Cloud Migration Strategies for Small and Medium-Sized Businesses: Challenges, Opportunities, and Best Practices

Omkar Hirugade[1], Aditya Bagate[2], Viraj Kakade[3]

[1,2,3]*Student, Department of Computer Applications (MCA), D. Y. Patil Institute of Master of Computer Applications and Management, Maharashtra, India.*

Dr. Prashant Chordiya[4]

[4]*Research Guide, associate professor, Department of Computer Applications (MCA), D. Y. Patil Institute of Master of Computer Applications and Management, Maharashtra, India.*

Abstract*—Small and medium-sized businesses (SMBs) increasingly view cloud computing as a route to lower capital expenditure, faster innovation and improved resilience, yet many migrations stall or fail to deliver the expected value. SMBs typically lack dedicated IT staff, formal architecture governance and negotiating power with vendors, so strategies developed for large enterprises cannot be adopted unchanged. This paper presents a structured, secondary-literature study of cloud migration for SMBs. Using peer-reviewed research, standards documents and publicly documented vendor frameworks, it consolidates the principal migration strategies (rehost, replatform, repurchase, refactor, retire and retain), classifies the technical, organizational, financial, security and regulatory challenges, and summarizes the opportunities that cloud adoption creates. On this basis the paper proposes a five-phase, SMB-oriented migration framework (assess, plan, pilot, migrate, optimize) supported by a strategy-selection guide and a set of best practices covering governance, cost management, security, skills and vendor-lock-in mitigation. The work is conceptual: no new empirical measurements are claimed, and the framework is offered as a decision aid whose effectiveness should be validated through case studies and surveys in future work.*

Index Terms*—Cloud Computing; Cloud Migration; Small and Medium-Sized Businesses; Migration Strategies; Cost Optimization; Vendor Lock-In; Cloud Security; Best Practices.*

I. INTRODUCTION

Cloud computing delivers computing resources—servers, storage, databases, networking and software—as on-demand services over a network, with rapid elasticity and measured, pay-per-use billing [1], [13], [14]. For small and medium-sized businesses, which often operate with constrained budgets and limited technical staff, this model offers access to capabilities that were once affordable only to large organizations [2], [3], [23]. Common motivations include converting capital expenditure into operating expenditure, scaling capacity with demand, enabling remote and hybrid work, and improving backup and disaster recovery.

Adopting the cloud is not, however, a single decision but a sequence of choices about which applications to move, in what order, and by which technical approach. Systematic reviews of cloud migration research show that the field is fragmented, that guidance is concentrated on large-enterprise settings, and that decision support for non-expert organizations remains limited [4], [19]. For an SMB, a poorly planned migration can produce unexpected recurring costs, downtime, security exposure and dependence on a single provider [16], [27].

This paper examines cloud migration from the perspective of the SMB. It synthesizes published strategies and challenges and proposes a practical framework that matches the resource profile of smaller organizations. The study is conceptual and based on secondary sources; it does not report new experimental measurements.

1.1 Research Gap and Problem Statement

Three limitations motivate this work. First, much of the migration literature and vendor guidance assumes dedicated architecture, security and operations teams, which most SMBs do not have. Second, strategy descriptions are often presented as generic menus without guidance on how an SMB should choose among them given its budget, skills and risk tolerance. Third, discussions of challenges and opportunities are frequently separated, so decision makers see either promotional or cautionary accounts rather than a balanced

view. The research problem is therefore to consolidate migration strategies, challenges, opportunities and best practices into a coherent and reproducible decision framework suitable for SMBs.

1.2 Objectives

- Describe the main cloud service and deployment models relevant to SMBs.
- Review and compare established cloud migration strategies.
- Identify and classify the challenges SMBs face before, during and after migration.
- Summarize the business and technical opportunities offered by cloud adoption.
- Propose a phased migration framework and a strategy-selection guide tailored to SMBs.
- Recommend best practices for governance, cost control, security, compliance and skills development.

1.3 Contributions

- A consolidated comparison of migration strategies framed around SMB constraints.
- A multi-dimensional classification of migration challenges with corresponding mitigation measures.
- A five-phase migration framework (assess, plan, pilot, migrate, optimize) with defined activities and outputs.
- A strategy-selection guide that links organizational profiles to recommended migration approaches.

