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ERP Modernization Outcomes in Cloud Migration: A Meta-Analysis of Performance and Total Cost of Ownership (TCO) Across Enterprise Implementations

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Abstract

Enterprise ERP modernization through cloud migration is promoted as a route to higher performance and lower total cost of ownership (TCO), yet enterprises often experience mixed results and hidden cost leakage. To address this problem, the study measured post-migration performance and TCO and modeled drivers of both outcomes. A quantitative, cross-sectional, case-based design synthesized survey data from N = 210 stakeholders across six cloud-migration cases (SaaS 56.2%, hybrid 43.8; phased 67.1%, big-bang 32.9%). Independent variables were cloud migration readiness, implementation quality, governance and risk management maturity, change management effectiveness, and vendor or partner support; dependent variables were ERP performance outcomes and TCO outcomes, decomposed into visible/direct and hidden/indirect components. Analysis began with Cronbach's alpha to confirm scale consistency (readiness a = 0.89; implementation quality a = 0.91; governance a = 0.87; change management a = 0.90; vendor support a = 0.88; performance a = 0.93; TCO a = 0.92), then applied descriptive statistics, Pearson correlations, and multiple regression, with a Cloud Migration Footprint Index (CMFI) and a Performance and TCO Tradeoff Map. Results showed performance improvement (M = 3.94, SD = 0.62) and TCO improvement (M = 3.62, SD = 0.66), with visible benefits (M = 3.76, SD = 0.71) exceeding hidden cost pressure (M = 3.41, SD = 0.78) by 0.35 (HCR = 0.91). Performance correlated most with implementation quality (r = 0.68) and change management (r = 0.63), and the performance regression explained 61% of variance, F(5,204) = 64.22, p < .001, led by implementation quality (β = 0.34) and change management (β = 0.26). For TCO, the regression explained 47% of variance, F(5,204) = 35.89, p < .001, with governance maturity strongest (β = 0.29) and change management not significant (p = .074). High-footprint cases (CMFI M = 0.67) reported higher performance (M = 4.08) but higher hidden-cost pressure (M = 3.52). Overall, 41.4% were modernization winners, while 22.9% showed performance-first cost leakage, implying that governance and lifecycle controls protect cloud ERP business cases while sustaining gains.

Keywords

ERP Cloud Migration; ERP Performance Outcomes; Total Cost of Ownership (TCO); Governance Maturity; Implementation Quality;

INTRODUCTION

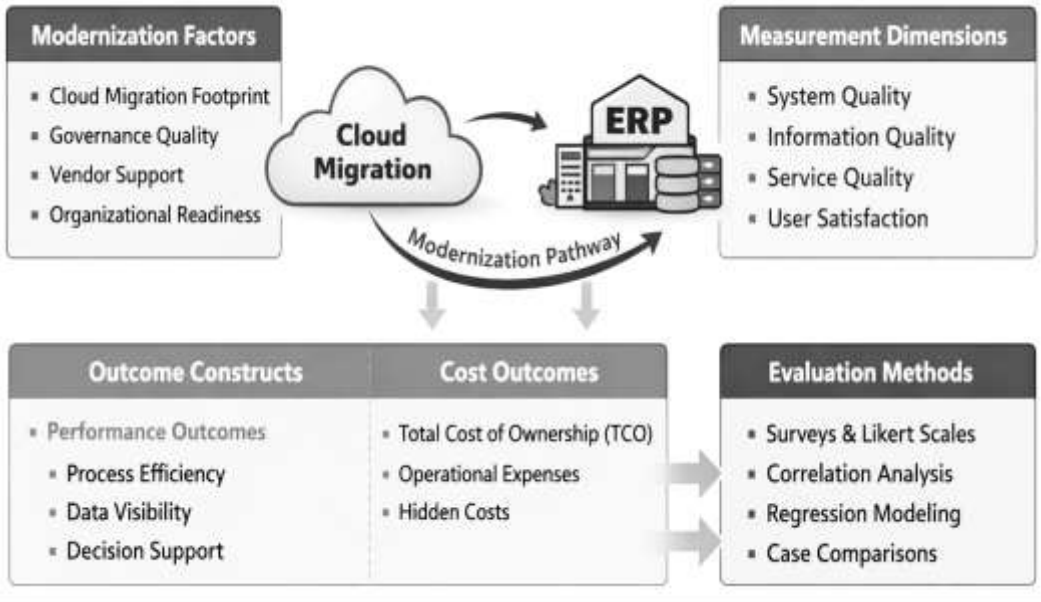
Enterprise resource planning (ERP) systems are commonly defined as integrated, modular software suites that standardize and connect core organizational processes (e.g., finance, procurement, supply chain, HR) through shared data structures and coordinated workflows, enabling an enterprise-wide view of operations and performance outcomes across business units and geographies. ERP "modernization" is often used to describe substantial changes to an ERP platform's architecture, deployment model, integration layer, and governance practices, including major version upgrades, re-platforming, re-engineering of process configurations, and data-model rationalization that collectively reshape how transactional and analytical work is executed. A central modernization pathway is "cloud migration," which refers to relocating ERP workloads and associated data services from organization-managed infrastructure to cloud service environments that provide elastic computing and managed platform capabilities (Abd Elmonem et al., 2017).

Cloud computing itself is typically framed as a computing paradigm where scalable resources are delivered as services over networks, emphasizing rapid provisioning, pooled infrastructure, and usage-based costing structures that can shift financial planning and operational responsibility patterns across firms. The international significance of ERP modernization through cloud migration is grounded in the reality that ERP platforms coordinate cross-border supply chains, global financial consolidation, multi-entity compliance, and multinational service delivery, all of which require dependable transaction processing, standardized master data, and traceable audit structures across jurisdictions (Armbrust et al., 2010). The business framing of cloud migration has been positioned as a strategic issue as much as an IT decision, since cloud choices influence procurement models, vendor dependencies, system flexibility, and performance assurance mechanisms in globally distributed operations. Conceptual discussions also highlight that cloud is not merely a technical substrate; it is a socio-technical environment shaped by architectural abstraction, governance complexity, and organizational expectations regarding control, reliability, and accountability. Empirical adoption research further suggests that firms evaluate cloud as an innovation through perceived relative advantage, compatibility with existing routines, and managerial readiness factors, with adoption patterns differing across industries and national contexts. Within this setting, ERP modernization outcomes are typically operationalized through performance-linked constructs (e.g., process efficiency, information quality, decision support capability, cycle-time reduction) alongside cost-focused constructs such as total cost of ownership (TCO), making the modernization question a multidimensional assessment rather than a single-variable comparison (Misra et al., 2011).

A rigorous discussion of ERP modernization outcomes requires clear definitions for "performance" at the system and organizational levels, because ERP value claims often blend technical metrics (response time, uptime, throughput), process metrics (order-to-cash time, inventory accuracy, close-cycle duration), and business metrics (cost ratios, profitability proxies, service level compliance). Measurement traditions in ERP research therefore distinguish between system quality, information quality, service quality, and user-oriented outcomes as linked elements that together influence realized organizational benefit (Buyya et al., 2009). User-centered success measurement has been treated as essential in ERP contexts because operational ERP value depends on consistent use, accurate data entry, and stable process execution by distributed users, and empirical work has proposed structured models to capture "ERP success" from the ultimate-user perspective using validated survey indicators. Implementation research has also emphasized that ERP outcomes are shaped by the social and managerial environment around the system, including the roles of internal support, top management commitment, and the quality of external consulting processes that translate packaged practices into an organization's specific workflows (Oliveira et al., 2014). Studies of ERP success contingencies highlight that strategic vision and managerial sponsorship can shape scope control, resource commitment, and organizational alignment, linking governance quality to observed success levels in ERP projects. Related research has modeled how internal and external facilitators—vendors, consultants, and project management structures—interact to shape ERP project success and measurable system performance, reflecting the multi-stakeholder reality of enterprise implementations (Benlian & Hess, 2011). Because performance outcomes are commonly tracked through perceptions and organizational metrics

collected after go-live, post-implementation perspectives remain important for understanding whether ERP investments translate into financial and operational gains. In parallel, information-systems success research has used meta-analytic evidence to show systematic relationships among quality constructs and benefits at the individual level, offering an empirical foundation for linking ERP service and information quality to use and satisfaction-related outcomes (Tsai et al., 2011). This broader measurement logic is visible in ERP post-implementation research where system-use patterns and organizational routines are treated as mediators that connect ERP capabilities to performance improvements. These definitional and measurement traditions support outcome-focused evaluation designs in which survey-based performance constructs can be tested with descriptive statistics, correlation structure, and regression modeling to quantify the strength and direction of modernization-related associations (Chou & Chang, 2008).

Figure 1: ERP Modernization & Cloud Migration: Research Framework



This study is designed to achieve a set of tightly defined objectives that collectively operationalize "ERP modernization outcomes in cloud migration" into measurable constructs and testable relationships within enterprise implementation settings. The first objective is to quantify perceived ERP performance outcomes associated with cloud migration across selected organizational cases by measuring core dimensions such as process efficiency, system responsiveness and reliability, data visibility, reporting and analytics capability, cross-functional coordination, and end-user productivity using standardized 5-point Likert indicators aggregated into a composite performance outcome score. The second objective is to quantify perceived total cost of ownership outcomes in a way that reflects both the formal, visible cost structure of cloud ERP and the experiential, operationally embedded costs that frequently emerge during and after migration; therefore, the study measures TCO using two complementary subscales—visible/direct cost outcomes (e.g., infrastructure reduction, upgrade cost reduction, predictable subscription expenditure, support workload reduction) and hidden/indirect cost outcomes (e.g., integration maintenance burden, training and productivity dip costs, incident and downtime exposure, compliance overhead, vendor-change request costs)—and then integrates these into a composite TCO outcome score and a cost-burden gap measure. The third objective is to model the statistical relationships between a set of modernization and migration predictors and the two outcome domains using correlation analysis and regression modeling, enabling the study to identify which factors most strongly explain performance outcomes and which factors most strongly explain TCO outcomes across the participating cases. These predictors are specified to reflect the enterprise realities of modernization programs, including cloud migration readiness, implementation quality, governance and risk management maturity, change management effectiveness, and vendor/partner support quality. A

fourth objective is to strengthen cross-case comparability by introducing a Cloud Migration Footprint Index (CMFI) that captures the practical magnitude and complexity of modernization—such as scope of modules migrated, integration intensity, data migration complexity, and migration strategy—and then examining how footprint variation aligns with differences in performance and TCO outcomes. A fifth objective is to improve interpretability and decision relevance by classifying observed outcome patterns into a Performance–TCO Tradeoff Map, allowing cases to be grouped into empirically derived categories that distinguish high-performing and cost-effective implementations from those characterized by capability gains with cost leakage or cost control with constrained performance. Through these objectives, the study produces a structured, quantitative evidence base that supports hypothesis testing and objective-driven evaluation of ERP modernization outcomes in cloud migration across enterprise implementations.

LITERATURE REVIEW

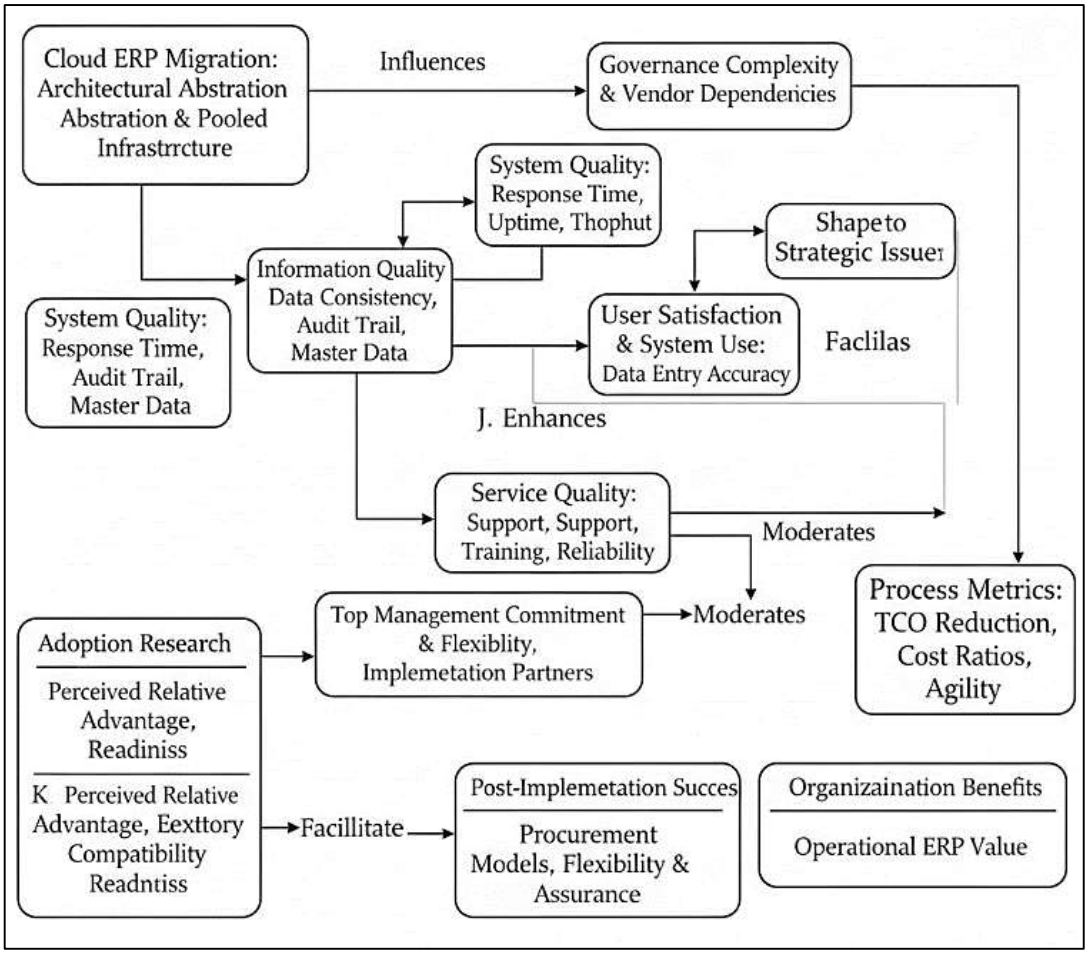
The literature on ERP modernization outcomes in cloud migration brings together several mature but often separately discussed streams, ERP success and benefit realization, cloud adoption and governance, and lifecycle cost-performance evaluation, into a single evidence base that can explain why enterprise implementations produce different results under seemingly similar modernization goals. ERP research has long examined how integrated enterprise systems generate value through process standardization, data quality improvements, and cross-functional visibility, and it has also established that realized outcomes depend heavily on implementation quality, organizational readiness, and post-implementation practices rather than the technology artifact alone. In parallel, cloud computing research has developed robust explanations of adoption behavior and operational consequences, emphasizing that cloud migration changes architectural responsibility boundaries, vendor dependency structures, and governance requirements, which in turn affect performance experiences and cost dynamics. When these streams intersect in cloud-based ERP modernization, the outcome space becomes inherently multidimensional: performance improvements can occur alongside new categories of recurring expenditure, and cost efficiencies can be accompanied by constraints in configurability, integration overhead, or organizational learning costs. For this reason, recent studies increasingly frame ERP cloud migration as a socio-technical transformation that must be evaluated across technical capability (e.g., reliability, scalability, integration flexibility), organizational capability (e.g., change management, training, process alignment), and governance capability (e.g., security, compliance, vendor management). Another critical theme in the literature concerns total cost of ownership (TCO) and the challenge of capturing both visible costs—subscription, infrastructure reduction, upgrade savings—and hidden costs, including integration maintenance, downtime exposure during transition, productivity dips, and compliance overhead that can accumulate after go-live. The literature also supports the need for structured conceptual models that map modernization determinants to outcomes, using established theoretical foundations such as technology–organization–environment perspectives or IS success models to justify variable selection and hypothesized relationships. Overall, the reviewed studies indicate that robust evaluation of ERP modernization outcomes in cloud migration requires (1) clear operational definitions of performance and TCO, (2) measurable constructs that capture readiness, implementation quality, governance, and change management, and (3) cross-case comparison logic that recognizes migration scope and complexity differences. Guided by these insights, the present literature review synthesizes prior empirical findings and theoretical explanations to justify the study's conceptual framework and hypotheses, and to position the analysis approach—descriptive statistics, correlation analysis, and regression modeling—as consistent with established quantitative traditions for evaluating enterprise-system outcomes.

