

**FROM DIGITIZATION TO TECHNOLOGICAL DEPENDENCE: IMPLICATIONS OF
COMPUTERIZED ACCOUNTING SYSTEMS**

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Abstract

The increasing computerisation of accounting has improved the speed, accessibility, integration and processing capacity of accounting information systems. However, as accounting activities become increasingly embedded in software, databases, networks, digital infrastructure and specialized technical capabilities, organisations also become more reliant on the technological environment supporting those activities. This paper examines the implications of this transition and proposes the Computerized Accounting Technological Dependence Management Framework (CATDMF). The paper adopts a conceptual review approach, drawing on literature on computerised accounting systems, information systems success, technological risks, organisational resilience and technology adoption. The review indicates that existing studies have largely examined the benefits of computerised accounting, system quality, internal controls, specific technological threats, information quality, organisational performance or resilience as separate areas of inquiry. CATDMF integrates these perspectives by proposing a sequential relationship from computerisation to technological dependence, disruption exposure and accounting-system implications, while positioning technological dependence management as a conditioning mechanism. The framework identifies four management dimensions: human capacity, continuity and recovery mechanisms, control and verification, and technological flexibility. Systems Theory, Organizational Resilience Theory and Diffusion of Innovations provide the theoretical foundation for the framework. The paper contributes by contextualizing established concepts within computerised accounting and shifting attention from technological adoption alone to the organisational capabilities required to sustain accounting operations when technology is disrupted, unavailable or compromised.

Keywords: computerised accounting, technological dependence, accounting systems, disruption exposure, organisational resilience, accounting information systems

Introduction

Information technology has transformed accounting from predominantly manual record-keeping into increasingly automated, integrated and digitally connected processes. Computerized accounting systems enable organisations to capture, process, store, retrieve and communicate accounting information with greater speed and accessibility. Modern accounting information systems combine people, procedures, data, software and technological infrastructure to support transaction processing, reporting, internal control and managerial decision-making (Romney et al., 2021). The adoption of computerised systems has therefore become an important part of contemporary accounting practice.

Despite these benefits, computerisation also changes the conditions under which accounting activities are performed. As accounting processes become embedded in software applications,

databases, networks, electricity supply, digital infrastructure and specialized technical knowledge, organisations become increasingly reliant on the technological environment that supports them. This reliance is not inherently undesirable. Indeed, some degree of technological dependence is unavoidable where organisations seek the efficiency and integration associated with modern accounting systems. The concern arises when critical accounting activities have few practical alternatives when the technology on which they depend becomes unavailable, unreliable, compromised or obsolete.

Existing literature provides evidence of both the benefits and vulnerabilities associated with computerised accounting. Studies have examined information quality, organisational performance, internal control, security threats and system reliability. Muhrtala and Ogundeji (2013), for example, identified security threats within computerised accounting environments in Nigeria and highlighted controls such as authorization, access restrictions, monitoring and transaction logging. Bansah (2018) similarly identified over-dependence on information technology among the threats affecting computerised accounting information systems in the banking industry. Nigerian evidence has also linked computerised accounting systems with organisational performance, financial reporting and accountability (Onifade & Adedire-Ampitan, 2024).

Recent research continues to expand the literature. Al-Hashimy et al. (2026a) examined the relationship between computerised accounting information systems, accounting information quality and financial performance, while Al-Hashimy et al. (2026b) connected computerised accounting systems with innovation, resilience and project performance. Ogaluzor and Zukbee (2026) examined accounting information system effectiveness and financial reporting quality among listed insurance companies in Nigeria. These studies demonstrate the continuing relevance of computerised accounting to performance, information quality and resilience. However, the literature remains distributed across different concerns rather than being organized around the broader sequence through which increasing computerisation creates technological dependence, exposes accounting activities to disruption and produces multiple system-level implications.

The present paper addresses this conceptual gap by proposing the Computerized Accounting Technological Dependence Management Framework (CATDMF). The framework does not treat technological dependence as a new phenomenon, nor does it suggest that computerisation is inherently harmful. Instead, it integrates established concepts to explain how the benefits of computerisation can coexist with exposure created by technological reliance. The framework proposes the sequence computerisation → technological dependence → disruption exposure → accounting-system implications, with technological dependence management conditioning the relationships across the pathway.

