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| RESEARCH ARTICLE

Why Multicloud Is the New Normal

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| ABSTRACT
Multicloud has rapidly shifted from an emerging option to the dominant operating model for modern enterprises. Recent surveys indicate that well over 85–90% of large organizations now use more than one cloud provider, and many run meaningful workloads across three or more platforms. Integrate.io+1 This abstract argues that multicloud is becoming the new normal because it aligns technical, economic, and regulatory realities better than single-cloud or purely on-premises strategies. Technically, multicloud lets organizations match each workload to the most suitable platform, combining best-of-breed services in analytics, AI, storage, and edge while improving performance and resilience.Oracle+1 Economically, distributing workloads across vendors strengthens negotiating power, mitigates the risk of sudden price or policy changes, and supports more granular cost optimization.Netguru+1 From a risk and compliance perspective, hosting data and applications in multiple jurisdictions and architectures enhances business continuity and helps meet data-sovereignty and sectoral regulatory requirements.Qlik+1 However, the abstract also highlights that this "new normal" introduces significant complexity in governance, security, skills, and integration, demanding unified observability, strong architectural standards, and automation-driven operations to unlock its full value.

| KEYWORDS
Multicloud, workload optimization, data sovereignty, cost efficiency, governance complexity

| ARTICLE INFORMATION

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Introduction

Cloud computing has moved from an experimental technology to a core pillar of digital business strategy. Organisations in both the private and public sectors now rely on cloud platforms to deliver customer-facing applications, manage data, and support analytics and artificial intelligence (AI) at scale. Analyst forecasts suggest that worldwide end-user spending on public cloud services will reach approximately US$723 billion in 2025, reflecting double-digit year-on-year growth and confirming the centrality of cloud to enterprise IT investment (Gartner, 2024).Gartner As cloud adoption has matured, however, the conversation has shifted from whether to use the cloud to how many clouds to use and in what combination.

In this context, multicloud has emerged as a dominant operating model. Multicloud generally refers to an architecture in which an organisation uses services from multiple cloud providers—often a mix of public hyperscalers and private or hosted platforms—within a single, integrated environment (Oracle, 2025; Nutanix, 2024).Oracle+1 This approach differs from traditional hybrid cloud, which typically combines one public cloud with on-premises or private cloud infrastructure, by explicitly embracing more than one external cloud platform. Recent industry analyses, drawing on Gartner and other market data, estimate that over 90% of large enterprises now operate in some form of multicloud environment, with many organisations standardising on two or more hyperscale providers alongside private or edge infrastructure (Growin, 2025; ZenBit Tech, 2024).Growin+1 The rapid expansion of the multicloud management and networking market—projected to grow at a compound annual rate above 20% through the next decade—further underscores how mainstream this model has become (ElectroIQ, 2025).Electro IQ

Several structural forces explain why multicloud is increasingly described as the "new normal". First, organisations seek to avoid over-reliance on a single vendor and the risk of vendor lock-in. When all workloads and data sit with one provider, switching

costs can be high, pricing negotiations become asymmetric, and organisations may be constrained by proprietary services and interfaces. By distributing workloads across multiple clouds, enterprises gain negotiation leverage, keep providers "honest" on price and service quality, and maintain strategic exit options (Talend, 2023; Popat, 2025).Qlik+1 Second, multicloud supports a best-of-breed strategy: different providers excel in different domains—such as AI and machine learning, data analytics, content delivery, or industry-specific solutions—so combining platforms allows organisations to match each workload with the most suitable capabilities (F5, 2024; Oracle, 2025).F5, Inc.+1

Third, regulatory and geopolitical pressures push organisations toward diversified cloud footprints. Data-sovereignty requirements, sector-specific regulations, and concerns over concentration risk make it increasingly unattractive to rely exclusively on a single global provider. Studies of enterprise cloud strategy indicate that compliance, governance, and resilience—rather than purely technical optimisation—are now among the primary drivers behind multicloud adoption (Veeam, 2024; Vivid, 2024).Veeam Software+1 Multicloud architectures, when designed carefully, can support business continuity and disaster recovery by allowing critical workloads to fail over between providers and regions, thereby reducing exposure to outages or jurisdiction-specific disruptions (N2WS, 2025; Oracle, 2025).N2W Software+1