II. BACKGROUND AND RELATED WORK

2.1 Cloud Service and Deployment Models

The National Institute of Standards and Technology defines three service models—Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS)—and four deployment models: public, private, community and hybrid cloud [1]. IaaS offers the greatest control and the greatest operational responsibility; SaaS offers the least control and the least operational burden. For SMBs the choice among these models largely determines the skills required after migration. Armbrust et al. identified elasticity, the illusion of infinite capacity and the elimination of up-front commitment as the central economic attractions of the cloud, and also listed availability, data lock-in and data-transfer bottlenecks as principal obstacles [2], [13].

2.2 Characteristics of SMBs

SMBs differ from large enterprises in several respects relevant to migration: smaller and less specialized IT teams, tighter cash flow, greater reliance on packaged or legacy line-of-business software, less formal governance, and weaker bargaining power with providers. Marston et al. note that the cloud can reduce barriers to entry for smaller firms but that benefits depend on the fit between the firm's needs and the service model chosen [3], [21], [22].

2.3 Technology Adoption Perspectives

Studies of firm-level IT adoption frequently use the Technology–Organization–Environment (TOE) framework, which groups adoption determinants into technological context, organizational context and environmental context [5], [26]. Integrated models combining TOE with the Technology Acceptance Model [30] have been applied to cloud adoption and highlight factors such as relative advantage, compatibility, top-management support, firm size and competitive or regulatory pressure [6], [20], [21]. This paper uses the TOE grouping as a lens for organizing SMB challenges and readiness criteria.

2.4 Cloud Migration Research

Jamshidi, Ahmad and Pahl systematically reviewed cloud migration research and reported that work concentrates on re-architecting legacy applications, with comparatively less attention to decision support, cost modelling and organizational readiness [4]. Vendor-lock-in has been analysed from the business perspective as a major concern that affects migration decisions and exit planning [7]. Case studies and decision-support tools for migrating enterprise systems to IaaS have been reported [16], [17], and patterns for adapting applications to the cloud have been catalogued [18]. Reviews of cloud research themes note

continuing gaps in practice-oriented guidance [19], and critical reviews caution that promised benefits and organizational realities may diverge [27]. Practitioner frameworks, most notably the "6 Rs" popularized by Amazon Web Services, describe a set of migration patterns that are now widely used across providers [8]. Related work on microservices and DevOps describes the architectural and cultural practices that make cloud-native operation sustainable [9], [10], [15].

2.5 Research Positioning

The present paper does not propose a new technical migration tool. Its contribution is a synthesis oriented to SMB decision makers: it connects established strategies with the resource constraints, risks and opportunities typical of smaller organizations and expresses the result as a phased framework and selection guide.

III. MATERIALS AND METHODS

3.1 Study Design

This is a secondary-data, conceptual study. No participants were recruited and no primary data were collected. The method consists of a structured review of published literature and documented practitioner guidance, followed by thematic synthesis and framework construction.

3.2 Sources and Selection

Sources comprised (i) standards and definitions from recognized bodies, (ii) peer-reviewed journal and conference papers on cloud computing, cloud migration and technology adoption, (iii) books on cloud-native architecture and DevOps, and (iv) publicly documented vendor migration guidance and regulatory texts. Sources were included when they addressed cloud adoption or migration strategy, cost, risk, security, governance or organizational readiness, and excluded when they were purely product marketing without methodological content. Before final submission, the authors should re-verify every citation against the original publication and record the access date.

3.3 Analysis Approach

Identified strategies, challenges and opportunities were coded into themes and grouped using the TOE lens (technological, organizational and environmental). Challenges were mapped to mitigation measures drawn from the literature. The phased framework was constructed by ordering the activities that recur across sources into stages, then adapting them to SMB constraints such as limited staff, budget ceilings and reliance on packaged software.

3.4 Scope and Terminology

SMB is used here in a general sense for organizations with limited staff, revenue and IT capacity; formal numeric definitions differ by country and sector and should be taken from the applicable national regulations. Cloud migration refers to moving applications, data and workloads from on-premises or co-located infrastructure to cloud services, and also to moving between cloud providers.

IV. CLOUD MIGRATION STRATEGIES

The six strategies in Table 1 are widely used to classify migration options [8]. They differ in effort, speed, risk and the degree to which they exploit cloud-native capabilities. SMBs commonly combine several of them across their application portfolio rather than applying one uniformly.

Table 1. Cloud migration strategies and their suitability for SMBs

Strategy	Description	Typical SMB use case	Trade-offs
Rehost ("lift and shift")	Move applications to cloud infrastructure with little or no change.	Quick data-centre exit; legacy servers nearing end of support.	Fast and low-risk, but may not reduce cost or gain cloud benefits.
Replatform ("lift, tinker and shift")	Make limited optimizations, e.g. move to a managed database.	Reduce administration of databases or web servers.	Moderate effort; gains in manageability; some provider coupling.

