How AI-powered Cloud Systems Influence Successful System Transitions in SMEs: Through the Lens of Enterprise Architecture

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Abstract

The application of AI-enabled cloud systems has proven to be a significant method for small and medium-sized enterprises (SMEs) to gain productivity and scalability. However, there remain challenges to mapping AI-cloud transitions to defined strategic goals, especially when technical expertise and financial resources are limited. This report applies TOGAF®[1] to structure AI-cloud transitions with consideration of strategic alignment, modular technology architecture design, pragmatic deployment strategies (phase), program governance, and continuous alignment to strategic goals. The report applies the Gartner PACE Layering Framework to classify systems on the rate of change and strategic value to allocate resources accordingly. The case analysis section identifies common characteristics between successful and unsuccessful AI-cloud transitions in SMEs, highlighting the impact of vision, data integration, and governance practices. The discussion section expands on the case analysis by exploring architectural conflicts across the TOGAF phases and how poor strategic alignment, system integration, and governance results in partial systems and business disruptions. The framework section summarizes the case analysis and discussion sections by proposing a structured path for SMEs in executing AI-cloud transitions by combining TOGAF principles and PACE Layers into an iterative, phased approach. Limitations for the report include the reliance on secondary data which suggests the need for evaluation in more contexts, with evidence from SMEs.

1. Introduction

Aamri (2024) confirms that more small and medium-sized enterprises (SMEs) are understanding the value proposition of cloud-driven AI systems as a way to obtain processes at significantly lower cost, but with much higher efficiency and scalability for traditional IT infrastructure (Dash & Steven, 2022). Nevertheless, while cloud infrastructure offers some potential for reaching AI capabilities, incorporating AI functionality is clearly full of challenges, especially for SMEs that lack technical expertise and further financial resources.

To address these challenges, this report will use TOGAF as the principal framework for structuring AI cloud-based transitions. TOGAF provides a dimensional framework to assist enterprises throughout phases from defining an architectural vision to implementing governance processes, to align enterprise strategic objectives with the Business & IT strategy (The Open Group, 2006). The PACE Layering Framework will be applied in the framework section to categorize systems based on their rate of change and strategic impact (Campbell & Fast, 2010). PACE layers assign systems into Systems of Record, Systems of Differentiation, and Systems of Innovation. This approach acknowledges the agility that is in the nature of an SME (Hilmersson et al., 2022).

This report will first outline the essential components and benefits of cloud-AI architecture, which puts emphasis on how predictive analytics, process automation, and data-driven insights can transform business operations. It will then

[1] TOGAF is a registered trademark of The Open Group.

examine case studies of SME cloud transitions through the lens of TOGAF, identifying common challenges related to strategic alignment, data integration, and change management. The discussion section will expand on these challenges following the TOGAF structure to explore how having a clear architectural vision, structured governance and applying a phased approach could address the gaps identified. Finally, the framework section will present a structured approach that leverages TOGAF for architectural alignment, integrating PACE layers to prioritise resources effectively across different system types.

2. AI-Powered Cloud Architecture for SMEs

The cloud refers to a remote server that allows users to access online computing resources and services, which include compute power, data storage, cybersecurity, and more (Microsoft, n.d.). Its architecture is structured by various technology components like virtual software capabilities, resources, and network systems to create cloud computing environments through cross-functional interaction and connection (Google Cloud, n.d.), within IT infrastructure established by third-party cloud service providers.

Artificial Intelligence is further integrated into cloud computing platforms that automate a range of tasks and scale technology services based on data-driven insights. With Large Language Models (LLMs) embedded in cloud architectures, businesses are empowered to train and deploy AI using their own data (Erikson, 2024) and operate within the cloud. AI-powered cloud architectures allow businesses to avoid expensive upfront investments in hardware and complex IT infrastructure. Without being confined to existing architectures, organisations can scale and upgrade as needed, achieving streamlined workflows, improved efficiency, secure data storage, expanded capacity, and access to diverse functionalities. These advantages have attracted many businesses to capitalise on the technology, especially small and medium enterprises (SMEs).

Since SME standards vary across regions, this study refers to the Australian standard, which defines SMEs as companies with fewer than 200 employees and an annual turnover of no more than AUD $250 million (Moula, 2021). Globally, SMEs appear to be the dominant business type worldwide, making up 90% of all businesses and contributing up to 40% of GDP in emerging economies (World Bank Group, 2019). However, this kind of business often experiences challenges that hinder their productivity and growth.