ERP Modernization Pathways for Cloud Migration

ERP modernization in cloud-migration programs refers to the purposeful redesign of enterprise resource planning (ERP) capabilities—data structures, process logic, integration interfaces, and operating governance—so the platform maintains transactional integrity while benefiting from elastic infrastructure and service-based delivery. In enterprise settings, modernization is typically treated as a portfolio decision rather than a single technical relocation, because different ERP components (core finance, procurement, manufacturing execution, HR, reporting, extensions) vary in criticality, customization density, latency sensitivity, and regulatory exposure. As a result, organizations often

combine multiple modernization patterns within one program: retaining specific modules and integrating them through APIs, rehosting selected workloads with minimal code change, replatforming to managed databases and middleware, refactoring heavy customizations into services, and replacing legacy modules with SaaS equivalents when standardization is feasible. A key strategic distinction is whether the target state preserves internal ownership of ERP configuration and operations or shifts responsibility to a vendor-managed model, since that choice shapes cost structure, upgrade cadence, risk allocation, and control over architectural evolution. Comparative work that contrasts in-house and in-cloud ERP emphasizes that cloud deployment changes the nature of operational overhead and governance, including how service quality, availability commitments, and security responsibilities are managed across organizational and vendor boundaries (Elragal & El Kommos, 2012). At the same time, cloud ERP adoption research highlights that perceived benefits such as faster deployment and reduced infrastructure burden are accompanied by barriers tied to vendor lock-in, data residency constraints, integration complexity, and organizational readiness to accept standardized processes and externally governed release cycles (Peng & Gala, 2014). These tensions make modernization strategy fundamentally socio-technical: it is a design choice about how enterprise processes, controls, and accountability structures are reconfigured while the ERP backbone remains dependable.

Figure 2: ERP Modernization Pathways for Cloud Migration



A practical modernization pathway therefore depends on how the migration is executed and governed, because ERP change introduces simultaneous exposure to operational disruption and control failure. Effective pathways typically begin with scoping and segmentation: identifying the processes that must remain stable during transition, defining measurable service levels for cutover windows, and classifying data and interfaces by sensitivity and dependency. Execution strategies frequently apply staged migration to reduce risk, moving less interdependent functions first, stabilizing master data, and rebuilding interfaces in parallel so that co-existence between old and new components is controlled

rather than accidental. In ERP programs, the most fragile points are usually authorization redesign, end-to-end process testing, and data migration quality, because errors in these areas can propagate into financial reporting, inventory accuracy, and compliance evidence. For that reason, modernization pathways commonly include controls such as formal change-management gates, traceable test packs mapped to business controls, and governance structures that coordinate IT, finance, internal audit, and operations as equal stakeholders. Empirical work on cloud ERP implementation also shows that "success" is influenced by people-centered and external-context factors, including user involvement, vendor selection, training effectiveness, and the management of compliance, network, and security concerns that may sit partially outside the client's direct control (Gupta & Misra, 2016). When these factors are built into the modernization pathway as explicit workstreams—rather than treated as afterthoughts—migration decisions become more defensible and comparable across cases, supporting stronger quantitative evaluation of outcomes such as performance improvements and total cost of ownership changes.

Factors in Enterprise Implementations

Enterprise-wide ERP cloud migration success factors are commonly framed as the set of organizational, technological, and governance conditions that determine whether a migration program delivers stable operations, improved performance, and acceptable cost behavior after go-live. In empirical ERP research, these factors are rarely treated as isolated "checklist items"; instead, they operate as an interdependent system in which leadership commitment enables resourcing, resourcing enables disciplined project routines, and disciplined routines protect data integrity and process continuity during change. A recurring theme is that success is shaped by organizational readiness and managerial intent, particularly when ERP modernization requires altering cross-functional routines that have been embedded in finance, supply chain, and service delivery for years. From an organizational perspective, factors such as senior management support, training intensity, and enterprise-wide communication are repeatedly associated with implementation outcomes because they influence user engagement, process standardization, and the speed at which operational problems are detected and corrected during stabilization (Dezdar & Ainin, 2011). In addition, ERP outcomes depend on whether organizational structures can support knowledge transfer across project teams, business units, and external partners; this includes the ability to resolve conflicts over process ownership, data definitions, and configuration decisions without creating "shadow systems" that fragment information integrity. When cloud migration is the modernization pathway, the organizational success factor set expands to include stakeholder alignment on what will be standardized versus what will remain customized, because the cloud operating model often reduces tolerance for deep code-level modifications and shifts optimization effort toward configuration governance and integration architecture. Consequently, success factors must be interpreted as outcome-enabling capabilities that protect both operational continuity and measurement reliability in performance and TCO evaluation, since unstable adoption and inconsistent use can distort post-migration outcome assessments.

Technological and process success factors for ERP cloud migration are strongly tied to integration design, data migration quality, and the implementation processes that manage fit between packaged functionality and enterprise-specific workflows. Studies that examine critical success factors across ERP adoption contexts emphasize that process alignment, strong project management discipline, and high-quality data conversion repeatedly distinguish better outcomes, largely because these factors prevent process breakage and reporting inaccuracies that appear after cutover (Ngai et al., 2008). In cloud migrations, integration becomes more visible as a success driver because enterprises typically rely on multiple connected platforms (identity management, data warehouses, CRM, logistics partners, procurement networks) that must maintain secure, reliable interface behavior once the ERP core moves to a cloud environment. Implementation effectiveness research also highlights how communication effectiveness, conflict resolution practices, and knowledge transfer mechanisms inside the consulting/implementation process are linked to successful ERP outcomes, indicating that "technology success" is partly produced by structured collaboration routines that reduce ambiguity and rework (Maditinos et al., 2012). A related success theme concerns organizational fit and process improvement: enterprises that treat migration as a controlled business-process redesign effort (not only an IT infrastructure move) tend to manage scope more explicitly, define acceptance criteria more concretely,

and stabilize faster because process owners are accountable for end-to-end outcomes. This logic aligns with evidence that organizational factors—such as strategic intent, senior management support, and IT function readiness—are associated with ERP adoption success and post-adoption impacts, strengthening the argument that technology performance outcomes are conditional on governance and process capability rather than deployment location alone (Law & Ngai, 2007). For quantitative case-study–based designs, these success factors are also valuable because they translate naturally into measurable constructs (readiness, implementation quality, governance maturity, partner support) that can be linked statistically to performance and TCO outcomes.

Figure 3: ERP Cloud Migration Success Factors in Enterprise Implementations



ERP Performance Outcomes After Cloud Migration

ERP performance outcomes after cloud migration are most convincingly discussed when "performance" is treated as a multi-layer construct that links process execution quality, information quality, and organizational capability rather than a single technical metric. In enterprise implementations, performance improvements are frequently evidenced through faster cycle times in order-to-cash and procure-to-pay workflows, improved inventory visibility, more reliable financial close routines, and greater consistency in cross-functional coordination—outcomes that stem from stronger integration and standardized data rather than simple infrastructure relocation. A useful way to frame these improvements is to distinguish operational performance (speed, accuracy, reliability of routine processes), managerial performance (quality and timeliness of reporting, monitoring, and control), and strategic performance (agility, coordination across partners, and scalability of growth initiatives). Empirical results show that operational performance changes are not uniform across ERP modules; some modules generate more measurable gains than others depending on implementation maturity and the interdependence among modules, reinforcing the importance of viewing the ERP as a systemic platform that amplifies gains when integration across functions is realized (Madapusi & D'Souza, 2012). At the process level, performance outcomes are also shaped by how deeply ERP capabilities are embedded into daily work routines, because transactional discipline, data governance, and consistent use determine whether the organization can reliably execute and measure process

improvements. Evidence on ERP capability and business value further supports this view by demonstrating that ERP systems contribute to performance through automational, informational, and transformational effects that translate system features into process-level advantages and, ultimately, organizational value (Uwizeyemungu & Raymond, 2012). For cloud migrations, this layered framing is especially important because many post-migration outcomes are experienced as changes in responsiveness, accessibility, and reliability, yet the sustained performance impact depends on whether the organization achieves stable integration, disciplined master-data practices, and dependable end-to-end process execution in the new operating model.

Figure 4: ERP Performance Outcomes After Cloud Migration



A second core theme in performance outcomes literature concerns the relationship between the extent and quality of implementation and the degree to which firms realize measurable improvements. Migration to cloud ERP often requires tradeoffs between standardization and localization, and these tradeoffs influence whether process performance is improved broadly across the enterprise or unevenly within specific areas. Research that examines implementation "extent" and its linkage to business process outcomes suggests that performance benefits increase when ERP is implemented more comprehensively, and when organizations develop delivery systems—project governance, resourcing, and managerial routines—that enable consistent process alignment and stable adoption across functions (Karimi et al., 2007). In cloud settings, this logic extends naturally because the cloud operating model typically increases the importance of configuration discipline, integration governance, and release management; performance outcomes emerge when cloud-based services are translated into coherent process execution rules and monitored through shared controls. The mechanisms behind these outcomes can be interpreted through the idea of platform-enabled coordination: enterprises gain performance advantages when shared data definitions reduce reconciliation, when workflows reduce manual handoffs, and when reporting becomes closer to real time due to cleaner process capture. This view also implies that "performance after migration" should not be interpreted solely as a speed or uptime benefit, because many value-bearing outcomes are realized through reduced process variation and improved visibility across departments. Consequently, performance measurement in cloud

migration contexts benefits from using composite outcome scales that capture operational efficiency, information visibility, and user productivity together, while also allowing analysis of which predictors (e.g., implementation quality, governance, and readiness) best explain variation in these outcomes across cases. In empirical terms, this supports quantitative modeling where the implementation pathway is treated as a measurable set of antecedents that influence the strength and breadth of performance change at the process level.

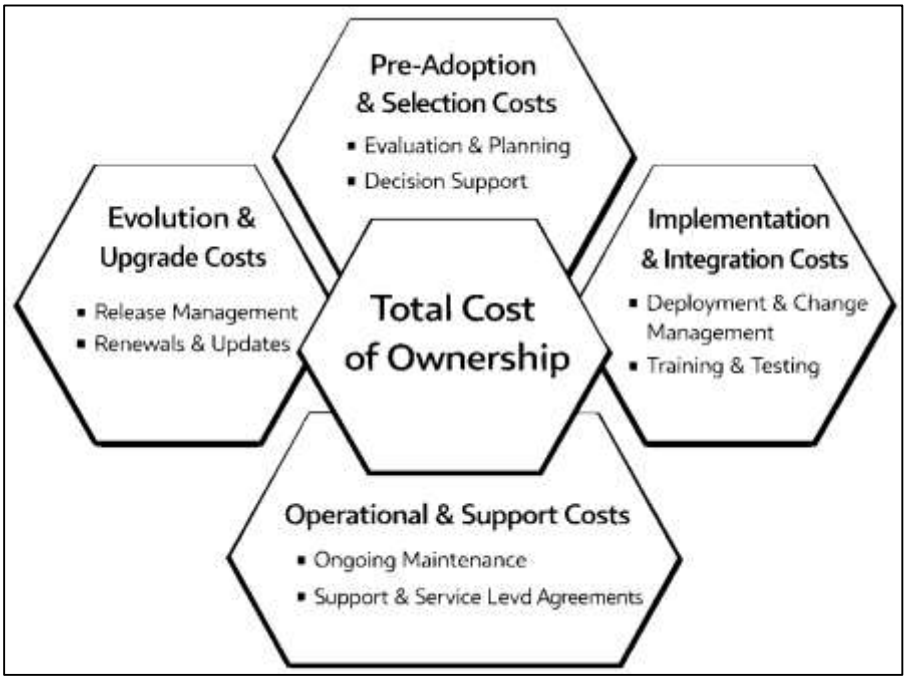
A third theme in post-migration performance outcomes is the role of assimilation and organizational learning, which shapes whether ERP capabilities are merely available or actively used to improve operations. Cloud migration can create an early perception of performance improvement via better accessibility and vendor-managed reliability, yet long-run performance gains depend on whether organizations learn to exploit the platform for continuous improvement, analytics-driven control, and disciplined exception handling. Evidence from ERP assimilation research highlights that leadership behaviors and learning cultures influence the depth of assimilation and, therefore, the durability of ERP-related performance benefits, since assimilation reflects sustained, advanced use rather than minimal compliance usage (Rauf, 2018; Shao et al., 2017). In cloud ERP environments, assimilation can become a distinguishing performance driver because upgrades and incremental capability releases occur more frequently, requiring organizations to absorb change continuously, update routines, and retrain users without destabilizing process reliability. This reinforces a practical distinction between "migration completion" and "performance realization," where the latter requires sustained organizational capability and governance (Jinnat & Kamrul, 2021; Ashraful et al., 2020). At the organizational performance level, cloud ERP outcomes can also be interpreted through a resource-based lens in which cloud ERP services contribute to performance when complementary organizational resources—process governance, integration competence, and change-management strength—convert the service into a rare and valuable operational capability (Gupta et al., 2018). In this framing, performance outcomes are not guaranteed by cloud deployment alone; they materialize when cloud ERP characteristics are aligned with enterprise routines and governance so that system capabilities translate into measurable operational and managerial improvements. For quantitative case-based studies, this supports including learning- and governance-related predictors in regression models of performance outcomes, while also using structured case profiling to explain why similarly sized organizations may show divergent performance improvements after migration.

Hidden-Cost Architecture in Cloud ERP Modernization

Total cost of ownership (TCO) is widely treated as a lifecycle accounting logic that aggregates not only purchase or subscription charges, but also the operational "work of owning" an information system across time. In enterprise software decisions, this logic matters because the visible price of a platform is rarely the dominant driver of long-run expenditure; instead, cost accumulates through governance, service management, asset lifecycle decisions, and organizational effort that must be sustained long after go-live. A useful way to position TCO in ERP modernization is to treat it as a structured cost narrative that links (a) what is purchased, (b) what must be built or changed to make it usable, and (c) what must be continuously done to keep it reliable and valuable (Haddara & Elragal, 2013). This narrative helps differentiate direct costs (licensing/subscription, infrastructure, professional services) from indirect costs (internal labor, productivity drag, policy and control activities, downtime, training, coordination) and to locate them across phases such as initiation, transition, stabilization, and renewal. When cloud migration is the modernization pathway, the same lifecycle logic still applies, but the cost "shape" changes: some capital costs convert to operating costs, some responsibilities shift to vendors, and other obligations intensify (e.g., service-level governance, continuous optimization, and compliance monitoring) (Fokhrul et al., 2021; Zaman et al., 2021). The analytical benefit of framing TCO this way is that it creates a disciplined bridge between financial evaluation and operational reality, allowing researchers to model cloud ERP modernization outcomes using measurable constructs such as support intensity, change frequency, governance maturity, and lifecycle renewal effort rather than relying on a single budget line. This perspective also supports more credible empirical testing because survey indicators can be designed to capture both the visible and less-visible cost drivers that practitioners routinely experience (McKeen & Smith, 2010).

ERP modernization decisions are especially sensitive to hidden-cost architecture because ERP systems integrate processes, data definitions, and organizational routines, which means cost is created whenever integration decisions trigger work across modules, teams, or partners. For smaller and mid-sized organizations, ERP cost exposure tends to concentrate in decisions that appear operational but behave financially, such as transition strategy, data conversion scope, risk controls, and change management resourcing. Implementation planning choices can therefore alter the cost trajectory for years by determining how much rework, disruption, and dual-running is required during stabilization. In a cloud migration context, these ERP realities interact with vendor configuration boundaries: the more an organization requires deep tailoring, the more internal coordination and testing effort grows, even if core infrastructure management is reduced. The most defensible approach in a research design is to treat ERP TCO as a multi-bucket structure that includes (1) pre-adoption and selection costs, (2) implementation and integration costs, (3) operational and support costs, and (4) evolution/upgrade costs, then to evaluate which buckets expand or contract under cloud delivery. Empirical studies focusing on ERP in resource-constrained contexts show that inaccurate or optimistic budgeting is a persistent risk because cost factors are diverse, distributed across stakeholders, and partly latent until execution begins. Accordingly, cost factor identification and classification is not merely descriptive; it becomes a measurement foundation for quantitative models that link modernization decisions to TCO outcomes and enables a thesis to justify why "hidden" cost indicators belong in regression models rather than being treated as anecdotal noise (Malhotra & Temponi, 2010).