Strategy	Description	Typical SMB use case	Trade-offs
Repurchase	Replace the application with a SaaS product.	Email, CRM, accounting, HR, collaboration tools.	Lowest operations burden; data migration and process change required.
Refactor / re-architect	Redesign the application for cloud-native services.	Core differentiating applications needing scale or agility.	Highest benefit but highest cost, time and skill demand.
Retire	Decommission applications that are no longer needed.	Redundant or unused systems found during assessment.	Saves cost; requires confirmation that no dependencies remain.
Retain	Keep the workload on-premises for now.	Regulated data, specialized hardware, recent investments.	Avoids risk now; creates a hybrid operating model.

4.1 Hybrid and Multi-Cloud Approaches

A hybrid approach keeps selected workloads on-premises while others run in a public cloud, and is common where data-residency, latency or legacy constraints exist. Multi-cloud uses more than one provider to reduce concentration risk or to select best-of-breed services. For SMBs, multi-cloud increases operational complexity and skill requirements, so it is usually justified only for clear resilience or commercial reasons; portability measures such as containers and open standards can offer a lower-cost partial alternative [7].

4.2 Big-Bang versus Phased Migration

A big-bang migration moves all workloads in a short window and shortens the period of dual running, but concentrates risk. A phased migration moves workloads in waves, beginning with low-risk and low-dependency systems, allowing the team to learn and adjust. Given limited SMB capacity for incident response, phased migration is generally the more prudent default.

V. CHALLENGES IN SMB CLOUD MIGRATION

The challenges reported in the literature fall into technological, organizational, financial, security and regulatory categories. Table 2 summarizes them together with commonly recommended mitigations.

Table 2. Principal challenges and mitigation measures

Category	Challenge	Mitigation
Technical	Legacy applications with undocumented dependencies; incompatibility with cloud services; data-transfer time and bandwidth limits; integration across hybrid environments.	Application and dependency discovery; pilot migrations; offline or staged data transfer; use of managed integration services.
Organizational	Shortage of cloud skills; resistance to change; unclear ownership; lack of executive sponsorship.	Targeted training and certification; managed service partners; a named migration owner; clear communication plan.
Financial	Underestimated total cost of ownership; unpredictable usage-based bills; duplicate costs during dual running; egress and licensing charges.	Cost modelling before migration; budgets and alerts; right-sizing; reserved or committed pricing where usage is stable; tagging for cost allocation.
Security and privacy	Misconfiguration; weak identity and access management; unclear shared-responsibility boundaries; data exposure.	Least-privilege access and multi-factor authentication; encryption in transit and at rest; configuration baselines; logging and monitoring.
Regulatory	Data-residency and sector rules; privacy obligations under laws such as the GDPR and India's Digital Personal Data Protection Act, 2023 [11], [12].	Data classification; selecting compliant regions; contractual data-processing terms; documented retention and deletion practices.
Vendor and market	Vendor lock-in; weak bargaining power; service-level gaps; provider outages.	Exit strategy; open standards and containers; reviewing service-level agreements; backups outside a single provider [7].

The shared-responsibility principle deserves particular emphasis: providers secure the underlying infrastructure, but customers remain responsible for configuring services, managing identities and protecting their own data. SMBs that assume the provider handles all security are especially exposed to misconfiguration risk. Surveys of cloud security identify data protection, access control and multi-tenancy as recurring concerns [24], [25].

VI. OPPORTUNITIES

- **Cost flexibility.** Pay-as-you-go pricing removes large up-front hardware purchases and allows spending to track demand [1], [2], [28].
- **Scalability and elasticity.** Resources can be increased for seasonal peaks and reduced afterwards, which is difficult with fixed on-premises capacity.
- **Access to advanced services.** Managed databases, analytics, machine-learning services and automated backup give SMBs capabilities that would be costly to build in-house [3].
- **Resilience and continuity.** Multi-zone deployment, snapshots and replication make disaster recovery more attainable for small organizations.
- **Agility and faster delivery.** Provisioning in minutes rather than weeks shortens experimentation cycles and time to market [10].
- **Remote and collaborative work.** Cloud-hosted collaboration and line-of-business tools support distributed teams.
- **Reduced maintenance burden.** Managed and SaaS services shift patching and hardware upkeep to the provider, freeing limited staff for higher-value work.