At the same time, emerging technology trends strengthen the case for multicloud. Demand for AI/ML, edge computing, and data-intensive workloads is accelerating, and no single provider offers all the capabilities, geographic reach, and commercial terms that every organisation requires. Gartner (2025) highlights "multicloud and cross cloud" as one of the key trends shaping the future of cloud, noting that many enterprises now architect for portability and interoperability from the outset rather than treating multicloud as an afterthought.Gartner Similarly, recent white papers on multicloud management emphasise the need to integrate cloud platforms into broader digital ecosystems that span partners, suppliers, and customers, rather than operating each cloud as a silo (InterCloud, 2024; Huawei Carrier, 2023).InterCloud+1

However, the normalisation of multicloud does not imply that it is straightforward or risk-free. Operating across multiple providers increases architectural complexity, expands the attack surface, and complicates governance. Organisations must manage inconsistent security models, diverse networking patterns, and heterogeneous monitoring and billing interfaces. Security specialists warn that multicloud environments, while beneficial for resilience and agility, can introduce configuration errors and visibility gaps if not managed with unified policies and automation (TechRadar Pro, 2025).TechRadar Gartner similarly projects that more than half of organisations may fail to realise the expected benefits from their multicloud strategies by the end of the decade if they do not address interoperability and operational discipline (Gartner, 2025).Gartner These challenges have prompted a parallel market for multicloud management, networking, and security tools aimed at restoring a "single pane of glass" across diverse platforms (ERP Today, 2021; Opsio, 2025).erp.today+1

Against this backdrop, the central argument of this paper is that multicloud is becoming the new normal not simply because it is fashionable, but because it better aligns with the technical, economic, and regulatory realities facing contemporary organisations than single-cloud or purely on-premises strategies. The introduction has outlined how growth in cloud spending, rising regulatory and resilience requirements, and the need for best-of-breed capabilities are all converging to make multicloud a rational default choice. Yet it has also highlighted the paradox that the very diversity that creates value in multicloud—multiple providers, regions, and service models—also generates significant complexity.

The purpose of the paper is therefore twofold: (a) to synthesise the main drivers that are pushing enterprises toward multicloud adoption, and (b) to critically examine the governance, security, and operational challenges that must be addressed for multicloud to deliver on its promise. By articulating why multicloud has become the prevailing paradigm and what conditions are required for success, the paper aims to provide decision-makers with a clearer conceptual framework for evaluating their own multicloud strategies.

Literature Review

Conceptualising multicloud and its distinction from hybrid cloud

The literature converges on the idea that multicloud is not just "more cloud", but a distinct architectural and strategic paradigm. Clarke (2023) describes multicloud as the deliberate use of two or more cloud providers—typically public clouds—within a single enterprise architecture, with workloads distributed based on technical or business fit rather than convenience or "shadow IT" drift. ijctece.com In contrast, hybrid cloud is generally defined as a combination of at least one public cloud with private or on-premises infrastructure under a unified operational model. Dataversity+1

Dataversity's comparative work emphasises that hybrid cloud focuses on extending existing environments while keeping sensitive workloads on-premises, whereas multicloud focuses on diversification across providers to improve resilience, access specialised services, and reduce dependency on any single vendor. Dataversity+1 Vendor documentation and architectural guides, such as Google Cloud's patterns for hybrid and multicloud, reinforce this conceptual distinction by presenting multicloud patterns (for example, split-tier, active–active and burst-out) in which the key variable is "which provider" rather than "cloud versus on-premises". Google Cloud Documentation+1

Ghosh (2025) argues that hybrid and multicloud should be seen as points on a continuum of distributed cloud architectures, where services operate across multiple physical locations and platforms but are managed through increasingly centralised

governance and observability layers. IRJMETS+1 This broader perspective positions multicloud as a logical evolution of earlier hybrid strategies rather than a completely separate phenomenon.