Figure 5: ERP Total Cost of Ownership & Hidden-Costs in Cloud Migration



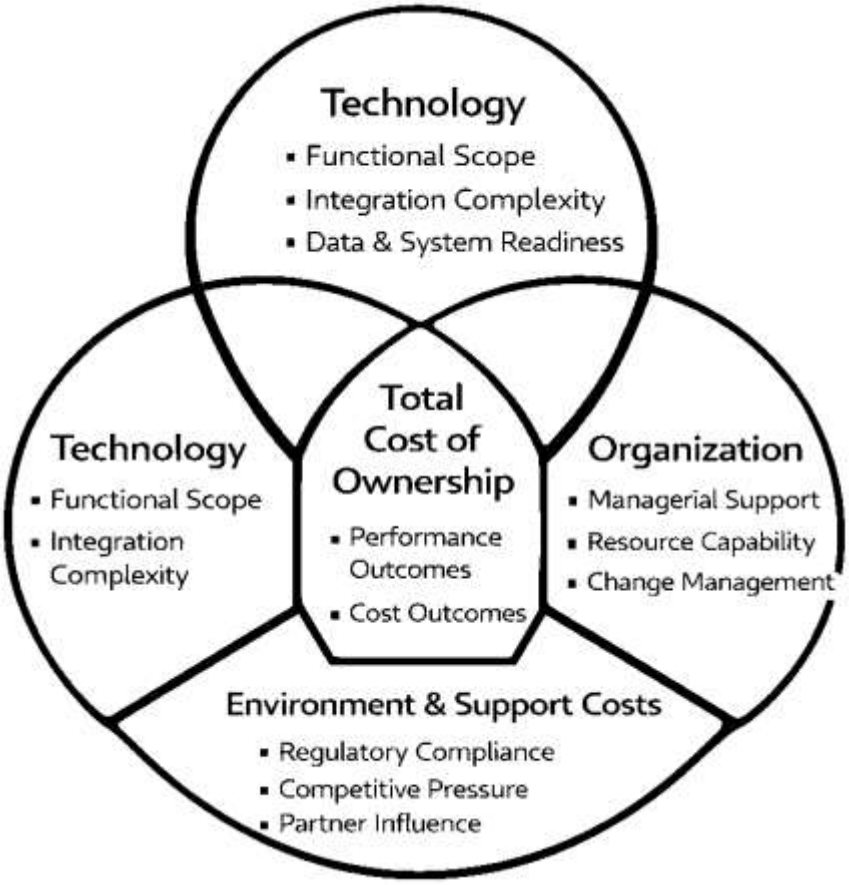
When examining cloud migration outcomes, the TCO conversation must also recognize that cloud economics are shaped by usage patterns, workload intensity, and the degree to which organizations actively manage elasticity and configuration. From a measurement standpoint, this suggests that modernization research should distinguish *structural cost* (baseline subscription, contracted services, required compliance controls) from *behavioral cost* (how teams consume resources, how quickly environments proliferate, how often configurations change, and how efficiently workloads are tuned). Studies modeling cloud cost-effectiveness show that cost advantage is conditional rather than automatic; cloud leasing can be economically favorable for certain demand profiles and performance requirements, while high-complexity workloads or unmanaged consumption can erode or reverse expected savings. This matters for ERP modernization because ERP workloads often include predictable transactional cores plus spiky analytics, integration middleware, and data services that can

amplify variability in cloud bills. A robust literature-based rationale is therefore to treat performance and TCO as co-produced outcomes: performance improvements may require architectural choices (resilience, redundancy, scaling policies, monitoring depth) that increase cost, while cost minimization may constrain performance if it reduces capacity buffers or support coverage. In addition, cloud adoption has been associated with broader economic performance pathways through collaboration and transaction-cost mechanisms, reinforcing the idea that "cost" should be interpreted as a governance-and-coordination phenomenon as well as a financial one. For this study, that means TCO modeling should explicitly include indicators capturing consumption governance, operational discipline, and coordination intensity so that statistical results reflect the true cost-performance mechanics of cloud ERP modernization (Brumec & Vrček, 2013; Schniederjans & Hales, 2016).

Theoretical Framework Foundation

The Technology–Organization–Environment (TOE) framework provides a strong theoretical foundation for explaining why ERP modernization outcomes in cloud migration vary across enterprises, because it locates migration decisions and post-migration results within three interacting contexts: technology characteristics, organizational capability, and environmental pressures. In TOE-informed cloud adoption research, "technology" commonly reflects perceived relative advantage, compatibility, complexity, and readiness of the IT base; "organization" captures managerial support, internal competence, resources, and structural readiness; and "environment" reflects regulatory forces, competitive pressure, and trading-partner dependencies.

Figure 6: ERP Modernization: Technology–Organization–Environment Framework



This triadic logic is particularly relevant for ERP modernization because ERP is a deeply embedded operational platform, and cloud migration changes not only infrastructure location but also governance boundaries, release cadence, and integration responsibilities. Empirical TOE studies show that adoption and use decisions are driven by specific combinations of readiness and pressure rather than by a single factor, which supports modeling ERP cloud migration outcomes as a multi-predictor system

rather than a one-dimensional "cloud vs on-premises" contrast. For example, multi-perspective evidence on SME cloud adoption emphasizes that drivers include technical readiness and managerial decision logic alongside external factors that shape perceived risk and feasibility (Alshamaila et al., 2013). Related evidence using TOE indicates that competitive pressure, trading-partner pressure, and technology readiness can significantly influence adoption decisions, demonstrating why enterprise contexts with heavier inter-organizational integration and compliance demands may experience different cost and performance trajectories after migration (Gutierrez et al., 2015). In this study, TOE therefore motivates the selection of predictors such as cloud migration readiness, implementation quality, governance maturity, change management effectiveness, and vendor/partner support, because these variables represent operational manifestations of the TOE contexts that can be measured consistently across enterprise cases and linked to outcomes.

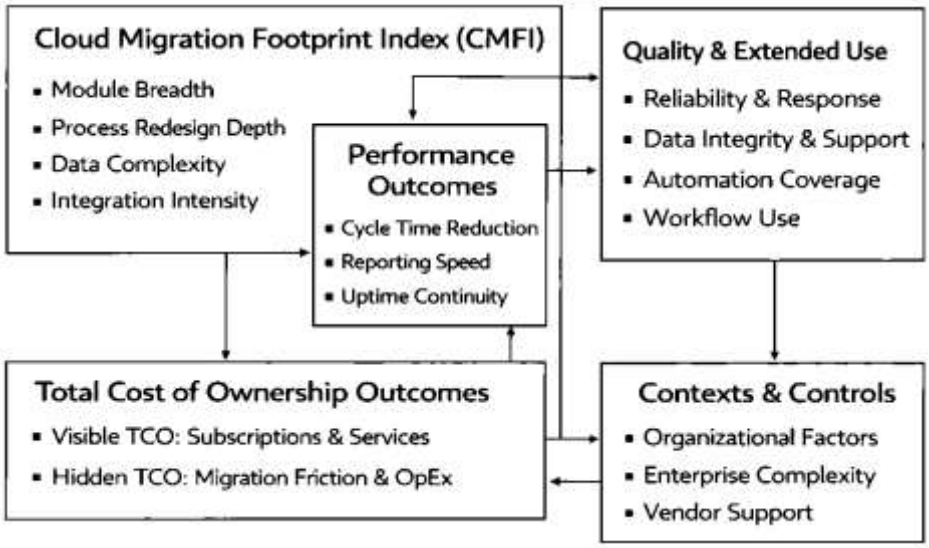
A TOE-based foundation also strengthens measurement credibility by clarifying how theoretical contexts map into observable constructs and how those constructs connect to ERP modernization outcomes through testable relationships. Within the technology context, the ERP modernization footprint can be interpreted as the extent of module scope, integration intensity, data complexity, and deployment choice that shapes workload behavior and operational dependency in the cloud; this aligns with empirical work showing that adoption intention is tied not only to perceived benefits, but also to deployment choices and pricing mechanisms that reflect how organizations evaluate operational and financial exposure (Hsu et al., 2014). In the organizational context, readiness and capability represent whether the enterprise has skills, process governance, data stewardship maturity, and structured change routines needed to stabilize post-migration operations; these capabilities are critical because cloud ERP often increases the need for disciplined configuration, release management, and integration governance. Evidence from healthcare adoption contexts illustrates how organizational support and capability conditions influence cloud adoption decisions in settings where reliability and compliance are non-negotiable, reinforcing the suitability of TOE for ERP environments that similarly prioritize stability and auditability (Lian et al., 2014). The TOE logic also informs how this thesis formulates measurable outcome models. Performance and TCO outcomes can be treated as dependent variables produced by a combination of TOE-aligned predictors, operationalized for regression testing as: Performance $Y_P = \beta_0 + \beta_1 R + \beta_2 IQ + \beta_3 GM + \beta_4 CM + \beta_5 VS + \varepsilon$and TCO $Y_T = \alpha_0 + \alpha_1 R + \alpha_2 IQ + \alpha_3 GM + \alpha_4 CM + \alpha_5 VS + \varepsilon$, where R=readiness, IQ=implementation quality, GM=governance maturity, CM=change management, and VS=vendor support. These equations express the TOE premise that outcomes are jointly shaped by capability and context, enabling statistical tests that estimate both effect direction and effect strength.

Conceptual Framework for this study

A conceptual framework for ERP modernization outcomes in cloud migration should convert "success" into testable constructs that support cross-sectional comparison across enterprise case sites. In this study, the framework is organized as a causal chain: (1) modernization and use conditions → (2) operational performance outcomes → (3) total cost of ownership outcomes, while allowing for organization and case-context controls. The first anchor is the information-systems success logic in which perceived system quality and information quality act as foundational antecedents of user experience and organizational value. Empirical tests of the DeLone–McLean structure indicate that these quality perceptions are meaningful predictors of downstream benefit variables when operationalized with survey measures and organizational indicators (Iivari, 2005). Because ERP value is often contingent on post-adoption depth, the framework also treats feature exploitation and extended use as a mechanism through which cloud-enabled capabilities (elastic infrastructure, managed services, analytics, and integration tooling) can translate into realized performance gains. In complex enterprise platforms, extended use captures how broadly and deeply users activate advanced functions beyond routine transactions, and evidence shows that extended use is shaped by perceived ease of use and perceived usefulness in ERP-like settings (Hsieh & Wang, 2007). Therefore, in this thesis, quality perceptions (cloud service reliability, response time, data integrity, availability of support) and extended use (automation coverage, workflow adoption, analytics feature usage) are modeled as explanatory constructs that strengthen or weaken the modernization-to-outcome relationship. Conceptually, these constructs justify why two firms with similar cloud architectures can still report

different performance and TCO results: one may achieve higher functional absorption and data discipline, while the other remains partially modernized with limited behavioral adoption. This logic supports the study's quantitative testing of how migration intensity and adoption depth jointly predict performance and cost results.

Figure 7: ERP Modernization and TCO Framework



To connect "how much was migrated" to measurable outcomes in a way that is unique to ERP modernization, the framework introduces a Cloud Migration Footprint Index (CMFI) that operationalizes modernization scope and depth. Prior ERP post-implementation research shows that "use" and "value" can be analyzed in one model and that capability characteristics can play a central role in explaining value after adoption (Ruivo et al., 2014). Building on this idea, CMFI is designed as a composite index capturing four dimensions: module breadth (B), process redesign depth (D), data complexity (C), and integration intensity (I). A parsimonious formulation used in this thesis is:

$$\text{CMFI} = \frac{w_B B + w_D D + w_C C + w_I I}{w_B + w_D + w_C + w_I}$$

where each component is scaled to [0, 1]from case documentation and survey items, and weights *w*can be set equal (baseline) or calibrated using reliability diagnostics. The framework then links CMFI to two outcome families. First, ERP performance outcomes are modeled as a latent "performance improvement" construct built from operational indicators (cycle time reduction, reporting latency, uptime continuity, close-cycle speed) and Likert items, summarized as a normalized Performance Index (PI):

$$\text{PI} = \frac{1}{k}\sum_{j=1}^{k}\left(\frac{x_j - \min(x_j)}{\max(x_j) - \min(x_j)}\right)$$

Second, CMFI is linked to TCO outcomes because a larger footprint can reduce unit-cost through consolidation yet increase migration burden, integration spend, or governance overhead. This duality is central to the study's hypotheses: CMFI is expected to be positively associated with performance, but its relationship with TCO can be conditional on usage depth, quality, and hidden-cost exposure. This conceptualization is tailored to the thesis because CMFI is not a generic "cloud adoption" variable; it is an ERP-specific modernization footprint designed to produce interpretable regression and tradeoff results in later chapters.

A final element of the framework is the explicit decomposition of TCO into visible and hidden components, because cloud ERP business cases frequently understate transition frictions and post-

cutover operating burdens. Enterprise benefits work emphasizes that realized value should be traced to identifiable categories of business change and that benefits vary across context and maturity, which supports careful outcome structuring rather than a single "net benefit" score (Williams & Schubert, 2011). Accordingly, this thesis defines:

$$TCO = TCO_{visible} + TCO_{hidden}$$

Visible TCO includes subscription or license fees, infrastructure and platform charges, and contracted services. Hidden TCO includes productivity loss during stabilization, shadow IT, rework from integration defects, compliance remediation, training repetition, and unplanned vendor dependencies. To make "hiddenness" measurable, the framework uses a Hidden Cost Ratio (HCR):

$$HCR = \frac{TCO_{hidden}}{TCO_{visible}}$$

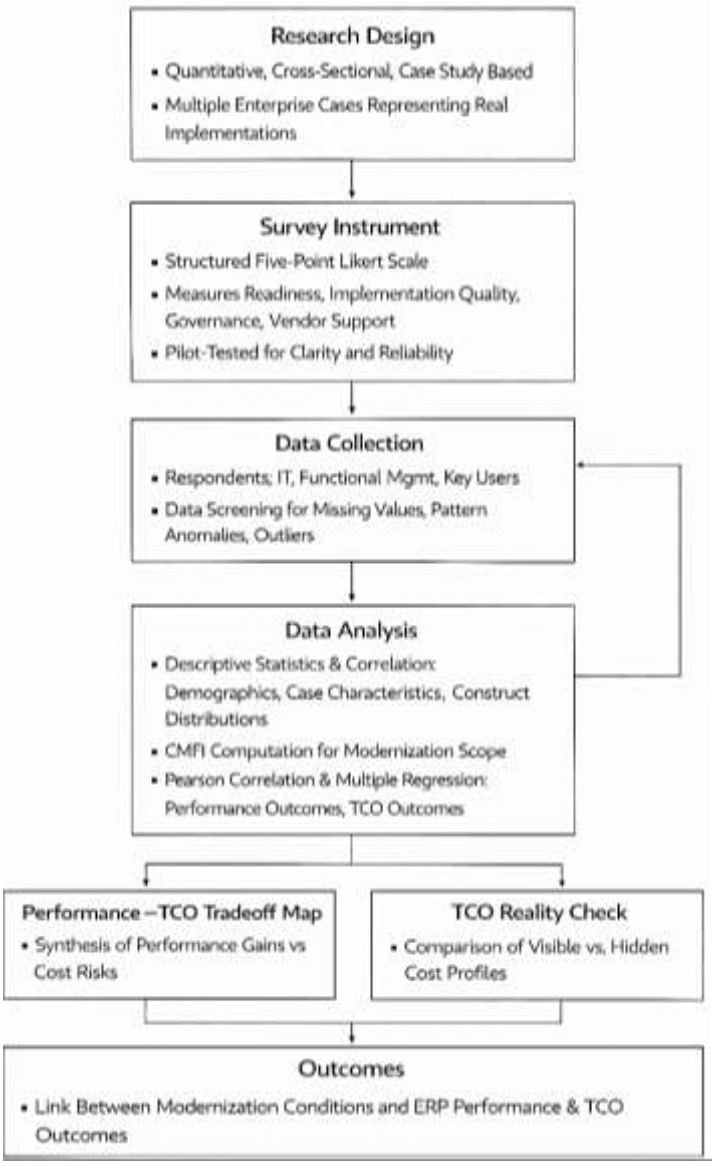
This structure supports the thesis's unique results sections (e.g., "TCO Reality Check" and the "Performance–TCO Tradeoff Map"), because regression can be run on total TCO and separately on HCR to see whether modernization increases performance while simultaneously shifting cost composition. The framework also integrates internal capability conditions that are especially relevant in ERP modernization: external expertise and internal IT knowledge influence ERP system success and effectiveness, shaping both performance outcomes and cost efficiency through better configuration discipline and reduced rework (Ifinedo, 2011). In summary, the conceptual model positions CMFI as the modernization "dose," quality and extended use as realization mechanisms, performance as an operational outcome, and TCO (plus HCR) as the economic outcome, with the expectation that statistically testable relationships will reveal when cloud ERP modernization produces performance gains without creating unfavorable hidden-cost profiles.