These benefits are conditional rather than automatic. Cost savings in particular depend on right-sizing, governance and sustained attention after migration; lift-and-shift of poorly utilized servers can increase rather than decrease spending.

VII. PROPOSED SMB MIGRATION FRAMEWORK AND BEST PRACTICES

The proposed framework has five phases. Each phase has defined activities and outputs so that a small team can proceed without specialized methodology expertise. The phases are iterative: lessons from the pilot and from each migration wave should feed back into planning.

Table 3. Five-phase cloud migration framework for SMBs

Phase	Key activities	Outputs
1. Assess	Inventory applications, data and dependencies; classify data sensitivity; evaluate readiness across technology, organization and environment (TOE); estimate current costs.	Application portfolio; readiness report; baseline cost; risk register.
2. Plan	Assign a strategy to each workload; compare provider options and pricing; define security, compliance and governance requirements; set budget, timeline and success measures.	Migration roadmap; business case and TCO model; governance and security policy; exit strategy.
3. Pilot	Migrate one or two low-risk workloads; build the landing zone (accounts, network, identity, logging); test performance, failover and rollback.	Validated landing zone; pilot report; revised plan and estimates.
4. Migrate	Migrate in waves; run parallel operation where needed; cut over with a tested rollback plan; train users and staff; update documentation.	Production workloads in the cloud; cut-over records; trained staff.
5. Optimize	Monitor cost, performance and security; right-size and automate; review service-level and contract terms; retire legacy infrastructure; plan further modernization.	Optimization backlog; cost and performance reports; continuous-improvement cycle.

7.1 Strategy-Selection Guide

Table 4 links common SMB situations to a recommended starting strategy. It is a heuristic to support discussion, not a substitute for workload-specific analysis.

Table 4. Strategy-selection guide

Situation	Suggested strategy	Rationale
Commodity function with a mature SaaS alternative (email, accounting, CRM)	Repurchase	Minimizes operations burden and skill needs.
Server hardware or data-centre lease ending soon; little in-house cloud skill	Rehost, then optimize	Fastest exit with least change; optimize after stabilization.
Self-managed database or web tier consuming administration time	Replatform	Managed services reduce effort with limited code change.
Core application limiting growth or scale	Refactor (phased)	Justifies higher effort when the application is a differentiator.
Unused or duplicate system discovered in assessment	Retire	Removes cost and attack surface.
Strict data-residency rules or recent hardware investment	Retain / hybrid	Defers risk while enabling selective cloud use.

7.2 Best Practices

- **Start with business goals.** Define measurable objectives such as cost, availability or time-to-market before choosing technology.
- **Adopt a phased approach.** Begin with a pilot and low-risk workloads, and use the results to refine estimates and processes.
- **Model total cost of ownership.** Include migration effort, dual-running, licensing, data egress, training and support, and not only compute prices.
- **Establish cost governance (FinOps).** Use budgets, alerts, tagging, right-sizing and periodic reviews to keep usage-based spending predictable [29].
- **Build security in from the start.** Enforce multi-factor authentication, least privilege, encryption, secure configuration baselines, centralized logging and tested backups.
- **Classify data and verify compliance.** Identify personal and regulated data, choose appropriate regions, and document processing agreements.
- **Plan for exit and portability.** Prefer open standards, containers and documented infrastructure-as-code to reduce lock-in [7], [9].
- **Invest in people.** Train staff, assign clear ownership, and use managed service partners where in-house skills are lacking; adopt DevOps practices gradually [10].
- **Test, monitor and rehearse.** Validate performance, failover and rollback before cut-over, and monitor continuously afterwards.
- **Review regularly.** Revisit architecture, contracts and costs at fixed intervals as services and prices change.

VIII. DISCUSSION

The synthesis indicates that the most consequential decisions for an SMB are not technical but concern scope, ownership and cost discipline. Strategies that minimize operational burden—repurchasing commodity functions as SaaS and replatforming to managed services—tend to fit SMB capacity better than extensive refactoring, which is best reserved for applications that genuinely differentiate the business. Lift-and-shift is a legitimate first step when time is constrained, provided it is followed by an optimization phase; otherwise the organization may pay cloud prices for on-premises-style usage.

Using the TOE lens, technological factors (legacy compatibility, integration) are often the most visible, but organizational factors (skills, sponsorship, change management) and environmental factors (regulation, provider terms) frequently determine whether a migration succeeds [5], [6], [20]. The proposed framework therefore treats readiness assessment and governance as first-class activities rather than preliminaries.