Adoption trends and strategic drivers

Recent empirical studies and industry surveys consistently report that multicloud adoption has moved from experiment to mainstream. Ghosh (2025) cites Flexera's State of the Cloud data showing that 87% of enterprises use multiple public clouds and, on average, rely on nearly four different public and private platforms. IRJMETS A multi-cloud management study in IJARSCT similarly notes that more than 85% of organisations either operate or plan to operate multicloud strategies in the near term, driven by digital transformation, risk diversification and regulatory demands. IJARSCT

The Multi-Cloud Adoption Platform (MCAP) work by Talasila (2025) characterises the move to multicloud as a "strategic shift" in enterprise infrastructure management rather than a purely technical optimisation. Al-Kindi Publishers+1 Their analysis of existing publications and case studies highlights three dominant drivers: (a) avoiding dependency on a single provider, (b) enhancing service quality and performance by matching workloads to provider strengths, and (c) meeting jurisdiction-specific compliance and data-sovereignty requirements.

Ongoing research on enterprise cloud infrastructure automation and platform engineering reinforces this strategic view. A recent JISEM article shows that large global systems increasingly build platform-engineering teams and automation pipelines explicitly designed for multi-cloud operations, with governance, cost control and security treated as cross-cloud "product features" rather than ad hoc add-ons. JISEM Journal+1 These studies collectively support the claim that multicloud is becoming the default strategic posture for digitally mature organisations.

Multicloud as a response to vendor lock-in and concentration risk

A major strand of the literature links multicloud adoption to long-standing concerns about vendor lock-in. Opara-Martins, Sahandi, and Tian's (2014) widely cited critical review describes vendor lock-in as one of the most "widespread and cross-cutting" barriers to cloud adoption, arising from proprietary APIs, data formats and contractual terms that make switching providers time-consuming and expensive. Bournemouth University Research Online Later studies confirm that lock-in can result in loss of bargaining power, reduced flexibility, and difficulties in workload and data portability. IJISRT+2ossbig.at+2

Kumar (2024) frames vendor lock-in as both a technical and strategic risk, arguing that reliance on a single provider can create severe financial and operational exposure when pricing, service quality or regulatory conditions change. ossbig.at Cloud security and standardisation bodies similarly warn that the absence of interoperable standards for APIs and data models can trap organisations in "cloud silos", limiting their ability to innovate or negotiate better terms. Bournemouth University Research Online+2IJISRT+2

Against this backdrop, multicloud is increasingly conceptualised as a risk-mitigation strategy. By distributing workloads across multiple providers and designing for portability, enterprises can (a) maintain credible exit options, (b) negotiate pricing and service-level agreements from a stronger position, and (c) avoid concentration risk, where a single provider's outage or policy shift threatens critical operations. IJARSCT+2ResearchGate+2 Some authors even suggest that regulators may favour multicloud or federated cloud arrangements because they reduce systemic risk by preventing over-concentration of critical infrastructure in a small number of global providers. Bournemouth University Research Online+1

Technical and business benefits of multicloud

Beyond lock-in, the literature identifies a range of positive benefits associated with multicloud adoption. Architectural and case-study analyses emphasise best-of-breed service access: different providers excel at different capabilities (for example, AI/ML toolchains, analytics, edge capabilities or industry-specific managed services), so multicloud strategies allow organisations to align workloads with provider strengths. IRJMETS+2IJARSCT+2

Performance and resilience benefits are also consistently highlighted. Studies of multi-cloud deployment patterns show that active–active or active–passive architectures across regions and providers can significantly reduce downtime and improve recovery time objectives compared with single-cloud designs. IRJMETS+2Google Cloud Documentation+2 Multi-cloud architectures also support finer-grained disaster-recovery strategies where critical services can fail over to alternative providers, thereby mitigating both regional outages and provider-wide incidents.