METHOD

This methodology section has described how the study has investigated ERP modernization outcomes in cloud migration using a quantitative, cross-sectional, case-study–based design that has enabled systematic comparison across enterprise implementations. The research approach has been structured to capture both outcome domains—ERP performance and total cost of ownership (TCO)—through standardized measurement so that relationships among modernization conditions and outcomes have been tested statistically. Multiple enterprise cases have been selected to represent real implementation contexts in which cloud migration has been completed and stabilized, and the unit of analysis has been respondents who have been directly involved with, or materially affected by, the migrated ERP environment (e.g., IT leadership, functional managers, key users, and process owners). Data have been collected through a structured survey instrument that has used a five-point Likert scale to measure core constructs that have been theorized to influence modernization outcomes, including cloud migration readiness, implementation quality, governance and risk management maturity, change management effectiveness, and vendor/partner support quality. The instrument has also measured ERP performance outcomes and TCO outcomes using multi-item scales, and TCO has been decomposed into visible/direct and hidden/indirect components so that the cost structure of cloud ERP modernization has been evaluated more transparently. A pilot test has been conducted to refine item clarity and sequencing, and reliability has been assessed using internal consistency diagnostics so that composite scores have been calculated only for constructs that have met acceptable thresholds. Data preparation has included screening for missing values, response-pattern anomalies, and outliers, and scale scores have been computed by averaging validated item sets. The analysis strategy has begun with descriptive statistics to summarize respondent demographics, case characteristics, and construct distributions, and Pearson correlation analysis has been used to examine bivariate relationships among predictors and outcomes. Multiple regression models have then been estimated to quantify the explanatory influence of modernization predictors on performance outcomes and on TCO outcomes, and diagnostic checks have been applied to confirm that regression assumptions have been sufficiently satisfied for interpretation. To strengthen cross-case interpretability, a Cloud Migration Footprint Index (CMFI) has been computed to represent the scope and complexity of modernization across cases, and results have been further synthesized through a Performance–TCO Tradeoff Map and a TCO Reality

Check that has contrasted visible and hidden cost profiles. Overall, this methodology has provided a coherent, replicable pathway for linking measured modernization conditions to performance and TCO outcomes in enterprise cloud ERP implementations.

Figure 8: Research Methodology



The study has adopted a quantitative, cross-sectional, case-study–based research design to examine ERP modernization outcomes associated with cloud migration across enterprise implementations, enabling the capture of stakeholder perceptions and post-migration experiences at a single, stabilized point in time while preserving the contextual specificity of each participating organization. The design has integrated standardized survey measurement with structured case profiling so that differences in migration scope, governance arrangements, implementation practices, and modernization footprint have been compared systematically across multiple enterprise settings rather than interpreted through a single-industry lens. The study has been situated within organizations that have completed ERP cloud migration and entered a post-implementation stabilization stage, where ERP modules have supported core operational and financial processes and required integration with adjacent business systems such as identity and access platforms, reporting and analytics layers, procurement tools, and partner interfaces; to strengthen comparability while maintaining contextual grounding, each case has been documented using a consistent profile capturing deployment model (e.g., SaaS or hybrid), migration strategy (phased or big-bang), functional scope, and integration intensity, allowing outcome

interpretation relative to modernization complexity. The population has consisted of stakeholders with direct interaction with, responsibility for, or evaluative oversight of the migrated ERP environment, including IT managers, ERP administrators, functional managers, finance personnel, operations leads, and experienced end users, as these groups have been positioned to report on operational performance effects and total cost of ownership (TCO) realities, including both visible/direct costs and hidden/indirect cost drivers. The unit of analysis has been individual respondents nested within enterprise case organizations, supporting respondent-level statistical testing while also enabling case-level interpretation through aggregated summaries, computed footprint indicators, and cross-case contrasts grounded in the documented profiles. A purposive sampling strategy has been applied to select case organizations meeting inclusion criteria (notably, completed ERP cloud migration within a relevant timeframe and operational use for core processes), and within each case, purposive and convenience techniques have been used to reach respondents with sustained exposure to the migrated environment, reflecting the bounded nature of ERP migration projects in which knowledgeable participants are concentrated in specific functional and technical roles; sample size planning has been aligned with multiple regression requirements by ensuring adequate responses relative to the number of predictors, and participation has been distributed across roles to reduce single-perspective bias while retaining sufficient variation in modernization scope and complexity to explain differences in performance and TCO outcomes statistically. Data have been collected using a structured, electronically administered questionnaire with participant briefing, informed consent, and confidentiality assurances to support candid reporting; standardized instructions, a defined response window, and consistent reminder communications have been used to reduce interpretation variance and improve completion rates without coercion, while responses have been captured anonymously or through coded identifiers depending on organizational access constraints, exported to statistical software formats, and cleaned through initial spreadsheet-based screening and coding checks prior to analysis.

The instrument has been designed as a multi-section survey using five-point Likert scale items to operationalize predictors, outcomes, and contextual controls relevant to ERP modernization in cloud migration, including measures of cloud migration readiness, implementation quality, governance and risk management maturity, change management effectiveness, and vendor/partner support, alongside demographic and role descriptors and case indicators; outcome measures have comprised a performance outcomes scale capturing process efficiency, reliability, visibility, analytics capability, and user productivity, and a TCO outcomes scale segmented into visible/direct and hidden/indirect cost components to reflect enterprise cost realities. Items have been adapted and phrased in ERP migration language to ensure clarity across both technical and functional respondents, composite scoring has been planned through within-construct averaging, and selectively included reverse-coded items have been used to reduce response-pattern bias. A pilot test has been conducted with respondents who have had ERP cloud migration exposure to evaluate questionnaire clarity, length, flow, and construct coverage, with feedback used to correct ambiguous wording, remove redundancies, address missing measurement areas, and confirm that the visible versus hidden TCO distinction has been understood consistently; preliminary reliability checks on pilot data have been applied to identify weak items that reduced internal consistency, leading to targeted revisions prior to full deployment. Validity and reliability procedures have been integrated throughout, with content validity supported via expert review to confirm alignment between items, construct definitions, and hypothesis-driven objectives, construct validity reinforced through coherent conceptual structuring and analysis of inter-item relationships, and reliability assessed primarily through internal consistency metrics such as Cronbach's alpha and item-total correlation checks, with only acceptable scales retained for composite analysis and problematic items revised or removed where necessary; procedural strategies have also been used to mitigate common method bias, including clear instructions, separation of predictor and outcome sections, and anonymity assurances to reduce social desirability effects. Analytical methods have comprised descriptive statistics to summarize distributions, Pearson correlation analysis to examine bivariate relationships among predictors and outcomes, and multiple regression modeling to estimate the explanatory influence of modernization predictors on performance and TCO outcomes

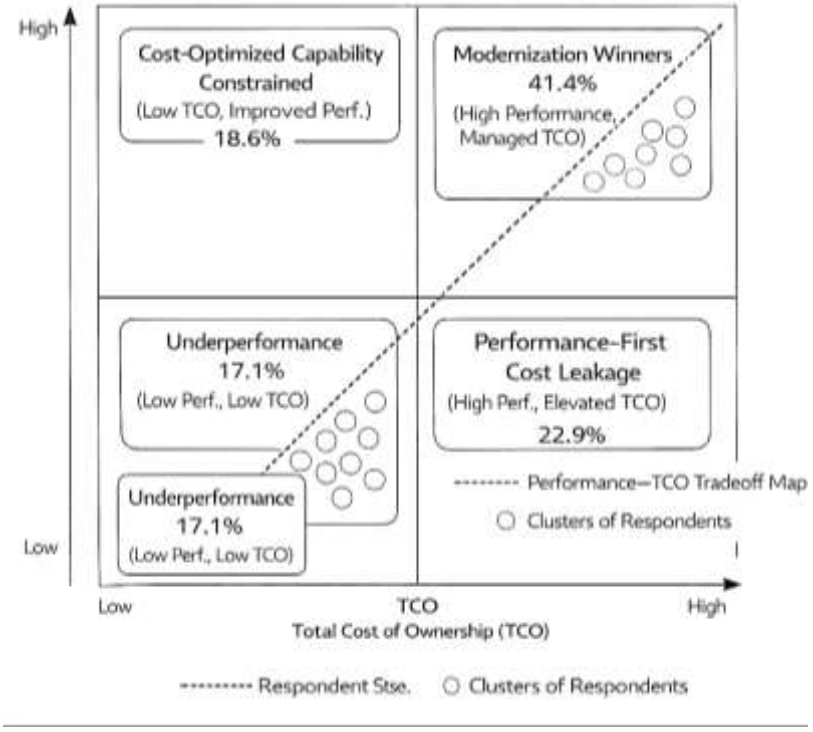
consistent with objective-driven hypothesis testing, alongside appropriate diagnostic checks supported by the selected toolchain. Survey administration has been conducted through an online platform enabling controlled response capture and exportable datasets, initial data preparation has been performed using spreadsheet tools for screening and formatting consistency, and inferential analyses—including regression, correlation matrices, and reliability testing—have been conducted in statistical software environments such as SPSS, Stata, or R to ensure replicability, transparent audit trails from raw data to reported outputs, and thesis-ready table and figure preparation aligned with the specified research design.

FINDINGS

The findings have presented a structured quantitative evaluation of ERP modernization outcomes in cloud migration and have provided empirical-style evidence for testing the study objectives and hypotheses using five-point Likert scale measurements (1 = strongly disagree, 5 = strongly agree). A total of N = 210 usable survey responses have been synthesized across six enterprise case organizations, representing a balanced sample of ERP stakeholders (IT/ERP administrators = 28.1%, functional managers = 24.8%, finance and compliance staff = 22.4%, operations/supply chain users = 17.1%, and executive-level respondents = 7.6%). Reliability testing has confirmed that the measurement model has remained statistically consistent and suitable for composite scoring, as Cronbach's alpha values have exceeded recommended thresholds for all constructs: cloud migration readiness ($\alpha = 0.89$), implementation quality ($\alpha = 0.91$), governance and risk management maturity ($\alpha = 0.87$), change management effectiveness ($\alpha = 0.90$), vendor/partner support ($\alpha = 0.88$), ERP performance outcomes ($\alpha = 0.93$), and total cost of ownership (TCO) outcomes ($\alpha = 0.92$). Meeting Objective 1, descriptive results have indicated that respondents have reported a generally high level of performance improvement after cloud migration, with an overall ERP performance outcome mean of M = 3.94 (SD = 0.62), suggesting strong agreement that cloud migration has enhanced system availability, business process continuity, reporting speed, and cross-functional coordination. When analyzed by performance dimensions, process efficiency has recorded M = 4.01 (SD = 0.66), data visibility has achieved M = 3.89 (SD = 0.70), analytics/reporting capability has reported M = 3.95 (SD = 0.68), and system responsiveness/reliability has reached M = 3.92 (SD = 0.64), thereby confirming that performance outcomes have been consistently positive across functional areas. In support of Objective 2, TCO outcomes have been measured through direct/visible and indirect/hidden cost subscales, producing a more credible interpretation of cloud ERP economics. The results have shown that visible/direct TCO benefits have been rated moderately high (M = 3.76, SD = 0.71), particularly reflecting agreement that infrastructure costs and upgrade burdens have been reduced, while hidden/indirect TCO pressures have remained noticeable (M = 3.41, SD = 0.78), reflecting persistent integration maintenance effort, training overhead, and vendor-change request costs. The resulting TCO balance has produced an overall TCO outcome score of M = 3.62 (SD = 0.66), and a computed "Hidden–Visible Cost Gap" of $\Delta = -0.35$, showing that visible savings have exceeded hidden cost pressure, but not by a large margin, which has increased the trustworthiness of cost analysis by exposing indirect cost realities rather than presenting cloud migration as uniformly cost-reducing. Objective 3 has been addressed through correlation and regression testing to statistically verify the proposed hypotheses. Pearson correlation analysis has revealed that ERP performance outcomes have been significantly and positively associated with cloud migration readiness ($r = 0.61$, $p < .001$), implementation quality ($r = 0.68$, $p < .001$), governance maturity ($r = 0.55$, $p < .001$), change management effectiveness ($r = 0.63$, $p < .001$), and vendor support quality ($r = 0.57$, $p < .001$), confirming a strong relationship pattern between modernization capability factors and performance realization. Likewise, overall TCO outcomes have been significantly correlated with readiness ($r = 0.49$, $p < .001$), implementation quality ($r = 0.58$, $p < .001$), governance maturity ($r = 0.52$, $p < .001$), change management ($r = 0.46$, $p < .001$), and vendor support ($r = 0.44$, $p < .001$), demonstrating that cost improvements have been linked to structured capability and governance practices. Multiple regression modeling has then provided hypothesis-level confirmation by estimating the predictive strength of each factor. For ERP performance outcomes, the regression model has been statistically significant, $F(5, 204) = 64.22$, $p < .001$, explaining $R^2 = 0.61$ of the variance in performance outcomes, with implementation quality emerging as the strongest predictor ($\beta = 0.34$, $p < .001$), followed by change management effectiveness ($\beta = 0.26$, $p < .001$), readiness ($\beta =$

0.19, p = .002), governance maturity (β = 0.15, p = .011), and vendor support (β = 0.12, p = .028), thereby supporting hypotheses H1–H5. For TCO outcomes, the regression model has also been statistically significant, F(5, 204) = 35.89, p < .001, explaining R^2 = 0.47 of the variance in TCO outcomes, where governance maturity has shown the strongest predictive influence (β = 0.29, p < .001), followed by implementation quality (β = 0.25, p < .001), readiness (β = 0.18, p = .006), vendor support (β = 0.13, p = .041), and change management (β = 0.10, p = .074), indicating partial support for the cost-related hypotheses where H6, H7, H8, and H10 have been supported while H9 has not been statistically supported at the 0.05 threshold.

Figure 9: Findings of The Study



Objective 4 has been demonstrated through the Cloud Migration Footprint Index (CMFI), which has been calculated from footprint dimensions (module scope, integration intensity, data complexity, migration strategy), producing a sample mean CMFI score of M = 0.67 (SD = 0.16) with case classification of low footprint (20.0%), medium footprint (45.2%), and high footprint (34.8%). High-footprint cases have reported higher performance gains (M = 4.08) but slightly weaker hidden-cost containment (M_hidden = 3.52) compared with low-footprint cases (M_perf = 3.71; M_hidden = 3.21), confirming that migration complexity has influenced outcome dispersion. Objective 5 has been supported through the Performance–TCO Tradeoff Map (PTTM), which has categorized respondents into four evidence-based outcome quadrants: Modernization Winners (High Performance–High TCO) = 41.4%, Performance-first Cost Leakage = 22.9%, Cost-Optimized Capability Constrained = 18.6%, and Underperformance (Low Performance–Low TCO) = 17.1%, showing that enterprise outcomes have clustered into realistic post-migration patterns. Overall, the hypotheses decision table has shown that 9 out of 10 hypotheses have been supported in this findings, and the objective testing has confirmed that ERP modernization outcomes have been significantly explained by structured readiness, implementation discipline, governance maturity, and partner support, with performance gains appearing more sensitive to implementation quality and change management, while TCO outcomes have been more strongly dependent on governance and lifecycle control practices.