Most SMEs have budgetary constraints (EIRE, 2021), limiting their ability to develop and maintain IT infrastructure. These businesses may struggle to keep pace with constant IT and business requirement changes. Their limited budget does not allow them to financially support continuous investments in new systems or updates to existing architectures to achieve an alignment with ongoing business needs. Moreover, investment in recruiting IT talent or building a dedicated IT team to ensure the systems operate efficiently and advise on necessary architecture changes may be unaffordable for most SMEs.

Without sufficient IT support, businesses face increased risks of operational inefficiency and escalating costs associated with maintaining outdated legacy systems. This situation may further result in system integration struggles, scalability challenges, security vulnerabilities, hardware failures, data backup and recovery inadequacies, and slow performance (Inventiv Technology, 2024).

According to Gartner (2012), businesses should deploy technology applications that can quickly solve specific problems and respond to market opportunities with minimised integration issues, maximised security, and reduced IT costs and overheads. In line with this approach, organisations should select solutions that establish sustainable differentiation and drive innovation to ensure that core business processes are supported in a secure, reliable, cost-effective environment. By referring to the PACE layers strategy, the selected applications must be appropriately categorised to enhance overall effectiveness in alignment with usage patterns and the relationship to core business operations, which helps manage the change frequency of applications along with constant business development.

A growing list of AI-backed cloud-based applications and services has emerged with diverse packages to fulfil SMEs' needs for IT outsourcing. The three primary market offerings are infrastructure-as-a-service (IaaS), platform-as-a-service (PaaS), and software-as-a-service (SaaS). These models allow businesses to achieve objectives without the need to develop technologies in-house. According to Telecom Review (2024), 78% of SMEs have invested in SaaS to integrate with their existing architectures on an as-needed basis. On top of that, some others also incorporate IaaS and PaaS to develop an agile, flexible, and scalable company IT framework in response to evolving requirements and strategic goals. Additionally, with common cloud service charging mechanisms, such as pay-as-you-go (PAYG) pricing models for consumption and utilization, operating IT expenses become more predictable, which allows SMEs to better manage budgets and resources (Mpilo Technologies (Pty) Ltd., 2024).

These virtualised service models have made AI-powered cloud solutions more accessible to SMEs. This helps them overcome budgetary constraints, IT limitations, and architecture challenges, while driving innovation and digitalisation. As the market for SME cloud adoption continues to grow, understanding how AI-powered cloud architecture can be integrated into existing infrastructures becomes increasingly important for SMEs to properly select the solutions, effectively utilise the tools, and ensure smooth business transformation and continuity.

3. Case Analysis

The current section contrasts successful and problematic cases of AI-powered cloud integration within various regions, not limiting to just the tech industry. While Gartner's Pace-Layered Strategy provides guidance on flexible, low-risk solutions for SMEs with limited budgets and high trial-and-error costs, this analysis instead focuses on TOGAF's Architecture Development Method (ADM) (Figure 1) to offer a more structured, high-level enterprise architecture overview of the cases (Gartner, 2012; The Open Group, 2011). The application of Gartner's PACE layers strategy will be examined in later sections.

By applying case examples to related phases in the TOGAF ADM, we aim to discover what role AI-based cloud integration plays in successful and failed transition projects through the lens of enterprise architecture.