The open empirical questions are whether the phased framework reduces migration failure or cost overruns compared with ad-hoc approaches, which of the listed challenges are most prevalent among SMBs in specific regions and sectors, and how strongly the strategy-selection guide agrees with expert judgment. These questions can be answered only through case studies, surveys or expert evaluation, none of which are reported here.

IX. LIMITATIONS AND FUTURE WORK

- The study relies on secondary sources; it contains no primary survey, interview or experimental data.
- Sources are weighted toward published English-language literature and publicly documented vendor guidance, which may under-represent local SMB experiences.
- SMBs are heterogeneous; the framework and selection guide are generalizations that require adaptation to each organization.
- Provider services, prices and regulations change quickly, so specific offerings and legal requirements must be re-verified at the time of use.
- No quantitative cost model is validated in this paper.
- Future work should evaluate the framework through multiple case studies and an SMB survey, develop a calibrated total-cost-of-ownership tool, examine sector-specific compliance requirements, and study the effect of emerging practices such as serverless computing and AI-assisted operations.

X. ETHICAL, SECURITY AND PRIVACY CONSIDERATIONS

Migration involves transferring business, employee and customer data to third-party infrastructure. Organizations should minimize the data moved, classify it by sensitivity, obtain legal advice on applicable privacy law, and ensure that contracts specify processing purposes, security measures, breach notification and data return or deletion at exit [11], [12]. This paper contains no personal data and recommends no specific commercial product; mentions of vendor frameworks are for descriptive purposes only. It does not constitute legal or financial advice.

XI. CONCLUSION

Cloud migration offers SMBs meaningful opportunities in cost flexibility, scalability, resilience and access to advanced services, but realizing them requires deliberate choices about strategy, governance and skills. This paper consolidated the six established migration strategies, classified the main technical, organizational, financial, security, regulatory and vendor-related challenges, and proposed a five-phase framework with a strategy-selection guide and best practices tailored to SMB constraints. The framework is a conceptual contribution; its effectiveness remains to be established through empirical validation, which is the principal direction for future work.

DECLARATIONS

- **Funding:** This research received no external funding. (Authors to confirm.)
- **Conflict of interest:** The authors declare that they have no competing interests. (Authors to confirm.)
- **Ethics approval and consent:** This manuscript is a review of published literature and involves no human participants or personal data. Authors should verify institutional and target-journal requirements.
- **Data availability:** No new datasets were generated. All sources are cited in the reference list.

- **Author contributions:** Proposed roles for confirmation: Omkar Hirugade – conceptualization, literature review, writing original draft; Aditya Bagate – methodology, framework design, validation; Viraj Kakade – analysis, visualization, writing review and editing; Dr. Prashant Chordiya – supervision, review and editing. All authors should review and approve the final allocation.
- **Acknowledgements:** The authors thank the department, institution and research guide for their support.
- **Corresponding author:** Omkar Hirugade (to be confirmed).

REFERENCES

[1]. P. Mell and T. Grance, "The NIST Definition of Cloud Computing," National Institute of Standards and Technology, Special Publication 800-145, 2011.

[2]. M. Armbrust et al., "A view of cloud computing," Communications of the ACM, vol. 53, no. 4, pp. 50–58, 2010, doi: 10.1145/1721654.1721672.

[3]. S. Marston, Z. Li, S. Bandyopadhyay, J. Zhang, and A. Ghalsasi, "Cloud computing — The business perspective," Decision Support Systems, vol. 51, no. 1, pp. 176–189, 2011.

[4]. M. Jamshidi, A. Ahmad, and C. Pahl, "Cloud migration research: A systematic review," IEEE Transactions on Cloud Computing, vol. 1, no. 2, pp. 142–157, 2013.

[5]. T. Oliveira and M. F. Martins, "Literature review of information technology adoption models at firm level," Electronic Journal of Information Systems Evaluation, vol. 14, no. 1, pp. 110–121, 2011.

[6]. R. Gangwar, H. Date, and R. Ramaswamy, "Understanding determinants of cloud computing adoption using an integrated TAM-TOE model," Journal of Enterprise Information Management, vol. 28, no. 1, pp. 107–130, 2015.

[7]. J. Opara-Martins, R. Sahandi, and F. Tian, "Critical analysis of vendor lock-in and its impact on cloud computing migration: a business perspective," Journal of Cloud Computing, vol. 5, art. no. 4, 2016.