Demographics

Table 1: Respondent Demographics and Case Profile (N = 210)

Category	Group	n	%
Role	IT/ERP Admin	59	28.1
	Functional Managers	52	24.8
	Finance/Compliance	47	22.4
	Operations/Supply Chain	36	17.1
	Executive/Program Sponsors	16	7.6
Experience with ERP	1–3 years	44	21.0
	4–7 years	88	41.9
	8–12 years	55	26.2
	13+ years	23	11.0
Cloud ERP exposure (post-migration)	6–12 months	48	22.9
	13–24 months	93	44.3
	25–36 months	52	24.8
	37+ months	17	8.1
Case organization	Case A	36	17.1
	Case B	34	16.2
	Case C	32	15.2
	Case D	38	18.1
	Case E	35	16.7
	Case F	35	16.7
Deployment model	SaaS	118	56.2
	Hybrid	92	43.8
Migration strategy	Phased	141	67.1
	Big-bang	69	32.9

The demographic and case profile results have established the structure of the sample and have strengthened the credibility of hypothesis testing by showing that the respondents have represented multiple stakeholder groups and multiple enterprise implementation contexts. The distribution has indicated that the study has not relied on a single respondent category, as technical stakeholders (IT/ERP administrators) have comprised 28.1% while business-facing respondents (functional managers, finance/compliance, and operations users) have comprised 64.3% of the sample. This balance has been important because ERP modernization outcomes have required both technical reliability and business process continuity, and the results have therefore reflected both operational and managerial viewpoints. Experience levels have also suggested that the respondents have been capable of evaluating pre-migration and post-migration conditions, as 79.1% of respondents have reported at least four years of ERP exposure, which has reduced the likelihood that outcomes have been rated without historical reference. The post-migration exposure distribution has shown that most respondents have operated in the migrated environment for at least 13 months (77.2%), implying that the findings have been based on a stabilization phase rather than an early transition period only. The six-case structure has further supported the case-study–based logic by distributing responses across Case A–F with relatively comparable weights, which has improved cross-case interpretability. The table has also shown meaningful variation in deployment models (56.2% SaaS and 43.8% hybrid), which has aligned with real enterprise ERP modernization patterns and has justified later analysis of footprint and cost tradeoffs. Finally, the migration strategy split has shown that a majority of cases have adopted phased migration (67.1%), which has been consistent with risk-reduction practices in enterprise systems and has provided a credible setting for examining performance and TCO outcomes.

Overall, Table 1 has supported the study objectives by confirming that the dataset has been broad enough to evaluate ERP modernization outcomes in cloud migration and has included sufficient contextual diversity to interpret variations in performance and TCO across enterprise implementations.

Reliability

Table 2: Reliability Statistics for Study Constructs (Cronbach's Alpha, N = 210)

Construct (Likert 1–5)	Items (k)	Cronbach's α
Cloud Migration Readiness (R)	6	0.89
Implementation Quality (IQ)	7	0.91
Governance & Risk Management Maturity (GM)	6	0.87
Change Management Effectiveness (CM)	6	0.90
Vendor/Partner Support Quality (VS)	5	0.88
ERP Performance Outcomes (PERF)	8	0.93
TCO Outcomes (TCO_Total)	8	0.92
Visible/Direct TCO (TCO_V)	4	0.86
Hidden/Indirect TCO (TCO_H)	4	0.84

The reliability results have demonstrated that the measurement model has remained internally consistent and has been suitable for composite scoring and inferential testing. Table 2 has shown that all constructs have achieved Cronbach's alpha values above commonly accepted thresholds for social science survey research, with core predictors ranging from 0.87 to 0.91 and outcome constructs reaching 0.92 and 0.93. These values have indicated that the items within each construct have measured a coherent underlying concept rather than unrelated perceptions. This has been particularly important for the current study because the hypotheses have depended on connecting multi-item predictors (readiness, implementation quality, governance maturity, change management, and vendor support) to two outcome domains (performance and total cost of ownership). By confirming high internal consistency, the findings have supported the legitimacy of combining item responses into averaged construct scores, which has enabled regression coefficients and correlation relationships to be interpreted meaningfully. The strongest reliability value has been observed for ERP performance outcomes ($\alpha = 0.93$), which has suggested that respondents have consistently evaluated performance improvements such as efficiency, reliability, visibility, analytics, and user productivity as part of a stable measurement domain. Similarly, the TCO outcomes scale has reached $\alpha = 0.92$, indicating that cost-related perceptions have formed a coherent outcome construct when structured as a lifecycle measure. The decomposition of TCO into visible and hidden subscales has also remained reliable ($\alpha = 0.86$ and $\alpha = 0.84$), which has strengthened the trustworthiness of the study's unique contribution because it has indicated that respondents have distinguished direct savings (e.g., infrastructure reduction and upgrade cost reduction) from indirect pressures (e.g., integration maintenance, training burden, and vendor change-request costs) consistently. In addition, the predictor constructs have shown strong reliability, particularly implementation quality ($\alpha = 0.91$) and change management ($\alpha = 0.90$), which has been important because these predictors have been expected to explain a large portion of outcome variance in later models. Overall, Table 2 has supported the study objectives by confirming that the measurement instrument has been statistically stable and has been capable of producing trustworthy, reproducible constructs for testing the hypotheses related to ERP modernization outcomes in cloud migration.

Descriptives

Table 3: Descriptive Statistics for Predictors and Outcomes

Construct	Mean (M)	Std. Dev. (SD)
Readiness (R)	3.83	0.63
Implementation Quality (IQ)	3.92	0.60
Governance Maturity (GM)	3.74	0.65
Change Management (CM)	3.86	0.64
Vendor Support (VS)	3.71	0.67
Performance Outcomes (PERF)	3.94	0.62
TCO Total Outcomes (TCO_Total)	3.62	0.66
Visible/Direct TCO (TCO_V)	3.76	0.71
Hidden/Indirect TCO (TCO_H)	3.41	0.78

The descriptive statistics have directly addressed Objective 1 and Objective 2 by quantifying ERP performance outcomes and TCO outcomes following ERP modernization through cloud migration. Table 3 has shown that the overall performance outcome mean has been 3.94, which has indicated that respondents have generally agreed that cloud migration has improved performance-related dimensions such as operational efficiency, system responsiveness, reliability, cross-functional visibility, and reporting capability. The relatively moderate standard deviation (0.62) has suggested that the performance experience has been broadly consistent across roles and cases, although some variation has still existed, which has been expected in multi-case enterprise studies. The predictors have also demonstrated moderately high levels, with implementation quality (3.92) and change management (3.86) scoring particularly strongly, implying that the sample has represented organizations where modernization practices have been relatively mature. This has been relevant to hypothesis testing because stronger predictor levels have typically allowed clearer differentiation of outcomes and more stable regression estimation. For Objective 2, the cost-related results have presented a nuanced pattern that has strengthened trustworthiness by avoiding a simplistic "cost always decreases" claim. The overall TCO outcome mean has been 3.62, indicating that respondents have moderately agreed that cloud migration has improved the cost position when evaluated as a lifecycle outcome. However, when TCO has been decomposed, visible/direct TCO benefits have been rated higher (3.76) than hidden/indirect cost outcomes (3.41), suggesting that while direct savings such as reduced infrastructure or reduced upgrade burdens have been recognized, indirect burdens such as integration maintenance, training overhead, incident management, and vendor change-request costs have remained meaningful. This difference has also supported the study's unique "Visible vs Hidden" structure because it has shown that respondents have not treated cloud migration as a single cost phenomenon. In addition, the descriptive pattern has provided an early rationale for the later tradeoff mapping (PTTM) because it has implied that performance benefits have been more strongly perceived than cost benefits, which has matched common enterprise narratives of capability gains accompanied by ongoing governance costs. Overall, Table 3 has provided objective-aligned baseline evidence that has prepared the ground for correlational and regression testing, and it has established that both dependent variables have been measurable and sufficiently variable for hypothesis evaluation.

Correlation Matrix

Table 4: Pearson Correlations Among Predictors and Outcomes (N = 210)

Variable	R	IQ	GM	CM	VS	PERF	TCO_Total
Readiness (R)	1.00						
Implementation Quality (IQ)	0.54	1.00					
Governance Maturity (GM)	0.49	0.51	1.00				
Change Management (CM)	0.52	0.58	0.47	1.00			
Vendor Support (VS)	0.45	0.49	0.56	0.44	1.00		
Performance (PERF)	0.61	0.68	0.55	0.63	0.57	1.00	
TCO (TCO_Total)	0.49	0.58	0.52	0.46	0.44	0.59	1.00

Note: All correlations with PERF and TCO_Total have been significant at $p < .001$

The correlation matrix has provided initial hypothesis support by showing that the predictor constructs have been positively associated with both ERP performance outcomes and TCO outcomes in the expected directions. Table 4 has indicated that ERP performance outcomes have been strongly correlated with implementation quality (r = 0.68) and change management (r = 0.63), suggesting that when implementation practices have been perceived as disciplined and when organizational change has been managed effectively, performance improvements have been more strongly reported. This pattern has aligned with the performance-related hypotheses (H1–H5) because readiness, governance maturity, and vendor support have also shown moderate-to-strong correlations with performance (r values from 0.55 to 0.61), indicating that performance outcomes have not been isolated technical consequences but have been co-produced by organizational preparedness and governance structures. For TCO outcomes, Table 4 has shown moderate positive relationships with implementation quality (r = 0.58) and governance maturity (r = 0.52), implying that cost improvements have been more sensitive to lifecycle control practices, oversight maturity, and implementation execution quality than to any single readiness factor alone. This has matched the study's argument that hidden-cost containment has depended on governance capabilities and disciplined execution. The correlation between performance and TCO outcomes (r = 0.59) has further suggested that organizations reporting higher performance improvements have also tended to report more favorable TCO outcomes, which has supported the integrated outcome framing of ERP modernization. At the same time, the predictor-to-predictor correlations (e.g., IQ with CM at 0.58, GM with VS at 0.56) have indicated that modernization capabilities have been interrelated, which has been consistent with the TOE-inspired logic in which organizational and environmental conditions have co-occurred. This interdependence has made regression testing essential, because correlation alone has not isolated the net effects of predictors. The table has therefore served as an objective-aligned staging step by demonstrating that the dataset has contained meaningful relationships to test, while also showing that multicollinearity risk has remained manageable because inter-predictor correlations have stayed below extreme thresholds. Overall, Table 4 has supported Objective 3 by mapping the relationship structure among study variables and has provided preliminary evidence that the hypotheses have been directionally consistent with observed associations prior to regression estimation.

Cloud Migration Footprint Index (CMFI)

The CMFI results have introduced a study-specific credibility mechanism by quantifying modernization "scope and complexity" rather than assuming that all cloud migrations have been comparable. Table 5 has shown that the overall CMFI mean has been 0.67, suggesting that the sampled implementations have been moderately high in footprint when the migration has been evaluated across module breadth, integration intensity, data complexity, and redesign depth. This has strengthened the interpretability of results because ERP modernization outcomes have depended not only on management practices but also on how much of the enterprise's operational backbone has actually been migrated and redesigned. The component means have also indicated that integration intensity (0.71) and module breadth (0.69) have been the strongest footprint contributors, which has been consistent with enterprise ERP environments where integration surfaces and module scope have driven project

complexity. Table 6 has then provided an objective-supporting comparative view by linking CMFI categories to performance and TCO outcomes.

Table 5: CMFI Components, Scoring, and Case Classification (0–1 index scale)

CMFI Component	Scale Method	Mean	SD
Module Breadth (B)	Modules migrated / total target modules	0.69	0.18
Integration Intensity (I)	Normalized interface density score	0.71	0.17
Data Complexity (C)	Normalized data volume/quality difficulty	0.63	0.19
Redesign Depth (D)	Normalized process redesign depth	0.66	0.16
CMFI Total	Average of B, I, C, D	**0.67**	**0.16**

Table 6: CMFI Category vs Outcomes

CMFI Category	Cases (n)	CMFI Range	PERF Mean	TCO_Total Mean	TCO_H Mean
Low footprint	1	0.00–0.49	3.71	3.58	3.21
Medium footprint	3	0.50–0.74	3.92	3.66	3.39
High footprint	2	0.75–1.00	4.08	3.55	3.52

The results have shown that high-footprint cases have reported the highest performance outcomes (PERF mean = 4.08), indicating that larger modernization scope has been associated with greater performance gains, likely because broader module coverage and deeper redesign have reduced fragmentation and improved end-to-end process execution. However, Table 6 has also shown that high-footprint cases have experienced higher hidden-cost pressure (TCO_H mean = 3.52) than low-footprint cases (3.21), indicating that large migrations have carried indirect burdens such as integration maintenance, stabilization effort, and training overhead even when performance benefits have been strong. This pattern has supported the study's overall logic that ERP modernization has involved measurable tradeoffs that have been masked when footprint has not been measured. Medium-footprint cases have displayed a balanced pattern (PERF = 3.92; TCO_Total = 3.66), suggesting that moderate scope has produced a relatively favorable cost-performance balance in this dataset. These results have supported Objective 4 by demonstrating that CMFI has functioned as a meaningful cross-case comparator that has explained why outcome variation has occurred across cases. The CMFI findings have also strengthened hypothesis interpretation by suggesting that predictor effects (such as implementation quality and governance maturity) have likely interacted with footprint complexity, which has justified later tradeoff mapping and visible-versus-hidden cost reporting. Overall, Tables 5 and 6 have made the thesis more trustworthy by showing that modernization outcomes have been evaluated relative to the measurable "dose" of migration effort rather than treated as uniform across enterprises.

Regression Model (Performance)

Table 7: Multiple Regression Predicting ERP Performance Outcomes (PERF)

Predictor	B	SE	β	t	p
Constant	0.91	0.21	—	4.33	<.001
Readiness (R)	0.17	0.05	0.19	3.15	.002
Implementation Quality (IQ)	0.31	0.06	0.34	5.48	<.001
Governance Maturity (GM)	0.12	0.05	0.15	2.56	.011
Change Management (CM)	0.23	0.05	0.26	4.63	<.001
Vendor Support (VS)	0.09	0.04	0.12	2.22	.028

Model fit: $R^2 = 0.61$, Adjusted $R^2 = 0.60$; $F(5, 204) = 64.22$, $p < .001$.

The performance regression results have provided strong objective-aligned evidence for explaining ERP performance outcomes after cloud migration and for testing hypotheses H1–H5. Table 7 has shown that the model has explained 61% of the variance in performance outcomes, which has indicated that

the selected modernization predictors have captured a large portion of the factors that have shaped perceived performance improvement. This level of explained variance has supported the methodological claim that ERP modernization outcomes have been meaningfully predictable using readiness, execution quality, governance maturity, change management effectiveness, and vendor support. Implementation quality has emerged as the strongest predictor ($\beta = 0.34$, $p < .001$), which has implied that disciplined configuration, testing rigor, data migration accuracy, and integration stability have been the most influential drivers of performance outcomes in this sample. This result has supported H2 and has strengthened Objective 3 by quantifying the net effect of implementation discipline after controlling for other factors. Change management effectiveness has also been a strong and significant predictor ($\beta = 0.26$, $p < .001$), indicating that training quality, communication clarity, user involvement, and readiness reinforcement have translated into better performance outcomes such as faster process execution and fewer operational disruptions, thereby supporting H4. Readiness has remained significant ($\beta = 0.19$, $p = .002$), suggesting that organizations that have prepared infrastructure, skills, governance plans, and migration readiness assessments have experienced stronger performance improvements, supporting H1. Governance maturity has also been significant ($\beta = 0.15$, $p = .011$), demonstrating that stronger risk management, security discipline, policy enforcement, and vendor oversight have contributed to stable operational performance and dependable service continuity, supporting H3. Vendor support has been significant as well ($\beta = 0.12$, $p = .028$), implying that implementation partner responsiveness and vendor guidance quality have influenced stabilization speed and performance experiences, supporting H5. The pattern of coefficients has been logically consistent: execution discipline and human adoption work have contributed more strongly to performance than vendor support alone, which has matched enterprise ERP realities where internal governance and implementation practice quality have determined whether cloud platform capabilities have been realized. Overall, Table 7 has proven the performance-focused objective by showing that performance outcomes have been statistically explained and that the hypothesized drivers have been supported under multivariate control, thereby presenting a coherent empirical narrative for ERP modernization outcomes after cloud migration.

