and effectiveness. Further research can assess conditional indirect effects, non-linear relationships, and configurations using multi-group analysis or set-theoretic methods. Cross-country comparisons can clarify whether institutional infrastructure changes the complementarity between transformation and digital finance.

Fifth, measurement invariance and unobserved heterogeneity were not assessed in the reported model. The meaning of digital transformation may differ between a 60-employee supplier using cloud accounting and a 500-employee manufacturer operating an integrated enterprise platform. Digital finance may also have different associations for exporters, family-owned firms, state-linked firms, and businesses with concentrated supply chains. Multi-group analysis can compare theoretically defined segments, while finite-mixture or prediction-oriented segmentation can identify latent groups. Without such tests, an average positive path may conceal weaker or different relationships in particular organisational configurations.

Finally, financial management effectiveness was modelled as a reflective composite covering planning, liquidity, cost, risk, and decision outcomes. Further research can model these areas as separate dimensions or as a higher-order construct. Sector-specific studies can add measures of project finance, foreign-exchange exposure, regulatory capital, public-sector accountability, or sustainability reporting to assess whether accounting information quality is equally important across financial-management tasks.

10. Data Availability Statement

The raw data are not publicly available because of participant privacy and confidentiality considerations. Aggregated results and analysis outputs may be made available by the corresponding author upon reasonable request.

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Appendix A. Questionnaire Items

Response scale for all substantive items: 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree.

A.1 Digital transformation

DT1: Our finance-related systems are integrated with major operating functions.
DT2: Routine finance transactions and reconciliations are extensively automated.
DT3: Finance managers have timely access to cross-functional, real-time data.
DT4: Digital technologies have been used to redesign, not merely computerise, finance workflows.
DT5: Top management provides sustained commitment and resources for digital transformation.
DT6: Finance employees possess the digital and analytical skills needed to use new systems effectively.

A.2 Accounting information quality

AIQ1: Accounting information is relevant to current planning and decision needs.
AIQ2: Accounting information accurately and faithfully represents underlying transactions and events.
AIQ3: Accounting information is available in time for managerial action.
AIQ4: Accounting information is consistent and comparable across periods and organisational units.
AIQ5: Accounting information is sufficiently complete and understandable for users.

A.3 Digital finance

DF1: The firm uses integrated digital payments and collections.
DF2: The firm can obtain banking or fintech financing through digital channels.
DF3: The firm uses platform-based or supply-chain finance where appropriate.
DF4: Digital credit and risk analytics support financing and counterparty decisions.
DF5: Treasury systems exchange data with banks or financial platforms in near real time.

A.4 Financial management effectiveness

FME1: Budgets and forecasts are prepared accurately and updated promptly.
FME2: The firm effectively controls cash, receivables, payables, and inventory-related working capital.
FME3: Cost information supports disciplined resource allocation and operational improvement.
FME4: Financial risks and compliance obligations are identified and managed effectively.
FME5: Financial decisions are made quickly and with high-quality analysis.