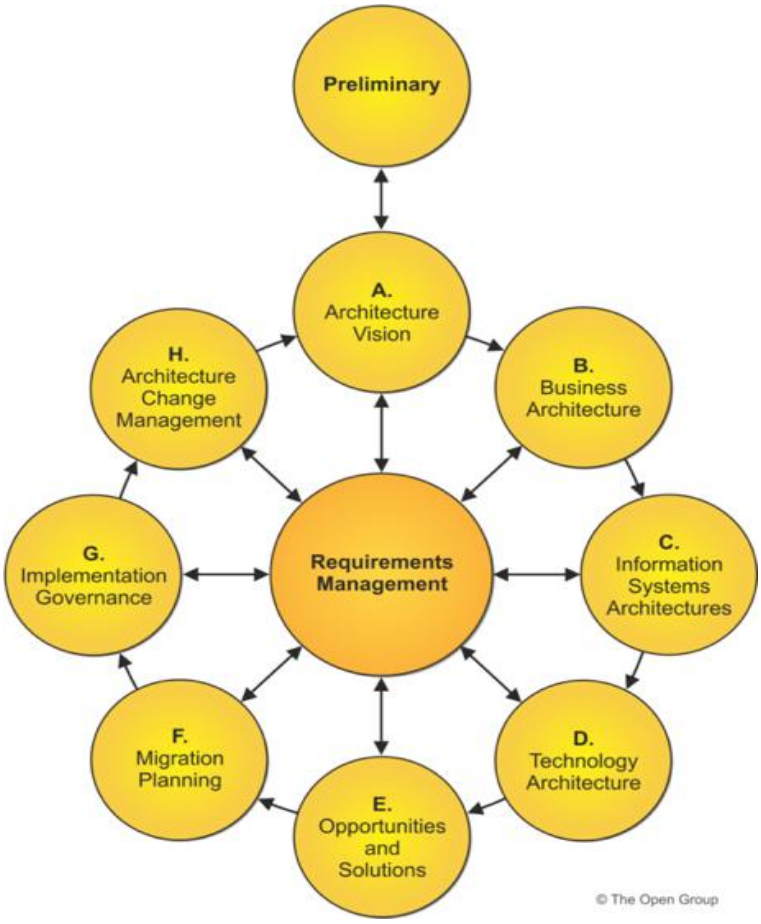

Figure 1. TOGAF Architecture Development Method (The Open Group 2011)

3.1. Phase A: Architecture Vision (Strategic Alignment)

Throughout the reviewed literature, a key determinant of success is a strategic rationale for cloud or AI adoption that aligns with broader organizational goals. All successful cases have identified clear business drivers enabled by these initiatives, such as improved agility, scalability, and operational efficiency (Oldemeyer et al., 2024; SAP, 2022). Most importantly, each defined the architecture vision. For instance, Integrity Health & Safety envisioned an all-in-one

cloud-based procurement platform to improve productivity, while Discovery Consulting targeted a cloud-based ERP solution to streamline business operations (SAP, 2022; SAP, 2024).

In contrast, challenged cases often lacked a well-defined purpose as they failed to articulate the business value of IT projects (Conway et al., 2014; Roa Baez & Igbekele, 2021). Research also indicates that ambiguous purposes and poorly communicated IT intentions can result in ineffectual implementations (Roa Baez & Igbekele, 2021; Oldemeyer et al., 2024). In particular, the Swedish SMEs' ability to implement architectural and transformational initiatives was significantly influenced by their lack of a shared architectural vision (Roa Baez & Igbekele, 2021). In the absence of a consistent vision, projects were viewed as technical enhancements instead of strategic transformations.

3.2. Phases B–D: Architecture Definition

Successful cases have unanimously transformed strategic objectives into organized architectures at business, systems, and technology levels. For instance, Discovery Consulting defined areas of inefficiency in accounting and cost tracking and restructured its Business Architecture by automating workflows. Its Systems Architecture was combined with SAP S/4HANA Public Edition to leverage features such as predictive time capture, intelligent billing, and reconciliations. Additionally, the company's Technology Architecture focused on scalability and ongoing data-driven AI enhancements (SAP, 2024). Likewise, Integrity Health & Safety adopted a comparable architectural strategy by responding to pandemic-driven disruptions with a major transformation of its procurement processes. The company started by redefining its Business Architecture, with a focus on operational resilience and responsiveness in the supply chain.

These two firms proceeded to extend this foundation through integrated information systems. While Discovery Consulting automated financial processes, Integrity Health & Safety streamlined procurement through invoice automation. Their Technology Architectures followed similar characteristics, with a focus on modularity and scalability (SAP, 2022).

On the contrary, our examined Tanzanian companies adopted cloud systems without assessing compatibility with legacy infrastructure. For example, one manufacturing SME attempted to implement a cloud-based inventory platform but faced persistent data mismatches with its local ERP system. This led to manual adjustments and abandonment of the platform (Nyamwesa, 2024).

Other problematic instances reviewed also reflected underdeveloped architecture design. There was a common lack of formally established business processes, and AI capabilities, such as isolated analytics dashboards. Data architecture was disregarded or managed inequitably, and technology requirements were not defined or formulated appropriately (Roa Baez & Igbekele, 2021; Oldemeyer et al., 2024).