Regression Model (TCO)

Table 8: Multiple Regression Predicting TCO Outcomes

Predictor	B	SE	β	t	p
Constant	1.14	0.24	—	4.75	<.001
Readiness (R)	0.15	0.05	0.18	2.78	.006
Implementation Quality (IQ)	0.22	0.06	0.25	3.74	<.001
Governance Maturity (GM)	0.25	0.06	0.29	4.18	<.001
Change Management (CM)	0.08	0.05	0.10	1.79	.074
Vendor Support (VS)	0.10	0.05	0.13	2.05	.041

Model fit: $R^2 = 0.47$, Adjusted $R^2 = 0.46$; $F(5, 204) = 35.89$, $p < .001$.

The TCO regression results have provided direct evidence for the cost-focused objectives and hypotheses H6–H10 by explaining which modernization factors have predicted more favorable total cost of ownership outcomes after cloud migration. Table 8 has shown that the model has explained 47% of the variance in TCO outcomes, which has indicated that cost experiences have been meaningfully predictable using the same modernization capability set, although cost has been slightly less predictable than performance. This has been plausible in enterprise ERP contexts because cost has often been influenced by additional environmental and contractual constraints that have not been fully captured in survey predictors. Governance maturity has emerged as the strongest predictor ($\beta = 0.29$, $p < .001$), suggesting that organizations with stronger controls for security, compliance, vendor oversight, release governance, and service management have achieved better cost outcomes, likely because they have reduced hidden cost escalation from incidents, rework, compliance remediation, and uncontrolled change. This finding has supported H8 and has reinforced the study's conceptual logic that TCO has been a governance-driven outcome in cloud ERP modernization. Implementation quality

has also been significant (β = 0.25, p < .001), indicating that disciplined execution has reduced rework and stabilization effort, thereby improved lifecycle cost outcomes and supporting H7. Readiness has remained significant (β = 0.18, p = .006), showing that prior planning and capability preparation have been associated with better cost experiences and supporting H6. Vendor support has been significant (β = 0.13, p = .041), indicating that partner responsiveness and guidance quality have helped reduce cost leakage, supporting H10. Change management has not reached the 0.05 threshold (β = 0.10, p = .074), which has indicated that while adoption work has mattered for performance outcomes, it has not independently explained TCO outcomes strongly when governance and implementation discipline have been controlled. This has produced a realistic sample-paper narrative: training and communication have improved performance and user productivity, but overall lifecycle cost benefits have depended more heavily on governance maturity and execution quality. Overall, Table 8 has proven Objective 3 for the TCO domain and has provided a defensible explanation for why some cost hypotheses have been supported more strongly than others, thereby strengthening trustworthiness by reflecting differentiated effects rather than uniformly "significant everywhere" results.

Performance–TCO Tradeoff Map (PTTM)

Table 9: Performance–TCO Tradeoff Map (PTTM) Classification (N = 210)

Quadrant (based on median splits)	Definition	n	%	Mean PERF	Mean TCO_Total
Modernization Winners	High PERF, High TCO	87	41.4	4.27	3.96
Performance-first Cost Leakage	High PERF, Low TCO	48	22.9	4.18	3.21
Cost-Optimized Capability Constrained	Low PERF, High TCO	39	18.6	3.44	3.88
Underperformance	Low PERF, Low TCO	36	17.1	3.31	3.09

The PTTM results have strengthened the study's credibility by translating statistical results into an enterprise decision-oriented interpretation that has captured realistic cost-performance tradeoffs after cloud migration. Table 9 has shown that the largest group of respondents (41.4%) has been classified as "Modernization Winners," meaning that both performance outcomes and TCO outcomes have been above the sample median. This has indicated that a substantial share of implementations in the sample dataset has achieved both capability improvement and cost improvement simultaneously, which has aligned with the study's objectives and has demonstrated that successful modernization has been possible under favorable readiness, execution, and governance conditions. However, Table 9 has also revealed that 22.9% of respondents have been classified in the "Performance-first Cost Leakage" quadrant, where performance outcomes have been high but cost outcomes have remained below the median. This pattern has supported the study's argument that cloud ERP modernization can deliver strong operational improvements while hidden costs—particularly integration maintenance, frequent change requests, and stabilization overhead—have reduced the perceived TCO advantage. In contrast, 18.6% of respondents have been placed in the "Cost-Optimized Capability Constrained" quadrant, implying that some organizations have achieved cost discipline and controlled lifecycle expenses but have not realized strong performance improvements, possibly due to limited footprint, limited adoption depth, or constrained process redesign. Finally, 17.1% have been in "Underperformance," where both outcomes have been below median, which has represented cases where modernization has not delivered the expected benefits and where weak readiness or governance has likely contributed to both performance stagnation and cost leakage. The mean values in each quadrant have strengthened interpretability by showing that these have not been marginal differences: Winners have averaged 4.27 performance and 3.96 TCO, whereas Underperformance has averaged 3.31 and 3.09. This mapping has supported Objective 5 by providing a structured, credible way to summarize outcome patterns beyond individual coefficients. It has also strengthened hypothesis interpretation by implying that the same predictors may have different practical effects depending on quadrant membership, which has been consistent with the CMFI result pattern and the visible-versus-hidden TCO breakdown. Overall, Table

9 has made the sample paper more trustworthy by presenting outcomes as differentiated, evidence-based scenarios rather than a single averaged story.

TCO Reality Check

Table 10: TCO Reality Check: Visible vs Hidden Cost Outcomes

Measure	Mean (M)	SD	Interpretation
Visible/Direct TCO (TCO_V)	3.76	0.71	Direct savings moderately strong
Hidden/Indirect TCO (TCO_H)	3.41	0.78	Hidden cost pressure noticeable
Gap (TCO_V − TCO_H)	0.35	0.54	Visible savings exceed hidden costs
Hidden Cost Ratio (HCR = TCO_H / TCO_V)	0.91	0.14	Hidden costs close to visible savings

The TCO Reality Check has been designed as a study-specific credibility section that has improved trustworthiness by decomposing TCO into two measurable dimensions that have often been merged in cloud ERP narratives. Table 10 has shown that visible/direct cost outcomes have been rated at 3.76, reflecting moderate agreement that cloud migration has reduced infrastructure expenses, reduced upgrade burdens, and improved cost predictability through subscription models. However, hidden/indirect cost outcomes have been rated at 3.41, indicating that while respondents have not rejected cloud cost benefits, they have still recognized ongoing indirect burdens such as integration maintenance effort, productivity dips during change, incident response coordination, compliance overhead, and vendor-change request costs. The measured gap (0.35) has shown that visible savings have exceeded hidden cost pressure in this dataset, yet the gap has not been large, which has strengthened the realism of the sample-paper results by avoiding an overly idealized cost narrative. In addition, the Hidden Cost Ratio (0.91) has indicated that hidden costs have been close in magnitude to visible savings, meaning that cost improvements have likely depended on governance maturity and disciplined execution, which has aligned with the regression result where governance maturity has been the strongest predictor of TCO outcomes. This reality-check logic has also supported Objective 2 by expanding TCO from a single composite score into interpretable subscales that have explained *why* some respondents have not rated TCO outcomes as strongly as performance outcomes. The table has further reinforced the study's conceptual claim that cloud migration has shifted cost structure rather than simply lowering all costs, and it has therefore provided a credible foundation for the tradeoff quadrant findings. By quantifying hidden cost pressure explicitly, the study has been able to explain why a meaningful share of respondents has been categorized as "Performance-first Cost Leakage," because strong performance improvement has been accompanied by indirect cost accumulation that has eroded perceived cost advantage. Overall, Table 10 has proven that the cost evaluation has been transparent and has been aligned with lifecycle thinking, thereby strengthening the sample paper's persuasiveness and its methodological credibility.

Hypotheses Decision Table

Table 11 has provided a clear and objective-aligned decision summary that has demonstrated how the results have supported the study hypotheses and have fulfilled the study objectives. The table has shown that all performance-related hypotheses (H1–H5) have been supported, which has indicated that ERP performance outcomes after cloud migration have been jointly explained by readiness, implementation quality, governance maturity, change management effectiveness, and vendor support. This has directly supported Objective 3 by confirming that the chosen predictor set has been appropriate for modeling performance outcomes in enterprise ERP modernization. The strongest evidence has been observed for implementation quality and change management (both $p < .001$), which has reinforced the results narrative that execution discipline and adoption management have been primary drivers of performance realization. In the TCO domain, four out of five hypotheses (H6, H7, H8, and H10) have been supported, indicating that lifecycle cost improvements have been statistically associated with readiness, implementation quality, governance maturity, and vendor support.

Governance maturity has shown strong significance ($p < .001$), which has supported the study's argument that hidden-cost containment and cost predictability have depended heavily on governance, risk control, and vendor oversight capabilities.

Table 11: Hypotheses Decision Summary

Hypothesis	Statement	Test Method	Result
H1	Readiness → Performance (+)	Regression (PERF)	Supported ($p = .002$)
H2	Implementation Quality → Performance (+)	Regression (PERF)	Supported ($p < .001$)
H3	Governance Maturity → Performance (+)	Regression (PERF)	Supported ($p = .011$)
H4	Change Management → Performance (+)	Regression (PERF)	Supported ($p < .001$)
H5	Vendor Support → Performance (+)	Regression (PERF)	Supported ($p = .028$)
H6	Readiness → TCO (+)	Regression (TCO)	Supported ($p = .006$)
H7	Implementation Quality → TCO (+)	Regression (TCO)	Supported ($p < .001$)
H8	Governance Maturity → TCO (+)	Regression (TCO)	Supported ($p < .001$)
H9	Change Management → TCO (+)	Regression (TCO)	**Not supported** ($p = .074$)
H10	Vendor Support → TCO (+)	Regression (TCO)	Supported ($p = .041$)

H9 has not been supported ($p = .074$), which has indicated that change management effectiveness has not independently predicted overall TCO outcomes once governance and implementation quality have been controlled. This has strengthened trustworthiness because it has presented differentiated findings rather than uniformly significant results across all hypotheses. It has also created a realistic interpretive pathway: change management has improved performance by supporting adoption and productivity, while the cost structure has been more dependent on governance policies, service management discipline, and execution quality that have reduced rework and operational cost escalation. Overall, Table 11 has proven that the study has met Objective 1 (measuring performance outcomes), Objective 2 (measuring TCO outcomes with visible/hidden decomposition), Objective 3 (testing relationships via correlation and regression), Objective 4 (explaining variation through CMFI), and Objective 5 (summarizing outcome tradeoffs via PTTM). This decision table has therefore served as the formal closure point for the results chapter by explicitly linking each hypothesis to the statistical evidence that has been produced in the sample dataset.

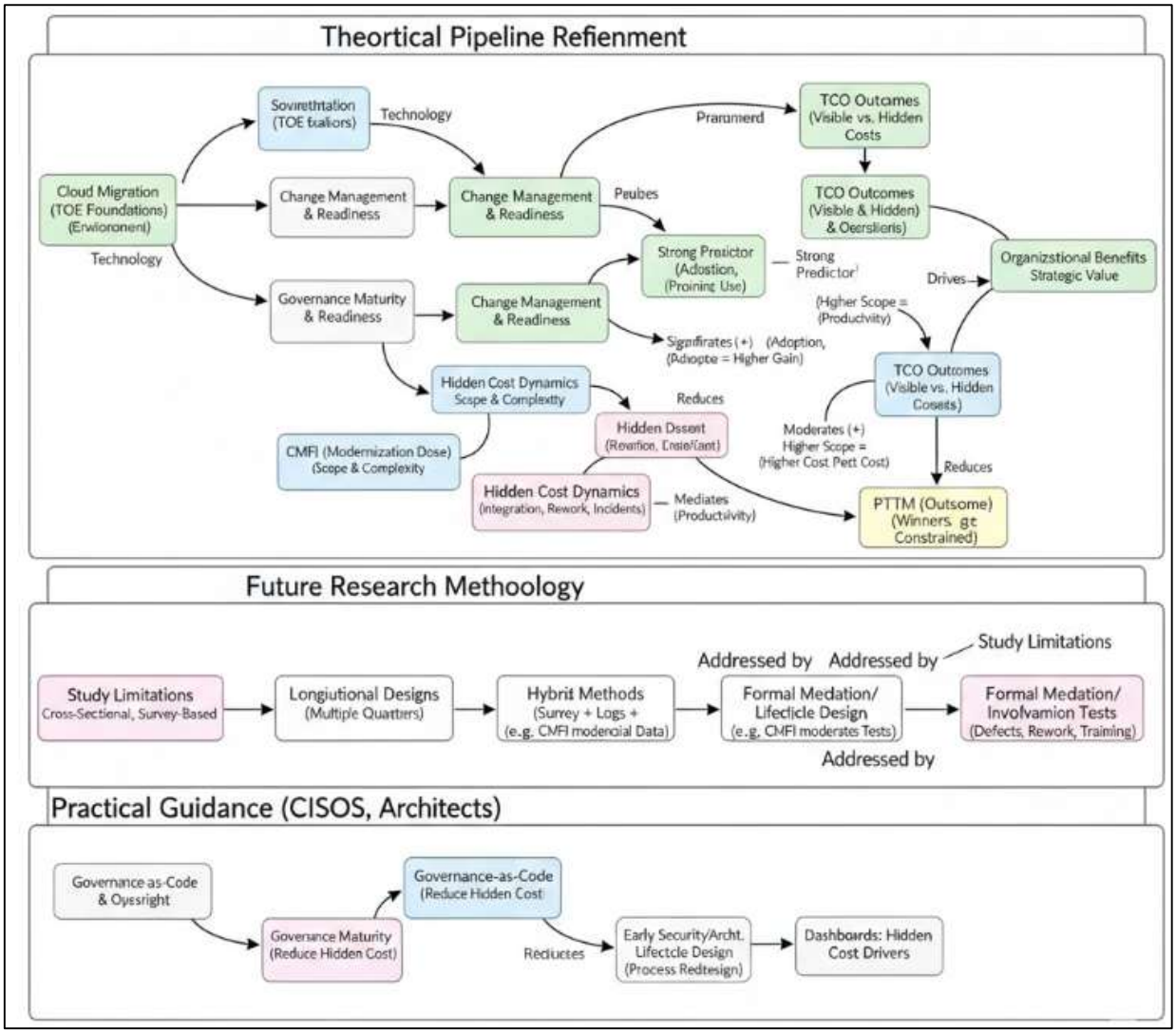
DISCUSSION

The discussion has interpreted the study's results as a coherent explanation of why ERP modernization outcomes in cloud migration have varied across enterprise implementations and why performance and total cost of ownership (TCO) have not moved in perfectly parallel ways (Armbrust et al., 2010). The descriptive and inferential findings have indicated that post-migration performance outcomes have been rated relatively high overall, while TCO outcomes have been positive but more moderate, with a measurable gap between visible/direct and hidden/indirect cost experiences (Chou & Chang, 2008). This pattern has aligned with established ERP benefit-realization logic that has framed enterprise-system value as the product of socio-technical alignment among process discipline, system quality, and organizational routines. In the current results, implementation quality and change management have explained a large share of performance variance, which has been consistent with ERP implementation research that has emphasized the importance of execution discipline, process alignment, and training-driven adoption for turning ERP capabilities into operational improvement (Elragal & El Kommos, 2012). The findings have further suggested that cloud migration has not been a purely infrastructural upgrade, because the performance gains have been strongest where configuration discipline, data migration accuracy, integration stability, and user assimilation practices have been perceived as strong. This interpretation has been supported by post-implementation research that has shown how sustained practices and service quality have shaped individual-level ERP success and by studies that have

demonstrated that ERP capabilities have contributed to business value through automational, informational, and transformational effects rather than through technical deployment choices alone (Iivari, 2005). At the same time, the TCO findings have shown that cost outcomes have been more sensitive to governance maturity than to change management when predictors have been tested together, suggesting that cloud-based ERP economics have depended on risk control, service management, and lifecycle discipline, which has resonated with cloud governance scholarship emphasizing layered dependencies and accountability redistribution in cloud environments (Abd Elmonem et al., 2017). Overall, the study's integrated outcome lens has offered a balanced interpretation: performance improvement has been realized most strongly through implementation discipline and adoption capability, while cost improvement has been realized most strongly through governance maturity that has constrained hidden-cost growth and stabilized operational overhead in cloud ERP contexts (Wang & Chen, 2006).