The paper contributes to the literature in three ways. First, it places technological dependence at the centre of the discussion on computerised accounting rather than treating technological threats as isolated risks. Second, it brings together human capacity, continuity and recovery mechanisms, control and verification, and technological flexibility as management capabilities for dealing with dependence. Third, it provides an accounting-specific conceptual framework through which future empirical research can examine how organisations maintain accounting operations when critical technology is disrupted, unavailable or compromised.

Conceptual Literature

Computerized Accounting Systems

Computerized accounting systems are technology-enabled arrangements through which accounting data are captured, processed, stored, retrieved and communicated. They consist of interacting components including people, procedures, data, software and technological infrastructure (Romney et al., 2021). Their development has moved from relatively isolated accounting applications to integrated platforms, enterprise systems, cloud-based services and interconnected digital

environments. This evolution has increased the capacity of organisations to process large volumes of transactions and produce information for financial reporting and managerial decision-making.

Itang (2020a) emphasizes the structural characteristics of computerised accounting systems, including automated data processing, reporting functions, databases and internal control features. The quality and effectiveness of such systems are also related to broader information-systems characteristics. DeLone and McLean (1992, 2003) identify system quality and information quality as important dimensions of information-system success. Within accounting, improvements in automation and integration can therefore contribute to faster processing, more accessible information and improved reporting outcomes.

However, increasing system integration also means that more accounting activities are embedded in technological arrangements. When transaction processing, record storage, reporting and control depend on interconnected digital components, the consequences of technological failure can extend beyond an individual application. Thus, the same computerisation that expands accounting capability can also increase organisational reliance on technology.

Technological Dependence

Technological dependence refers to the extent to which accounting activities rely on technological systems, digital infrastructure, data environments and technology-related human capabilities for their continued operation. Dependence is a normal consequence of computerisation and should not automatically be interpreted as a weakness. An organisation that processes transactions, stores records and prepares reports electronically will necessarily depend on the availability and functioning of the relevant technologies.

The conceptual concern is unmanaged or excessive dependence. Bansah (2018) identifies over-dependence on information technology as one of the threats associated with computerised accounting information systems. The significance of dependence, however, is determined not simply by the presence of technology but by the availability of capabilities that allow an organisation to continue or recover critical activities when technology is disrupted. This shifts the focus from asking whether an organisation depends on technology to asking how that dependence is managed.

Technological dependence therefore provides the link between computerisation and disruption exposure in CATDMF. Greater computerisation may increase the number of accounting activities that rely on technological resources. The resulting exposure becomes consequential where the organisation lacks adequate human capacity, recovery arrangements, controls or technological alternatives.

Technology-Related Disruption

Technology-related disruption refers to an interruption, degradation or compromise of technological resources that affects the performance or availability of accounting activities. Disruption may result from system or network failure, power and infrastructure problems, cyber incidents, software errors, data-access problems, inadequate backups, compatibility problems, technological obsolescence or insufficient technical capacity. Muhrtala and Ogundeji (2013) and Bansah (2018) provide evidence of several technology-related threats within computerised accounting environments.

CATDMF distinguishes between disruption and disruption exposure. A disruption is the event or condition that affects technology, whereas disruption exposure represents the extent to which accounting activities are vulnerable to the consequences of such an event. For example, a network failure becomes an accounting-system problem when it prevents transaction processing, restricts

access to records, delays reporting or interferes with control activities.

The consequences of disruption can therefore extend across several accounting functions. System unreliability may affect information availability and reporting timeliness; interruption of transaction processing may affect operational continuity; restricted access may interfere with managerial decision-making; and weaknesses in verification or access controls may increase control risks. The effects are interconnected because accounting systems operate as systems rather than as isolated technological components.

Technological Dependence Management

Technological dependence management refers to the organisational capabilities and arrangements used to control the consequences of reliance on technology while preserving the benefits of computerised accounting. It does not imply a return to manual accounting. Rather, it involves building sufficient human, procedural and technological capacity to maintain or recover critical accounting activities when technology is disrupted. Four dimensions are proposed.