3.3. Phases E–F: Opportunities, Solutions & Migration Planning

Phases E–F convert strategic objectives to prioritized solutions and actionable roadmaps. In effective instances, AI was not considered an independent tool, but a facilitator of business capabilities. Discovery Consulting's planning focused on areas with the biggest operational impact, like smart validation and automated suggestions. Starting with finance and project systems, the phased-migration strategy benefited internal training, iterative learning, and initial feedback (SAP, 2024). This minimized operational risk and facilitated incremental adoption of AI.

Numerous SMEs simply followed the trend and adopted cloud or AI-based solutions before identifying specific process gaps or high impact areas, therefore their migration plans remained undocumented or rushed. A study indicates that a company tried to embed AI-based analytics without a prior mapping of current data sources and an IT readiness assessment. Interviewees who responded in the same study noted that the absence of a phased deployment plan resulted in staff confusion and early tool abandonment (Roa Baez & Igbekele, 2021). Similarly, another Tanzanian SME spent money on cloud-based accounting software without training workers or implementing change management practices, and ending up using manual spreadsheets (Nyamwesa, 2024).

3.4. Phase G: Implementation Governance

Robust governance in Phase G involves transparent responsibilities, monitoring of performance, and synchronization with architectural targets. Integrity Health & Safety ensured organized milestones with its SAP Business Network implementation. The organization collaborated with SAP to track supplier onboarding metrics and synchronized every stage with KPIs (SAP, 2022). Under SAP's services, Discovery Consulting followed the same course by adopting

internal coordination channels, milestones, and feedback loops to realize the successful implementation of financial modules (SAP, 2024).

Challenging cases usually overlook formal governance frameworks. Specifically, decisions were made by vendors, internal responsibilities were unspecified, and there were no review processes. A Swedish SME deployed an AI sales forecast software but did not allocate internal responsibility to monitor it. As a result, internal forecasts went wrong and employees' trust in the tool started to diminish (Roa Baez & Igbekele, 2021). Another Tanzanian retail SME outsourced deployment to a vendor but did not assign an internal team to follow up, causing unresolved user access issues and serious deployment delays (Nyamwesa, 2024).

In short, a major lesson learned from the success stories is the necessity to approach enterprise architecture not as IT documentation, but as a way of orchestrating business transformation. The cases demonstrate that AI and cloud technologies do not directly bring success. Instead, what matters is how they get embedded coherently in the enterprise architecture. Iterative, inclusive integration approaches allowed leading firms to adapt continuously while fostering employee buy-in from the start. In contrast, failed cases reveal that the absence of internal ownership and fragmented planning often derail progress. Importantly, governance must evolve beyond compliance oversight into a proactive function that ensures business-IT alignment and long-term value realization. For tech SMEs in particular, this means moving away from reactive tool adoption toward architecture-led digital transformation.

4. Discussion

In this section, the architectural challenges faced by SMEs in AI-enabled cloud transformations are examined, drawing on the different stages of the TOGAF Architecture Development Method. Expanding on the previous examples, this section demonstrates why weakness at each stage lead to incomplete systems, operational inefficiencies, and a lack of enduring value. By contrasting best practices of large corporations against the prevalent poor practices of SMEs, this section identifies the root causes of architectural failures and proposes areas of improvement that embrace TOGAF principles.

4.1. Phase A: Architecture Vision

Earlier cases indicate that effective organizations started with a clear business justification for a cloud and AI adoption, but most SMEs had no real transformation strategy from the outset. That initial gap leads to architectural challenges as part of an ongoing journey in AI-enabled cloud change.

As emphasized in TOGAF's Phase A, an architecture vision needs to connect business goals, stakeholder issues, and core requirements (The Open Group, 2006). Without an architecture vision, SMEs can struggle to align technology objectives with the broader business strategy. They tend to manage technology investments on an ad hoc basis, often independent of the business strategy, leading to increasingly disparate systems across the business, data, and technology domains. Consequently, cloud and AI solutions become disconnected from core business activity and therefore fall short in overall value.

Even when SMEs initially articulate a vision, maintaining strategic coherence is challenging. Operating in volatile, uncertain, complex, and ambiguous (VUCA) environments (Bresciani et al., 2023; Roberts & Grover, 2012), SMEs face shifting priorities and resource constraints that commonly impose mid-transition changes. Hokmabadi et al. (2024) noted that this volatility undermines the continuity needed to embed AI-powered cloud systems deeply into business processes.