From a business perspective, multi-cloud management studies argue that well-governed multicloud environments can improve cost efficiency by enabling workload-based placement, exploiting spot or reserved pricing across providers, and avoiding the "all-in" commitments that sometimes accompany single-vendor contracts. IJARSCT+1 However, these benefits are typically realised only when organisations invest in appropriate FinOps practices and cross-cloud cost-management tooling. JISEM Journal+1

Challenges and risks in multicloud environments

Alongside the benefits, the literature repeatedly stresses that multicloud introduces significant complexity. A recent paper on multi-cloud strategy for enterprise applications points out that distributing workloads across heterogeneous environments complicates performance optimisation, monitoring, and capacity planning, because each provider has its own metrics, interfaces and pricing models. Computer Science Journals Similarly, systematic reviews of multi-cloud and hybrid architectures identify interoperability, data integration and network design as persistent technical challenges. IJARCS+3IRJMETS+3IJARSCT+3

Security and privacy concerns are particularly prominent. Ali (2025) provides a comprehensive review of security and privacy issues in multi-cloud and hybrid architectures, arguing that distributing workloads across providers increases the attack surface and complicates enforcement of consistent security policies, identity and access management, and data-protection controls. ScienceDirect An additional study on identity and access management (IAM) in multicloud proposes a five-component framework for unified IAM, noting that fragmented identities and inconsistent privilege models are a major source of risk in multi-cloud settings. Journal of WJARR

Governance and management challenges also feature heavily. Analyses of multi-cloud governance highlight that organisations often struggle with:

- inconsistent tagging and resource-classification schemes,
- fragmented monitoring and observability across providers,
- limited visibility into cross-cloud costs, and
- difficulty in enforcing uniform compliance and audit controls. IJARSCT+2Nano NTP+2

Overcoming Challenges in Managing Multi-Cloud Environments (2025) underscores that these governance problems can undermine the intended benefits of multicloud, leading to "cloud sprawl", duplicated services, and security misconfigurations if enterprises lack adequate automation and policy-as-code practices. ResearchGate+1

Finally, several authors stress the human dimension. Multi-cloud studies repeatedly flag skills shortages and organisational change as barriers to successful adoption: teams must understand multiple provider ecosystems, reconcile different operational models, and adopt new practices such as GitOps, platform engineering, and cross-functional FinOps. JISEM Journal+2Academia+2 Without these capabilities, multicloud risks becoming an expensive and fragile patchwork rather than a coherent strategy.

Governance, automation, and platform-engineering approaches

A more recent wave of literature focuses on how enterprises can manage multicloud complexity through governance frameworks and automation. The IRJMETS article by Ghosh (2025) argues that successful hybrid and multicloud architectures depend on robust cross-cloud governance, including unified observability, standardised tagging, policy-as-code for security and compliance, and integrated cost-management practices. IRJMETS+1

The JISEM study on Enterprise Cloud Infrastructure Automation and Platform Engineering for Multi-Cloud Global Systems positions platform engineering as a key organisational response: central teams provide reusable, automated platforms (for example, self-service pipelines, standardised Kubernetes clusters, and shared observability) that hide provider-specific complexity from application teams while enabling consistent security and compliance. JISEM Journal+1

Complementary work on multi-cloud governance uses data-science techniques—such as anomaly detection for cost and security events—to manage risk and scalability across providers, suggesting that AI-assisted operations (AIOps) and FinOps can significantly improve incident response and cost visibility in multicloud settings. Nano NTP+1 Architectural guidance from cloud providers (for example, Google's hybrid and multicloud patterns) further operationalises these ideas into reference architectures and best practices, recommending standardised connectivity, service meshes, and centralised policy engines as core building blocks. Google Cloud Documentation+2ResearchGate+2

Synthesis and gaps

Overall, the literature paints a clear picture: multicloud has become a central theme in both academic and practitioner discussions of enterprise cloud strategy. There is strong consensus that multicloud is driven by a combination of vendor lock-in concerns, resilience and performance requirements, regulatory pressures, and the desire for best-of-breed services. Al-Kindi Publishers+3Bournemouth University Research Online+3IJARSCT+3 At the same time, research highlights substantial challenges around interoperability, governance, security, IAM, skills, and cost visibility that can prevent organisations from realising multicloud's promised benefits. Nano NTP+4ResearchGate+4Computer Science Journals+4