Human Capacity

Human capacity includes digital competence, continuous training, cross-training, technical awareness and human oversight of automated processes. Digital transformation can create new skill requirements, making employee competence important to the reliability of accounting operations. Tega and Okwuosa (2026) provide evidence linking process digitalisation, digital skills and organisational capabilities with internal control and reporting-related outcomes. Within CATDMF, human capacity reduces the concentration of system knowledge in a small number of individuals and improves the organisation's ability to respond when technology fails.

Continuity and Recovery Mechanisms

Continuity and recovery mechanisms include data backups, recovery procedures, disaster-recovery arrangements and practical alternatives for critical accounting activities. The objective is not to eliminate dependence but to ensure that dependence does not automatically translate into prolonged interruption. Where critical accounting data can be restored and essential processes can be recovered, the organisation is better positioned to absorb and respond to disruption.

Control and Verification

Control and verification mechanisms include reconciliations, independent verification, access controls, audit trails, segregation of duties, monitoring and review of automated processes. Muhrtala and Ogundeji (2013) emphasise authorisation, restricted access, logging and monitoring in computerised accounting environments, while Itang (2020b) shows that built-in accounting-system controls may be underutilised because of limited awareness, staffing constraints and inadequate formal policies. Tadesse et al. (2026) further provide evidence concerning the relationship between COSO internal-control adoption and cybersecurity risk. These mechanisms help ensure that dependence on automated processes does not remove appropriate human accountability and verification.

Technological Flexibility

Technological flexibility concerns the capacity to adjust, substitute or migrate technological resources when required. It includes compatibility, data portability, migration capability, redundancy and alternative technology arrangements. Dependence becomes more difficult to manage when accounting operations are tied to a single platform, vendor, infrastructure component or incompatible data environment. Flexibility therefore provides an additional layer of protection by reducing the consequences of technological lock-in and facilitating continuity during system changes

or failures.

Accounting-System Implications

The implications of technological dependence and disruption are consolidated into four dimensions. The first is operational and financial, covering processing efficiency, productivity, operating costs, resource use and continuity of financial activities. The second is information and managerial, covering information quality, reporting timeliness, information availability, planning and decision-making. The third is organisational and human, covering workflow, job roles, skills, training, employee adaptation and concentration of system knowledge. The fourth is control and technological, covering internal control, cybersecurity, infrastructure reliability, compatibility, access, verification and technological obsolescence.

These dimensions are not independent. A technological disruption can simultaneously interrupt transaction processing, delay financial reports, restrict managerial information and weaken control procedures. Conversely, effective dependence management can help preserve the benefits of computerisation while limiting the effects of disruption. This multidimensional view is consistent with the systems perspective underpinning CATDMF.

Methodology

This study adopts a conceptual review approach. It does not constitute a systematic review or meta-analysis. The review draws on literature concerning computerised accounting systems, technological dependence and threats, information-system effectiveness, organisational resilience and technology adoption. Priority is given to accounting-specific studies, particularly evidence relevant to computerised accounting and the Nigerian environment, while broader information-systems and resilience literature is used to provide theoretical explanation.

The literature was examined thematically to identify recurring concepts, relationships and areas of fragmentation. The review considered how computerisation changes accounting processes, how technological reliance creates exposure to disruption, how disruption affects accounting-system outcomes, and what organisational capabilities can condition these effects. The resulting synthesis informed the construction of the proposed framework.

Theoretical Foundation

Systems Theory

Systems Theory provides the primary theoretical foundation for CATDMF. Bertalanffy (1968) conceptualized systems as sets of interacting elements whose behavior cannot be fully understood by examining isolated components. This perspective is particularly relevant to computerised accounting because accounting activities depend on the interaction of people, procedures, data, software, infrastructure and controls. A failure in one component can therefore affect other components and produce consequences beyond the original point of failure.

Systems Theory explains why increasing computerisation can create broader interdependence. As more accounting functions are integrated through technology, the functioning of one part of the accounting system becomes increasingly connected to the availability of other technological and human resources. CATDMF extends this logic by linking computerisation with technological dependence, disruption exposure and multidimensional accounting-system implications.

Organizational Resilience Theory

Organizational Resilience Theory provides the second core foundation. Duchek (2020) conceptualizes organisational resilience as a capability involving anticipation, coping and adaptation.