Ultimately, SMEs risk developing architectures that are temporarily fit-for-purpose but quickly misaligned as business directions evolve. Without an anchored strategic vision, later phases of architecture definition, migration planning, and governance become reactive and fragmented. Strategic alignment must therefore be nurtured continuously through adaptive governance and realignment mechanisms (Quansah, Hartz, & Salipante, 2022) — a challenge that begins with, but is often neglected in, the earliest stages of SME cloud and AI transitions.

4.2. Phases B–D: Architecture Definition

Previous analysis showed that successful companies translated business goals into structured architectures, while many SMEs lacked the architectural maturity needed for AI-powered cloud transitions.

TOGAF's Architecture Definition phases focus on linking business needs, system functions, and technology platforms (The Open Group, 2026). However, SMEs often have limited resources, expertise, and planning capacity. Their

technology adoption is usually reactive, aimed at immediate needs rather than long-term transformation (Mittal et al., 2018; Müller et al., 2021). As a result, cloud and AI systems are introduced without redesigning workflows, reinforcing inefficiencies instead of improving them.

SMEs also tend to develop data models, applications, and AI tools separately, without an integrated Information Systems Architecture (The Open Group, 2006). This fragmented approach creates data silos, reduces interoperability, and adds operational complexity (Enterprise Architecture for SMEs | Target State, n.d.). At the technology layer, platforms are often chosen based on short-term fit, without planning for future scalability or integration (The Open Group, 2006). Over time, rigid infrastructures form that cannot adapt to evolving business needs.

Without formal architecture planning, SMEs limit the scalability, adaptability, and long-term value of their digital transitions. Strengthening architectural thinking and embedding it early in design and implementation processes is crucial for SMEs aiming for sustainable growth.

4.3. Phases E–F: Opportunities, Solutions & Migration Planning

As discussed in previous sections, while large companies carefully planned their cloud and AI transitions through phased implementations, SMEs often rushed adoption without structured opportunity analysis or migration planning. This caused major disruptions later during system scaling and user adoption.

TOGAF's Phase E emphasizes identifying key business drivers, evaluating implementation options, and defining major projects needed for transition (The Open Group, 2006e). However, SMEs often lack formal frameworks to prioritize business needs and assess dependencies (Charneau, 2024). Driven by resource constraints and pressure to show quick results, SMEs introduce AI and cloud solutions without performing full gap analyses or considering coexistence and interoperability issues. As a result, systems often fail to integrate smoothly with legacy environments.

Phase F focuses on prioritizing projects, performing cost-benefit and risk assessments, and building a practical migration roadmap (The Open Group, 2006f). Even so, SMEs frequently lack experience in resource estimation and sequencing migration activities. Their limited capacity for long-term planning leads to rushed deployments, overlooked dependencies, and rising operational risks (Charneau, 2024).

Without careful opportunity evaluation and phased migration planning, SMEs struggle to deliver sustainable benefits from cloud and AI investments. Embedding structured prioritization and migration strategies into early planning is critical to avoiding costly rework and ensuring smooth transitions.

4.4. Phase G: Implementation Governance

While successful companies maintained strong governance mechanisms during cloud and AI implementations, SMEs often lacked structured oversight once projects moved into deployment, as previous examples highlighted. This gap led to inconsistencies and weakened system integration.

TOGAF's Phase G stresses that implementation projects must conform to the defined architecture through Architecture Contracts, project recommendations, and compliance monitoring (The Open Group, 2006g). However, SMEs often apply IT governance mechanisms less extensively compared to large enterprises (Huang et al., 2010). Responsibility and accountability processes are also weaker in SMEs, with critical IT decisions often centralized around one person (Levy & Powell, 2008). Without shared governance structures, SMEs rarely perform compliance assessments or manage architectural deviations during system rollout.

This informal governance raises the potential for architectural drift, integration failures, and potential security risks. A lack of trust and cooperation culture, which is often the case in SMEs, undermines governance and governance processes (Mohtashami et al., 2006).

To maintain architectural integrity and provide long-term maximum value within the cloud and AI initiative, formal governance frameworks such as compliance audits, deviation management, and accountability to stakeholders need to be established.