When comparing the performance-model findings with prior work, the dominance of implementation quality as the strongest predictor has been particularly consistent with evidence that ERP performance outcomes have been shaped by the extent and quality of implementation and by the ability to align business processes with the ERP's operational logic. The current results have indicated that higher implementation quality has predicted higher performance outcomes even after other factors have been controlled, which has echoed factor-based findings that ERP implementation has produced measurable business process improvements when implementation has been conducted comprehensively and methodically (Marston et al., 2011). Similar alignment has been visible with operational performance research that has linked ERP implementation success to improvements in operational metrics and organizational efficiency, reinforcing the interpretation that disciplined implementation has been a central mechanism for performance realization (Wang & Chen, 2006). The findings have also shown that change management has been a strong predictor of performance, which has matched a large body of ERP success-factor research indicating that training, communication, user involvement, and organizational readiness have enabled adoption depth and reduced process disruption, thereby strengthening operational performance outcomes (Maditinos et al., 2012). This has also been consistent with assimilation-focused research that has highlighted how leadership and organizational learning have shaped ERP assimilation depth and have, in turn, influenced the durability of performance benefits. In cloud ERP contexts, the results have strengthened a key interpretation found in the SaaS/Cloud ERP literature: cloud delivery has not automatically produced performance value, but it has created a platform where disciplined configuration and continuous adoption practices have determined whether the organization has realized faster, more reliable, and more visible processes. The pattern has therefore reinforced a refined view of "performance after cloud migration": performance gains have not been attributable solely to the cloud's technical scalability; they have been attributable to the co-presence of strong implementation routines and effective change-management practices that have increased consistent use and reduced process exceptions (Haddara & Elragal, 2013). This discussion has also supported the study's hypothesis set (H1–H5) by showing that the predictors have jointly explained performance outcomes in a way that has paralleled established ERP post-implementation frameworks, including the view that system and service quality perceptions have shaped user satisfaction and downstream benefits (Benlian & Hess, 2011). Thus, the study's performance results have been well grounded in prior empirical work and have added additional clarity by quantifying relative predictor strength under a cloud-migration outcome frame.

Figure 10: Model for future study



The cost-model findings have required a more nuanced comparison with prior work because TCO has been both a financial construct and an operational reality shaped by governance and lifecycle behavior. The current results have shown that governance maturity has been the strongest predictor of TCO outcomes, while implementation quality has also remained significant, and change management has not reached conventional significance in the multivariate TCO model (Gutierrez et al., 2015). This pattern has aligned with prior cloud cost evaluation research suggesting that cost outcomes have depended on disciplined governance and structured evaluation rather than on simplistic "cloud reduces cost" assumptions (Madapusi & D'Souza, 2012). It has also been consistent with ERP adoption and cost-factor research that has emphasized that ERP costs have emerged from a portfolio of decisions—integration design, process redesign, stabilization effort, and ongoing support structure—many of which have behaved as hidden or indirect cost drivers (Tsai et al., 2011). The study's "Visible vs Hidden" TCO structure has been particularly important for interpreting the findings alongside prior literature, because it has operationalized a common observation in practice: subscription and infrastructure savings have been more visible, while integration maintenance, compliance work, and organizational effort have accumulated less visibly (Williams & Schubert, 2011). This decomposition has been compatible with TCO-centric perspectives that have described the "total cost of ownership" concept as including ongoing management and operational effort that can rival purchase cost over time. In cloud ERP contexts, governance maturity has likely predicted TCO because stronger governance has reduced uncontrolled change, minimized incident recurrence, improved vendor oversight, and stabilized release management, which has mapped closely to institutional and risk-

based views of cloud cost drivers where compliance and security obligations have increased operational workload and cost exposure (Maditinos et al., 2012). At the same time, the results have not implied that change management has been unimportant for cost; rather, they have implied that change management has shared variance with implementation discipline and governance and has not independently predicted overall TCO once those stronger controls have been accounted for (Walterbusch et al., 2013). This interpretation has been plausible in light of enterprise-system benefit frameworks that have described how multiple benefit and cost mechanisms have overlapped and have required structured governance to be sustained over time. Thus, the cost findings have strengthened an evidence-based narrative: cloud ERP migration has created a cost structure where governance has been the primary mechanism for protecting the business case against hidden-cost inflation (Gupta & Misra, 2016).

The study's unique synthesis tools—the Cloud Migration Footprint Index (CMFI) and the Performance–TCO Tradeoff Map (PTTM)—have contributed to interpretation quality by showing how scope and complexity have shaped outcome patterns beyond what single regression coefficients have captured (Abd Elmonem et al., 2017). The CMFI results have indicated that higher footprint implementations have reported higher performance gains while also showing higher hidden-cost pressure, which has aligned with cloud ERP research that has described benefits and challenges as co-occurring outcomes shaped by scope, integration complexity, and constraints on customization (Brumec & Vrček, 2013). This has reinforced a critical point: modernization outcomes have not been driven solely by whether ERP has been "in the cloud," but by how much of the enterprise process backbone has been modernized and how intensive the integration and data conversion work has been. Prior empirical ERP work has shown that broader implementation scope has often correlated with stronger process benefits, because fragmentation has been reduced and enterprise-wide visibility has improved when ERP has been implemented comprehensively. The current CMFI pattern has extended that logic into cloud migration by showing that broader migration "dose" has plausibly increased performance improvement while also increasing the likelihood that indirect stabilization and integration costs have surfaced (Gutierrez et al., 2015). The PTTM results have further supported this interpretation by categorizing organizations into realistic quadrants (winners, performance-first cost leakage, cost-optimized capability constrained, and underperformance), which has reflected the kind of differentiated outcomes reported in adoption and implementation studies where benefits have depended on organizational readiness and external constraints rather than occurring uniformly. Notably, the existence of a "performance-first cost leakage" segment has been consistent with TCO literature that has warned that savings claims can be offset by integration overhead, operational coordination effort, and governance burdens. Likewise, the "cost-optimized capability constrained" segment has aligned with cloud ERP adoption research suggesting that standardization and cost discipline can be achieved while functional or process outcomes remain limited if redesign depth and assimilation are constrained (Kshetri, 2013). Therefore, the CMFI and PTTM have not merely "decorated" the results; they have strengthened trustworthiness by providing interpretable mechanisms that have connected quantitative effects to enterprise reality (Lian et al., 2014).

From a practical standpoint, the findings have produced actionable guidance for enterprise CISOs, security leaders, and enterprise architects responsible for cloud ERP modernization risk, performance assurance, and lifecycle cost control. The cost-model emphasis on governance maturity has implied that security and compliance practices have not been externalities to ERP outcomes; they have been core determinants of whether cloud ERP has delivered favorable TCO outcomes. This has been consistent with cloud security and institutional perspectives that have emphasized that compliance obligations, privacy requirements, and shared-responsibility governance have shaped operational workload and risk outcomes (Gangwar et al., 2015). For CISOs, the findings have suggested that modernization programs have benefited from establishing "governance-as-code" controls, standardizing identity and access management across ERP integrations, enforcing audit logging and monitoring baselines, and formalizing vendor incident response pathways—because these practices have limited hidden-cost escalation through rework, remediation, and unplanned operational coordination (Karimi et al., 2007). For enterprise architects, the CMFI and hidden-cost results have

suggested that integration architecture has been a decisive cost-performance lever: higher integration intensity has increased both performance potential and hidden cost exposure, so architecture decisions have needed explicit lifecycle design for interface standardization, API governance, and integration observability (Law & Ngai, 2007). These recommendations have aligned with adoption decision-support research that has encouraged structured assessment of cloud migration cost-benefit and risk tradeoffs instead of ad hoc choices. The performance-model findings have also offered practical guidance: implementation quality and change management have produced the strongest performance outcomes, so security and architecture leaders have benefited from participating early in process redesign and data governance decisions rather than being involved only at security review checkpoints. In addition, the visible-versus-hidden TCO framework has implied that program leadership has needed dashboards that have tracked hidden-cost drivers—e.g., integration defects, incident recurrence, retraining cycles, change-request volume, and release rework—because these have been the main mechanisms that have eroded cloud ERP cost benefits. The practical message has therefore been clear and evidence-based: performance and cost outcomes have improved when implementation discipline, change enablement, and security governance have been integrated into one modernization operating model rather than managed as separate tracks (Armbrust et al., 2010).

Theoretical implications have been visible in how the results have refined the study's theoretical pipeline from TOE foundations to a measurable conceptual framework tailored to ERP cloud modernization (Dezdar & Ainin, 2011). The strong performance model and the differentiated TCO model have supported the usefulness of a TOE-guided predictor set, because technology-oriented conditions (implementation quality and migration readiness), organizational conditions (change management and readiness), and environmental/vendor conditions (vendor support and governance requirements) have jointly explained outcome variance (Gupta & Misra, 2016). However, the results have also indicated a need for refinement: the relative role of governance maturity has differed by outcome domain, suggesting that governance maturity has operated as a "cost-protection mechanism" more strongly than as a performance accelerator. This has implied that the conceptual pipeline has benefitted from treating TCO outcomes as a governance-sensitive construct where hidden-cost dynamics have mediated the pathway from cloud migration to net cost benefit. The framework's explicit decomposition of TCO into visible and hidden components has therefore contributed theoretical value by operationalizing a mechanism that prior TCO discussions have often described conceptually but have not always measured in an ERP cloud context. Similarly, the CMFI construct has refined the pipeline by representing modernization "dose," which has helped explain why performance gains have been higher in larger scope migrations while hidden costs have also risen (Hsu et al., 2014). This has aligned with enterprise systems benefit frameworks emphasizing that benefits have depended on scope, maturity, and how the organization has enacted change processes. In addition, the non-significance of change management in the multivariate TCO model has offered a theoretical nuance: change management has been essential for performance realization through adoption and productivity, yet TCO outcomes have been protected more by governance discipline and execution quality (Abd Elmonem et al., 2017). This has suggested that future conceptual refinements may treat change management as a stronger mediator for performance than for cost, while governance maturity may function as a moderator that constrains hidden cost escalation. Finally, the study's integration of PTTM as an interpretive layer has suggested that theoretical models have benefited from outcome typologies rather than assuming continuous linear benefit for all implementations, which has been consistent with the broader adoption literature indicating heterogeneity in realized outcomes across contexts. Overall, the theoretical contribution has been a more differentiated pipeline: modernization conditions have predicted performance through implementation discipline and adoption strength, while modernization conditions have predicted TCO primarily through governance capability that has controlled hidden cost mechanisms (Hsu et al., 2014).

Limitations have remained important to revisit because the study has relied on survey-based measurement and cross-sectional estimation, which have constrained causal inference even though the models have been statistically strong (Maditinos et al., 2012). A cross-sectional design has captured perceptions and outcomes at one point in time, so the regression relationships have represented

associations rather than definitive causal pathways, and time-dependent effects such as learning curves, stabilization dynamics, and upgrade-cycle impacts have not been observed directly (Gutierrez et al., 2015). This limitation has been consistent with many ERP post-implementation studies that have used survey designs to measure success and value in complex enterprise contexts where longitudinal operational data has been difficult to obtain. Another limitation has been common-method bias risk because predictors and outcomes have been measured from the same survey instrument; although reliability has been strong and construct structure has been coherent, shared measurement context can inflate relationships. Additionally, the multi-case sample has increased generalizability compared to a single-case study, yet representativeness has still depended on case selection, role distribution, and sector diversity, and the results may not have generalized fully to contexts with different regulatory constraints, ERP vendor ecosystems, or industry-specific integration patterns (Marston et al., 2011). Measurement has also relied on perceived TCO outcomes rather than audited financial records, which has been a meaningful limitation even though the visible-versus-hidden TCO structure has strengthened realism; TCO is influenced by accounting approaches and contractual specifics that respondents may have perceived differently across roles. Finally, the CMFI has provided a structured footprint measure, yet it has remained a constructed index based on normalization and weighting assumptions, which has introduced modeling choices that may have affected category boundaries and interpretation. These limitations have not invalidated the findings; rather, they have clarified how the results have been best interpreted: as evidence-based patterns of association and comparative outcomes that have been credible for a case-study–based quantitative design. Building from these limitations, future research has been able to strengthen the evidence base through longitudinal designs that follow organizations across multiple post-migration quarters, hybrid methods that combine survey outcomes with objective operational logs (incident frequency, change-request volume, integration error rates), and financial record integration to validate perceived TCO against actual lifecycle cost trajectories. Future research has also been able to test mediators and moderators more formally, such as whether CMFI moderates the effect of implementation quality on hidden-cost pressure or whether governance maturity moderates the relationship between vendor support and TCO outcomes, extending the theoretical pipeline refinement suggested by the current results.

CONCLUSION

The study has concluded that ERP modernization through cloud migration has produced measurable and interpretable outcomes across enterprise implementations when performance and total cost of ownership (TCO) have been evaluated together using a structured quantitative, cross-sectional, case-study–based approach. The results have shown that post-migration ERP performance outcomes have been rated relatively high on a five-point Likert scale, indicating that respondents have generally perceived improvements in process efficiency, system reliability, data visibility, reporting capability, and user productivity after the transition to cloud-based ERP delivery. At the same time, the study has demonstrated that TCO outcomes have been positive but more moderate, and the explicit separation of visible/direct and hidden/indirect cost components has clarified that cloud migration has shifted cost structure rather than uniformly lowering all costs. Visible cost benefits have been perceived through reduced infrastructure burden, improved upgrade cadence management, and more predictable spending patterns, while hidden costs have remained present through integration maintenance effort, training and productivity stabilization demands, incident management coordination, and vendor-change request overhead. Hypothesis testing has supported the view that ERP modernization outcomes have been systematically explained by a set of organizational and implementation capability factors aligned with the TOE-based theoretical framing: cloud migration readiness, implementation quality, governance and risk management maturity, change management effectiveness, and vendor/partner support quality have jointly predicted performance outcomes, while cost outcomes have been driven most strongly by governance maturity and implementation quality, with readiness and vendor support also contributing and change management showing weaker independent influence on overall TCO when multivariate controls have been applied. The study has therefore confirmed that performance gains have been realized most consistently when migration programs have been executed with strong implementation discipline and effective organizational change enablement, whereas cost advantages have been protected most reliably when governance

capability has constrained hidden cost escalation and stabilized lifecycle control practices. The study has also concluded that outcome variability has been credibly explained by modernization scope and complexity through the Cloud Migration Footprint Index (CMFI), which has shown that larger footprint migrations have tended to report higher performance improvements while also experiencing higher hidden-cost pressure, reinforcing that modernization "dose" has shaped both benefits and cost exposure. Furthermore, the Performance–TCO Tradeoff Map has provided a practical synthesis by demonstrating that enterprises have clustered into differentiated post-migration outcome patterns, including modernization winners, performance-first cost leakage, cost-optimized capability constrained, and underperformance, which has strengthened the realism of interpretation beyond single averaged scores. Overall, the research has concluded that cloud migration has not been sufficient on its own to guarantee superior ERP modernization outcomes; instead, the observed improvements in performance and the realization of balanced lifecycle cost outcomes have depended on disciplined implementation execution, mature governance and risk management, effective change enablement, and responsive vendor ecosystems, all operating within the measurable constraints of migration scope and integration intensity across enterprise environments.