Vakilzadeh and Haase (2020), in their review of empirical resilience research, identify resources, leadership, planning, culture, innovation and learning among the factors associated with resilience.

Within CATDMF, resilience is applied specifically to the continuity of accounting activities. Human capacity supports coping and adaptation; continuity and recovery mechanisms support response and restoration; controls support reliable operation under disruption; and technological flexibility supports adaptation when technological arrangements change. The theory therefore explains why technological dependence does not necessarily produce poor outcomes: its consequences are partly conditioned by the organisation's capacity to anticipate, absorb, recover from and adapt to disruption.

Diffusion of Innovations Theory

Diffusion of Innovations theory provides a supporting explanation for the movement from manual accounting processes toward computerised systems. Rogers (2003) explains how innovations spread through social systems over time. In accounting organisations, adoption and diffusion of computerised technologies increase the degree to which accounting work is embedded in digital systems. DOI therefore provides the adoption context for the first stage of the proposed framework, while Systems Theory and Organizational Resilience Theory explain the subsequent system relationships and management requirements.

Theoretical Integration

The three theories are integrated rather than treated as competing explanations. Diffusion of Innovations explains the movement toward computerisation; Systems Theory explains the increasing interdependence created by technological integration; and Organizational Resilience Theory explains the capabilities required to sustain and recover accounting activities under disruption.

The integrated logic can be represented as:

Diffusion of Innovations → Computerization → Technological Dependence → Disruption Exposure
→ Accounting-System Implications

Technological Dependence Management operates across the pathway as a conditioning mechanism.

Conceptual Synthesis and Research Gap

The reviewed literature establishes several important strands of knowledge. Computerized accounting research demonstrates improvements in processing, reporting, information quality and organisational performance. Other studies identify security threats, power and infrastructure problems, weak controls, insufficient backups and over-dependence on technology. Information-systems research provides established dimensions of system and information quality, while organisational resilience research explains anticipation, coping, recovery and adaptation. Recent studies have also begun to connect computerised accounting with resilience and performance.

The conceptual gap is therefore not the absence of research on technological dependence, disruption or resilience. Rather, the gap lies in the limited integration of these perspectives into an accounting-specific pathway that explains how increasing computerisation creates technological dependence, how that dependence generates disruption exposure, how disruption affects several dimensions of accounting-system functioning, and how organisational capabilities can condition the resulting effects.

Computerized Accounting Technological Dependence Management Framework addresses this gap by bringing these relationships together within one framework. Its contribution is consequently one

of integration and contextualization: established concepts are reorganized around the specific problem of sustaining computerised accounting activities under technological disruption.

Computerized Accounting Technological Dependence Management Framework Framework Overview

The Computerized Accounting Technological Dependence Management Framework (CATDMF) proposes a sequential relationship between computerisation, technological dependence, disruption exposure and accounting-system implications. Technological Dependence Management operates across the pathway as a conditioning mechanism.

Core pathway:

COMPUTERIZATION → TECHNOLOGICAL DEPENDENCE → DISRUPTION EXPOSURE → ACCOUNTING-SYSTEM IMPLICATIONS

Accounting-system implications are represented through four dimensions:

1. Operational and Financial
2. Information and Managerial
3. Organisational and Human
4. Control and Technological

Technological Dependence Management comprises four dimensions:

1. Human Capacity
2. Continuity and Recovery Mechanisms
3. Control and Verification
4. Technological Flexibility

Relationships within CATDMF

Computerization and Technological Dependence

Computerization increases the use of software, databases, networks, digital infrastructure and specialised technical capabilities in accounting. As more critical activities become technology-enabled, reliance on those resources increases. The relationship is therefore one of increasing embeddedness rather than a claim that computerisation is inherently harmful.

Technological Dependence and Disruption Exposure

Technological dependence creates exposure because the interruption of a critical technological resource can affect accounting activities that rely on it. The extent of exposure depends on the criticality of the technology and the availability of alternatives, recovery arrangements and competent personnel.

Disruption Exposure and Accounting-System Implications

When disruption affects critical accounting technologies, consequences may extend to operational continuity, financial activities, information quality and timeliness, employee roles and organisational workflow, as well as controls and technological reliability. The effects can occur simultaneously because accounting systems are interconnected.