[8]. S. Orban, "6 Strategies for Migrating Applications to the Cloud," AWS Cloud Enterprise Strategy Blog, Amazon Web Services, 2016.

[9]. S. Newman, Building Microservices: Designing Fine-Grained Systems. Sebastopol, CA, USA: O'Reilly Media, 2015.

[10]. G. Kim, J. Humble, P. Debois, and J. Willis, The DevOps Handbook. Portland, OR, USA: IT Revolution Press, 2016.

[11]. Regulation (EU) 2016/679 of the European Parliament and of the Council (General Data Protection Regulation), Official Journal of the European Union, 2016.

[12]. Government of India, The Digital Personal Data Protection Act, 2023, Act No. 22 of 2023.

[13]. Q. Zhang, L. Cheng, and R. Boutaba, "Cloud computing: state-of-the-art and research challenges," Journal of Internet Services and Applications, vol. 1, no. 1, pp. 7–18, 2010.

[14]. R. Buyya, C. S. Yeo, S. Venugopal, J. Broberg, and I. Brandic, "Cloud computing and emerging IT platforms: Vision, hype, and reality for delivering computing as the 5th utility," Future Generation Computer Systems, vol. 25, no. 6, pp. 599–616, 2009.

[15]. C. Pahl and P. Jamshidi, "Microservices: A systematic mapping study," in Proc. 6th Int. Conf. Cloud Computing and Services Science (CLOSER), 2016, pp. 137–146.

[16]. A. Khajeh-Hosseini, D. Greenwood, and I. Sommerville, "Cloud migration: A case study of migrating an enterprise IT system to IaaS," in Proc. IEEE 3rd Int. Conf. Cloud Computing (CLOUD), 2010, pp. 450–457.

[17]. A. Khajeh-Hosseini, I. Sommerville, J. Bogaerts, and P. Teregowda, "Decision support tools for cloud migration in the enterprise," in Proc. IEEE 4th Int. Conf. Cloud Computing (CLOUD), 2011, pp. 541–548.

[18]. V. Andrikopoulos, T. Binz, F. Leymann, and S. Strauch, "How to adapt applications for the Cloud environment," Computing, vol. 95, no. 6, pp. 493–535, 2013.

[19]. P. K. Senyo, E. Addae, and R. Boateng, "Cloud computing research: A review of research themes, frameworks, methods and future research directions," International Journal of Information Management, vol. 38, no. 1, pp. 128–139, 2018.

[20]. C. Low, Y. Chen, and M. Wu, "Understanding the determinants of cloud computing adoption," Industrial Management & Data Systems, vol. 111, no. 7, pp. 1006–1023, 2011.

[21]. H. Alshamaila, S. Papagiannidis, and F. Li, "Cloud computing adoption by SMEs in the north east of England: A multi-perspective framework," Journal of Enterprise Information Management, vol. 26, no. 3, pp. 250–275, 2013.

[22]. E. Carcary, E. Doherty, G. Conway, and S. McLaughlin, "Cloud computing adoption readiness and benefit realization in Irish SMEs," Information Systems Management, vol. 31, no. 4, pp. 313–327, 2014.

[23]. P. Gupta, A. Seetharaman, and J. R. Raj, "The usage and adoption of cloud computing by small and medium businesses," International Journal of Information Management, vol. 33, no. 5, pp. 861–874, 2013.

[24]. S. Subashini and V. Kavitha, "A survey on security issues in service delivery models of cloud computing," Journal of Network and Computer Applications, vol. 34, no. 1, pp. 1–11, 2011.

[25]. M. Ali, S. U. Khan, and A. V. Vasilakos, "Security in cloud computing: Opportunities and challenges," Information Sciences, vol. 305, pp. 357–383, 2015.

[26]. L. G. Tornatzky and M. Fleischer, The Processes of Technological Innovation. Lexington, MA, USA: Lexington Books, 1990.

[27]. K. Venters and E. A. Whitley, "A critical review of cloud computing: researching desires and realities," Journal of Information Technology, vol. 27, no. 3, pp. 179–197, 2012.

[28]. J. Weinman, Cloudonomics: The Business Value of Cloud Computing. Hoboken, NJ, USA: Wiley, 2012.

[29]. J. Storment and M. Fuller, Cloud FinOps: Collaborative, Real-Time Cloud Financial Management. Sebastopol, CA, USA: O'Reilly Media, 2019.

[30]. F. D. Davis, "Perceived usefulness, perceived ease of use, and user acceptance of information technology," MIS Quarterly, vol. 13, no. 3, pp. 319–340, 1989.