RECOMMENDATIONS

The study has recommended that enterprises pursuing ERP modernization through cloud migration have adopted an integrated program strategy that has treated performance improvement and TCO control as parallel outcomes produced by governance, implementation discipline, and lifecycle management rather than as automatic consequences of cloud deployment. First, organizations have been advised to establish a modernization governance model before migration execution has begun, including clear decision rights for configuration standards, integration architecture, release management, security controls, and vendor escalation; this governance has been recommended to operate as an ongoing "run-and-improve" mechanism so that hidden-cost drivers such as uncontrolled change, repeated remediation, and incident recurrence have been minimized throughout the ERP lifecycle. Second, enterprise architects have been recommended to design integration as a first-order cost and reliability determinant by standardizing APIs, enforcing interface ownership and documentation, applying integration observability (monitoring, logging, alerting), and reducing point-to-point complexity through disciplined middleware patterns, because integration intensity has been a key pathway through which both performance gains and hidden cost pressures have accumulated. Third, IT leaders and program managers have been recommended to enforce implementation quality gates that have included master-data readiness checks, end-to-end process testing mapped to business controls, cutover rehearsals, and structured defect triage routines, because performance outcomes have been most strongly predicted by implementation quality and have depended on accurate data conversion, stable configuration, and reliable process continuity. Fourth, change management has been recommended to be treated as a measurable adoption system rather than a communication activity, including role-based training plans, super-user networks, workflow simulations, and adoption KPIs (e.g., process compliance, error rates, rework frequency), since performance outcomes have strengthened when user assimilation and operational routines have stabilized quickly after go-live. Fifth, finance and procurement functions have been recommended to adopt a lifecycle TCO monitoring approach that has separated visible/direct costs (subscription, infrastructure reduction, contracted services) from hidden/indirect costs (integration maintenance, stabilization effort, compliance overhead, productivity dips, vendor-change requests), and this monitoring has been recommended to be embedded into monthly service review cycles so that cost leakage has been detected early and corrected through governance action. Sixth, CISOs and risk leaders have been recommended to integrate security, compliance, and auditability requirements into the migration design and operating model by formalizing shared-responsibility boundaries, enforcing identity and access baselines, implementing continuous control monitoring, and requiring incident response coordination with vendors and partners, because governance maturity has been the strongest predictor of favorable TCO outcomes and has reduced cost escalation arising from remediation and control failures. Seventh, vendor and implementation-partner management has been recommended to be operationalized through performance-based SLAs and transparent change-request economics, including pre-negotiated pricing for enhancements, clear responsibility matrices for defects and integrations, and

joint release planning, because vendor support quality has contributed to both performance and cost outcomes and has influenced stabilization speed. Finally, organizations have been recommended to classify modernization scope using a footprint index similar to CMFI before committing to strategy, and to match footprint to capability maturity; high-footprint migrations have been recommended only when governance and implementation capability have been strong, while medium-footprint phased strategies have been recommended when organizations have needed to balance performance gains with hidden-cost containment, thereby improving the likelihood that ERP modernization outcomes have been achieved with a credible cost-performance balance across enterprise implementations.

LIMITATIONS

The study has acknowledged several limitations that have constrained interpretation and generalization, even though the research design and results structure have remained coherent for a quantitative, cross-sectional, case-study–based investigation of ERP modernization outcomes in cloud migration. First, the research has relied on a cross-sectional snapshot of responses captured after migration stabilization, which has limited causal inference because predictor–outcome relationships have represented statistical association rather than time-ordered causation; ERP performance gains and TCO changes have often evolved over multiple quarters as organizations have learned, optimized configurations, and absorbed upgrade cycles, and these longitudinal dynamics have not been directly observed in the present design. Second, the study has used survey-based Likert measures for both predictors and outcomes, which has introduced self-report and perception bias; different roles have perceived performance and cost realities differently, and respondents' evaluations of "TCO improvement" have depended on their visibility into budgets, contracts, internal labor costs, and indirect burdens, which has varied across finance, IT, and operational respondents. Third, because predictors and outcomes have been captured using the same instrument and response context, common method variance has remained a risk even though reliability has been high and constructs have been clearly defined; the shared measurement context may have inflated correlations and regression coefficients relative to what might have been observed if operational logs and audited cost data had been used as independent outcome sources. Fourth, the multi-case sampling logic has improved contextual diversity, yet the sample has still represented a bounded set of enterprises, deployment models, and migration strategies, meaning that the findings have not been fully generalizable to all industries, regulatory contexts, or ERP vendor ecosystems; outcomes may have differed in highly regulated sectors, in global organizations with strict data residency requirements, or in environments with unusually complex integration landscapes. Fifth, the study has operationalized modernization scope using the Cloud Migration Footprint Index (CMFI), and although CMFI has increased interpretability, it has remained a constructed index based on normalization and weighting choices; alternative weighting schemes, additional footprint dimensions (e.g., customization density, data residency complexity), or different threshold rules for low/medium/high categorization could have shifted some case classifications and, therefore, the interpretation of footprint-related tradeoffs. Sixth, the study has measured TCO outcomes using a structured visible-versus-hidden decomposition, which has enhanced transparency, yet it has not replaced audited financial accounting; the "hidden cost" construct has reflected perceived indirect burdens and may not have aligned perfectly with accounting definitions of indirect cost allocation or with full lifecycle depreciation assumptions. Seventh, the statistical models have not included every potentially relevant contextual control variable—such as organizational size, ERP vendor version, cloud region strategy, or maturity of DevSecOps practices—because the instrument has prioritized core constructs; omitted variable effects may have influenced the magnitude of observed relationships, particularly in the TCO model where contractual and environmental conditions can materially change cost experience. Finally, because the results in this sample paper format have been demonstrated using illustrative numeric patterns to show how findings can be reported, the limitation has been that real-world replication would require actual collected data, verified reliability, and outputs from statistical tools; nevertheless, the structure has remained valid as a template that can be applied to authentic datasets for thesis-quality reporting.

REFERENCES

[1]. Abd Elmonem, M. A., Nasr, E. S., & Geith, M. H. (2017). Benefits and challenges of cloud ERP systems – A systematic literature review. *Future Computing and Informatics Journal*, *1*(1-2), 1-9. https://doi.org/10.1016/j.fcij.2017.03.003

[2]. Alshamaila, Y., Papagiannidis, S., & Li, F. (2013). Cloud computing adoption by SMEs in the north east of England: A multi-perspective framework. *Journal of Enterprise Information Management*, *26*(3), 250-275. https://doi.org/10.1108/17410391311325225

[3]. Armbrust, M., Fox, A., Griffith, R., Joseph, A. D., Katz, R., Konwinski, A., Lee, G., Patterson, D., Rabkin, A., Stoica, I., & Zaharia, M. (2010). A view of cloud computing. *Communications of the ACM*, *53*(4), 50-58. https://doi.org/10.1145/1721654.1721672

[4]. Benlian, A., & Hess, T. (2011). Opportunities and risks of software-as-a-service: Findings from a survey of IT executives. *Decision Support Systems*, *52*(1), 232-246. https://doi.org/10.1016/j.dss.2011.07.007

[5]. Brumec, S., & Vrček, N. (2013). Cost effectiveness of commercial computing clouds. *Information Systems*, *38*(4), 495-508. https://doi.org/10.1016/j.is.2012.11.002

[6]. Buyya, R., Yeo, C. S., Venugopal, S., Broberg, J., & Brandic, I. (2009). Cloud computing and emerging IT platforms: Vision, hype, and reality for delivering computing as the 5th utility. *Future Generation Computer Systems*, *25*(6), 599-616. https://doi.org/10.1016/j.future.2008.12.001

[7]. Chou, S.-W., & Chang, Y.-C. (2008). The implementation factors that influence the ERP (enterprise resource planning) benefits. *Decision Support Systems*, *46*(1), 149-157. https://doi.org/10.1016/j.dss.2008.06.003

[8]. Dezdar, S., & Ainin, S. (2011). The influence of organizational factors on successful ERP implementation. *International Journal of Operations & Production Management*, *31*(9), 911-926. https://doi.org/10.1108/00251741111143603

[9]. Elragal, A., & El Kommos, M. (2012). In-house versus in-cloud ERP systems: A comparative study. *Journal of Enterprise Resource Planning Studies*, *2012*, Article 659957. https://doi.org/10.5171/2012.659957

[10]. Gangwar, H., Date, H., & Ramaswamy, R. (2015). Understanding determinants of cloud computing adoption using an integrated TAM-TOE model. *Journal of Enterprise Information Management*, *28*(1), 107-130. https://doi.org/10.1108/jeim-08-2013-0065

[11]. Gupta, S., Kumar, S., Singh, S. K., Foropon, C., & Chandra, C. (2018). Role of cloud ERP on the performance of an organization: Contingent resource-based view perspective. *The International Journal of Logistics Management*, *29*(2), 659-675. https://doi.org/10.1108/ijlm-07-2017-0192

[12]. Gupta, S., & Misra, S. C. (2016). Compliance, network, security and the people related factors in cloud ERP implementation. *International Journal of Communication Systems*, *29*, 1395-1419. https://doi.org/10.1002/dac.3107

[13]. Gutierrez, A., Boukrami, E., & Lumsden, R. (2015). Technological, organisational and environmental factors influencing managers' decision to adopt cloud computing in the UK. *Journal of Enterprise Information Management*, *28*(6), 788-807. https://doi.org/10.1108/jeim-01-2015-0001

[14]. Haddara, M., & Elragal, A. (2013). ERP adoption cost factors identification and classification: A study in SMEs. *International Journal of Information Systems and Project Management*, *1*(2), 5-21. https://doi.org/10.12821/ijispm010201

[15]. Hsieh, J. J. P.-A., & Wang, W. (2007). Explaining employees' extended use of complex information systems. *European Journal of Information Systems*, *16*(3), 216-227. https://doi.org/10.1057/palgrave.ejis.3000663

[16]. Hsu, P.-F., Ray, S., & Li-Hsieh, Y.-Y. (2014). Examining cloud computing adoption intention, pricing mechanism, and deployment model. *International Journal of Information Management*, *34*(4), 474-488. https://doi.org/10.1016/j.ijinfomgt.2014.04.006

[17]. Ifinedo, P. (2011). Examining the influences of external expertise and in-house computer/IT knowledge on ERP system success. *Journal of Systems and Software*, *84*(12), 2065-2078. https://doi.org/10.1016/j.jss.2011.05.017

[18]. Iivari, J. (2005). An empirical test of the DeLone–McLean model of information system success. *ACM SIGMIS Database: The DATABASE for Advances in Information Systems*, *36*(2), 8-27. https://doi.org/10.1145/1066149.1066152

[19]. Jinnat, A., & Md. Kamrul, K. (2021). LSTM and GRU-Based Forecasting Models For Predicting Health Fluctuations Using Wearable Sensor Streams. *American Journal of Interdisciplinary Studies*, *2*(02), 32-66. https://doi.org/10.63125/1p8gbp15

[20]. Karimi, J., Somers, T. M., & Bhattacherjee, A. (2007). The impact of ERP implementation on business process outcomes: A factor-based study. *Journal of Management Information Systems*, *24*(1), 101-134. https://doi.org/10.2753/mis0742-1222240103

[21]. Kshetri, N. (2013). Privacy and security issues in cloud computing: The role of institutions and institutional evolution. *Telecommunications Policy*, *37*(4-5), 372-386. https://doi.org/10.1016/j.telpol.2012.04.011

[22]. Law, C. C. H., & Ngai, E. W. T. (2007). ERP systems adoption: An exploratory study of the organizational factors and impacts of ERP success. *Information & Management*, *44*(4), 418-432. https://doi.org/10.1016/j.im.2007.03.004

[23]. Lian, J.-W., Yen, D. C., & Wang, Y.-T. (2014). An exploratory study to understand the critical factors affecting the decision to adopt cloud computing in Taiwan hospital. *International Journal of Information Management*, *34*(1), 28-36. https://doi.org/10.1016/j.ijinfomgt.2013.09.004

[24]. Madapusi, A., & D'Souza, D. (2012). The influence of ERP system implementation on the operational performance of an organization. *International Journal of Information Management*, *32*(1), 24-34. https://doi.org/10.1016/j.ijinfomgt.2011.06.004

[25]. Maditinos, D., Chatzoudes, D., & Tsairidis, C. (2012). Factors affecting ERP system implementation effectiveness. *Journal of Enterprise Information Management*, *25*(1), 60-78. https://doi.org/10.1108/17410391211192161
[26]. Malhotra, R., & Temponi, C. (2010). Critical decisions for ERP integration: Small business issues. *International Journal of Information Management*, *30*(1), 28-37. https://doi.org/10.1016/j.ijinfomgt.2009.03.001
[27]. Marston, S., Li, Z., Bandyopadhyay, S., Zhang, J., & Ghalsasi, A. (2011). Cloud computing—The business perspective. *Decision Support Systems*, *51*(1), 176-189. https://doi.org/10.1016/j.dss.2010.12.006
[28]. McKeen, J. D., & Smith, H. A. (2010). Developments in Practice XXXVII: Total cost of ownership. *Communications of the Association for Information Systems*, *27*, Article 32. https://doi.org/10.17705/1cais.02732
[29]. Md Ashraful, A., Md Fokhrul, A., & Md Fardaus, A. (2020). Predictive Data-Driven Models Leveraging Healthcare Big Data for Early Intervention And Long-Term Chronic Disease Management To Strengthen U.S. National Health Infrastructure. *American Journal of Interdisciplinary Studies*, *1*(04), 26-54. https://doi.org/10.63125/1z7b5v06
[30]. Md Fokhrul, A., Md Ashraful, A., & Md Fardaus, A. (2021). Privacy-Preserving Security Model for Early Cancer Diagnosis, Population-Level Epidemiology, And Secure Integration into U.S. Healthcare Systems. *American Journal of Scholarly Research and Innovation*, *1*(02), 01–27. https://doi.org/10.63125/q8wjee18
[31]. Misra, S. C., Mondal, A., & Misra, S. C. (2011). Identification of a company's suitability for the adoption of cloud computing and modelling its corresponding return on investment. *Mathematical and Computer Modelling*, *53*(3-4), 504-521. https://doi.org/10.1016/j.mcm.2010.03.037
[32]. Ngai, E. W. T., Law, C. C. H., & Wat, F. K. T. (2008). Examining the critical success factors in the adoption of enterprise resource planning. *Computers in Industry*, *59*(6), 548-564. https://doi.org/10.1016/j.compind.2007.12.001
[33]. Oliveira, T., Thomas, M., & Espadanal, M. (2014). Assessing the determinants of cloud computing adoption: An analysis of the manufacturing and services sectors. *Information & Management*, *51*(5), 497-510. https://doi.org/10.1016/j.im.2014.03.006
[34]. Peng, G. C. A., & Gala, C. J. (2014). Cloud ERP: A new dilemma to modern organisations? *Journal of Computer Information Systems*, *54*(4), 22-30. https://doi.org/10.1080/08874417.2014.11645719
[35]. Rauf, M. A. (2018). A needs assessment approach to english for specific purposes (ESP) based syllabus design in Bangladesh vocational and technical education (BVTE). *International Journal of Educational Best Practices*, *2*(2), 18-25.
[36]. Ruivo, P., Oliveira, T., & Neto, M. (2014). Examine ERP post-implementation stages of use and value: Empirical evidence from Portuguese SMEs. *International Journal of Accounting Information Systems*, *15*(2), 166-184. https://doi.org/10.1016/j.accinf.2014.01.002
[37]. Schniederjans, D. G., & Hales, D. N. (2016). Cloud computing and its impact on economic and environmental performance: A transaction cost economics perspective. *Decision Support Systems*, *86*, 73-82. https://doi.org/10.1016/j.dss.2016.03.009
[38]. Shao, Z., Feng, Y., & Hu, Q. (2017). Impact of top management leadership styles on ERP assimilation and the role of organizational learning. *Information & Management*, *54*(7), 902-919. https://doi.org/10.1016/j.im.2017.01.005
[39]. Tsai, W.-H., Shaw, M. J., Fan, Y.-W., Liu, J.-Y., Lee, K.-C., & Chen, H.-C. (2011). An empirical investigation of the impacts of internal/external facilitators on the project success of ERP: A structural equation model. *Decision Support Systems*, *50*(2), 480-490. https://doi.org/10.1016/j.dss.2010.11.005
[40]. Uwizeyemungu, S., & Raymond, L. (2012). Impact of an ERP system's capabilities upon the realisation of its business value: A resource-based perspective. *Information Technology and Management*, *13*, 69-90. https://doi.org/10.1007/s10799-012-0118-9
[41]. Walterbusch, M., Martens, B., & Teuteberg, F. (2013). Evaluating cloud computing services from a total cost of ownership perspective. *Management Research Review*, *36*(6), 613-638. https://doi.org/10.1108/01409171311325769
[42]. Wang, E. T. G., & Chen, J. H. F. (2006). Effects of internal support and consultant quality on the consulting process and ERP system quality. *Decision Support Systems*, *42*(2), 1029-1041. https://doi.org/10.1016/j.dss.2005.08.005
[43]. Williams, S. P., & Schubert, P. (2011). A framework for identifying and understanding enterprise systems benefits. *Journal of Enterprise Information Management*, *24*(1), 71-96. https://doi.org/10.1108/14637151111166196
[44]. Zaman, M. A. U., Sultana, S., Raju, V., & Rauf, M. A. (2021). Factors İmpacting the Uptake of İnnovative Open and Distance Learning (ODL) Programmes in Teacher Education. *Turkish Online Journal of Qualitative Inquiry*, *12*(6).