Technological Dependence Management as a Conditioning Mechanism

Human capacity, continuity and recovery mechanisms, control and verification, and technological flexibility can reduce the consequences of technological dependence. They do not remove

dependence; instead, they strengthen the organisation's ability to continue, verify, recover and adapt when technology is disrupted.

Distinction of CATDMF from Existing Conceptual Approaches

CATDMF differs from existing approaches in the following respects:

- Technological adoption to technological reliance: Rather than focusing only on why organisations adopt computerised accounting, CATDMF considers what increasing technological embeddedness means for continued accounting operations.
- From individual threats to disruption exposure: Existing studies identify specific threats such as cyber incidents, power interruptions, weak controls and system failures. CATDMF connects these threats to the broader condition of dependence and exposure.
- From controls to broader management capabilities: Internal controls remain important, but CATDMF places them alongside human capacity, continuity and recovery, and technological flexibility.
- From general resilience to accounting-specific resilience: Organisational resilience is a broad concept. CATDMF applies resilience reasoning specifically to the continuity and recoverability of accounting activities.
- From isolated outcomes to multidimensional implications: The framework recognises operational, information, organisational, control and technological effects rather than reducing implications to a single performance measure.
- From separate literature streams to an integrated pathway: The principal contribution is the integration of established concepts into a coherent accounting-specific framework.

The framework therefore does not claim that its individual constructs are entirely new. Its contribution lies in how established concepts are connected and contextualised within computerised accounting.

Theoretical Contribution and Practical Implications

Theoretical Contribution

CATDMF extends the application of Systems Theory to computerised accounting by making technological dependence an explicit link between increasing computerisation and disruption exposure. It also applies Organisational Resilience Theory to the continuity of accounting activities, emphasising anticipation, coping, recovery and adaptation. Diffusion of Innovations provides the adoption context that explains how accounting becomes increasingly computerised. Together, these perspectives provide a layered explanation of technological dependence rather than treating it as an isolated technological risk.

Practical Implications

Management should evaluate computerised accounting not only in terms of efficiency and automation but also in terms of continuity and recoverability of critical accounting activities. Accounting professionals require continuous digital competence, cross-training and sufficient understanding of automated processes so that critical accounting knowledge is not concentrated in a small number of individuals. Internal audit and control functions should emphasise reconciliation, access controls, audit trails, independent verification and monitoring of automated processes. Technology managers should maintain reliable backups and recovery arrangements while considering data portability, compatibility, migration capability and alternative technology arrangements. Organizations should identify critical accounting activities and assess which technological resources they depend on, what would happen if those resources became unavailable, and which capabilities would support continuity or recovery.

Conclusion and Future Research

The transition from manual to computerised accounting has transformed the processing, storage, communication and use of accounting information. However, the benefits of computerisation are accompanied by increasing reliance on technological systems, infrastructure, data environments and specialised capabilities. Dependence itself is not inherently problematic; vulnerability becomes more significant when critical accounting activities lack adequate alternatives, recovery mechanisms or organisational capacity when technology is disrupted.

CATDMF provides a conceptual explanation of this relationship by connecting computerisation, technological dependence, disruption exposure and accounting-system implications. The framework identifies human capacity, continuity and recovery mechanisms, control and verification, and technological flexibility as the principal dimensions through which organisations can manage dependence. Its theoretical foundation combines Diffusion of Innovations, Systems Theory and Organizational Resilience Theory.

The contribution of the framework is therefore not the invention of technological dependence, disruption or resilience as individual concepts. Rather, it is the integration and contextualization of established concepts within computerised accounting. Future empirical research can test the framework across industries, organisational sizes and levels of technological maturity. Researchers may also examine the relationship between the four management dimensions and outcomes such as accounting continuity, information quality, reporting timeliness, internal-control effectiveness and organisational performance.

The effectiveness of computerised accounting should not be assessed only by what technology enables an organisation to accomplish under normal conditions. It should also be considered in terms of the organisation's capacity to maintain critical accounting activities when the technology on which those activities rely is unavailable, disrupted or compromised.

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