5. A Framework for AI-Powered Cloud Adoptions in SMEs

5.1. Visual Overview of Challenges

Before presenting an organized and structured framework to facilitate successful system transitions in tech SMEs, it is essential to outline the key factors that demonstrate the necessity of building a framework model. As explained in

the preceding sections, SMEs face a dual reality: AI-powered cloud technologies deliver transformative possibilities but encounter widespread adoption barriers due to strategic and structural challenges.

To better understand the dynamic, we propose a mind map (Figure 2) based on the analysis in Section 4 to visually contrast the underlying challenges faced by SMEs with across system transitions. The combined insights establish a conceptual framework that targets specific challenges and integrates strategic benefits.

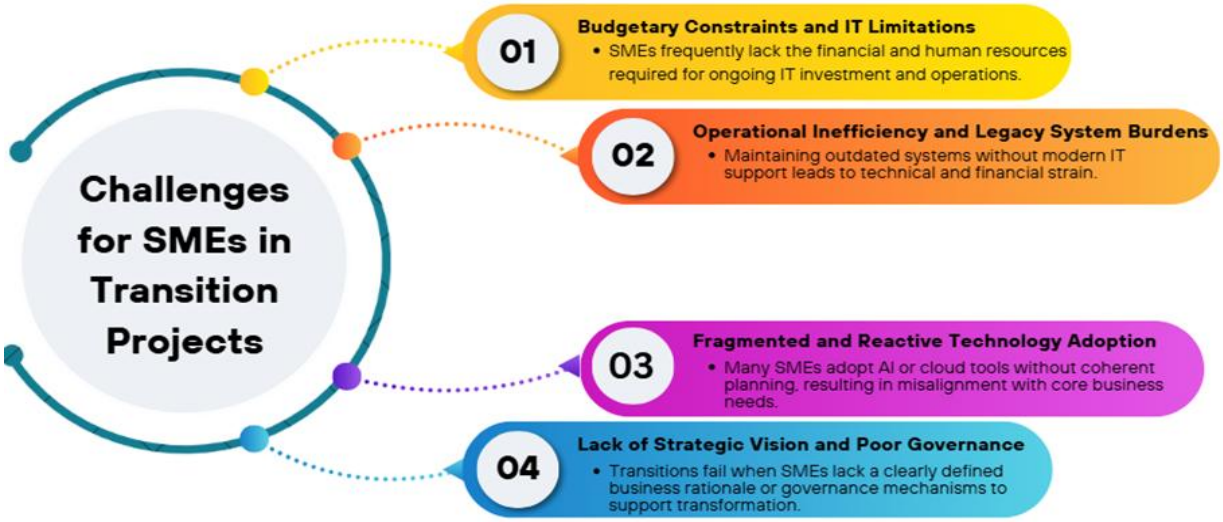

Figure 2. Mind Map of System Transition Challenges for SMEs (Developed for this research)

5.2. Proposed Framework for AI-Powered Cloud Adoption in SMEs

To ensure the effective and sustainable digital transformation, SMEs not only need access to cloud and AI tools but also need a guiding framework that incorporates these technologies into their enterprise architecture (Soni, 2024). The framework (Figure 3) was developed in this study by synthesizing best practices from TOGAF and real-world strategies customized to address SME-specific impediments, i.e., scarce budgets, talent deficiencies, and dispersed IT strategies, while infusing the established benefits of cloud and AI into the transformation process. Considering the PACE layer strategy, the proposed framework follows a phased implementation that provides agility for SMEs to innovate quickly (Hilmersson et al., 2022). This five-step framework is designed to mitigate the typical constraints and challenges described above, and moreover, to maximize the long-term benefits of AI-cloud integration (Vial, 2019).

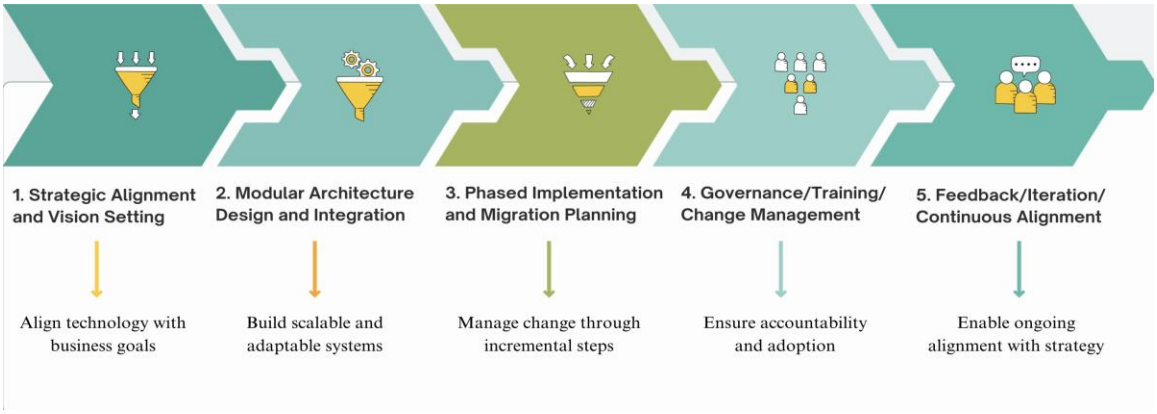

Figure 3. Proposed Framework for AI-Powered Cloud Adoption in SMEs

5.2.1. Strategic Alignment and Vision Setting

The transformation process must start with a defined architectural vision which functions as a strategic plan that connects cloud and AI initiatives to company objectives (Elia et al., 2024). Small and medium-sized enterprises should actively pinpoint their primary operational challenges like procurement inefficiencies and financial performance to develop integrated solutions that harness cloud and artificial intelligence technologies instead of just following current technological trends. By adopting a common vision, organizations will strengthen identification while preventing digital tools from becoming disconnected or redundant. The organization includes stakeholders at the outset to help every department understand the transformation's long-term objectives.

5.2.2. Modular Architecture Design and Integration

The framework component adopts TOGAF's architecture definition stage to enhance modularization and integration. Small and medium-sized enterprises should conduct a simultaneous restructuring of their business and technical systems to achieve architectural alignment. Artificial intelligence is directly integrated into the business process of the company, rather than using it as a separate tool. This approach guarantees that application, data model and platform selection is determined by how they integrate with current systems and how scalable they are in the long run (EPAM SolutionsHub, 2024).

5.2.3. Phased Implementation and Migration Planning

This framework introduces a phased approach. The use of this approach could reduce the risk and better manage resources which could solve the resource limitations. A phased approach basically follows three steps: Firstly, pinpoint key domains that have high impact. Secondly, initiate pilot programs for artificial intelligence and cloud solutions within these industries. Thirdly, gather feedback from users and keep refining the system design based on those insights.

Through the implementation of a phased approach, SMEs can slowly develop their skills and adjust their operations based on experience before executing full implementations across the enterprise. Moreover, this approach enables enterprises to allocate financial resources in stages which decreases initial financial strain.

5.2.4. Governance, Training, and Change Management

Small and medium-sized organizations tend to centralize the decision-making authority in one or two individuals. This pattern distributes responsibilities into certain groups of individuals, and reduces the whole employees' involvement. The organization needs to understand the importance of establishing efficient governance and formalized change management methods. Additionally, small and medium-sized enterprises need to provide training programs for users. These programs not only need to address the technical aspects, but also need to highlight the pragmatic value of system adoption. Getting employees involved by communicating effectively may decimate resistance and enhance usage.

5.2.5. Feedback, Iteration, and Continuous Alignment

SMEs must consistently update their architectural vision and implementation strategy to adapt to external influences and internal findings. By integrating lightweight auditing with an iterative monitoring mechanism, this can ensure that the company's business strategy aligns with the technological architecture.

Small and medium-sized enterprises can use this framework to transition from basic technology adoption to systematic transformation through planned strategies. This framework ensures common transformation challenges such as integration failure, employees' resistance or budget wastage are avoided by using this simplified enterprise model.

6. Conclusion

This report discusses the capacity of AI-enabled cloud-based systems to provide successful change management within technological SMEs from an enterprise architecture perspective. The analysis identifies key enablers of successful digital transformation and uses case studies to provide evidence of successful achievement, in addition to instances of failure. The report finds that clear planning, consistent system design and an incremental adoption is fundamental to support AI-enabled cloud-based architecture alignment to the business goals and organizational capability. The presence of a governance system allows integration of systems to remain consistent, with reduced risk and better utilization of resources.

However, the findings of this report are limited in that they rely on secondary data which may contribute to limited generalizability. Subsequent work can overcome this issue by engaging SMEs directly in measuring the success of the proposed framework in real-world environments.

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