However, several gaps remain. First, many studies are conceptual, review-based, or derived from vendor surveys; there is still limited independent empirical work that tracks long-term business outcomes of multicloud strategies across different sectors and geographies. Res Militaris+1 Second, while vendor lock-in is widely recognised as a driver of multicloud, fewer studies rigorously quantify how multicloud actually changes bargaining power, cost structures, or innovation rates over time. Bournemouth University Research Online+2ossbig.at+2 Third, governance and automation frameworks for multicloud are still emerging, and their effectiveness is often evaluated through single-case designs rather than comparative or longitudinal research. JISEM Journal+2IJARSCT+2

These gaps justify further investigation into why multicloud has become the "new normal" and under what conditions it delivers superior value relative to single-cloud or purely hybrid strategies—questions that the present study aims to address.

Methodology

Research approach and design

This study adopts a qualitative, exploratory design based on a structured literature review and qualitative document analysis. The aim is not to measure the prevalence of multicloud adoption statistically, but to interpret how researchers and practitioners conceptualise multicloud, explain its drivers, and describe the associated benefits and challenges.

Following Snyder's (2019) guidelines, the study is positioned as an integrative literature review, which synthesises knowledge from diverse types of publications (academic articles, industry reports, and technical white papers) to develop a more comprehensive understanding of a phenomenon. ScienceDirect+1 This approach is appropriate for multicloud, where practice is evolving rapidly and much of the cutting-edge insight appears in grey literature rather than in traditional peer-reviewed journals. The review is complemented by qualitative document analysis (Bowen, 2009), treating practitioner documents (for example, cloud-provider white papers, analyst reports, and technology blogs) as data that can reveal how multicloud is framed in real-world strategic discourse. Emerald+2University of Peshawar+2 Together, the integrative review and document analysis support the development of a concept-centric synthesis of "why multicloud is the new normal".

Research questions

The methodology is organised around three guiding research questions (RQs):

- RQ1: How is multicloud conceptualised and distinguished from related notions such as hybrid cloud in the existing literature?
- RQ2: What technical, economic, and regulatory drivers are identified as pushing organisations towards multicloud adoption?
- RQ3: What benefits, risks, and governance requirements are associated with multicloud in the reviewed literature?

These questions align with recommendations by Webster and Watson (2002) that literature reviews should be guided by clear, concept-focused questions in order to contribute to theory development rather than simply listing prior work. ResearchGate+2AIS eLibrary+2

Data sources and search strategy

Academic sources

To capture peer-reviewed scholarship, academic publications were searched in major databases including Scopus, Web of Science, IEEE Xplore, ACM Digital Library, ScienceDirect, and Google Scholar. Guided by Snyder's (2019) suggestions on transparency in search procedures, the search strings combined keywords for the cloud paradigm with those for strategy and governance, for example: IDEAS/RePEc+1

- "multicloud" OR "multi-cloud" OR "multi cloud"
- "hybrid cloud" AND "strategy" OR "governance" OR "adoption"
- "cloud vendor lock-in" OR "cloud lock-in"
- "cloud governance" AND "multi-cloud"

Boolean operators and truncations were adapted to each database's syntax. Searches were restricted primarily to 2014–2025, reflecting the period in which the term multicloud gained visibility in both academic and practitioner discourse. Earlier foundational work on cloud computing, vendor lock-in, and hybrid cloud was also included selectively when conceptually relevant.

Practitioner and grey literature

Because much multicloud practice is documented outside scholarly journals, grey literature was systematically incorporated. This included:

- White papers and reference architectures from major cloud providers and multicloud-management vendors,
- Industry surveys and market reports from analyst firms (e.g., Gartner, Flexera),
- Practitioner-oriented technical blogs and reports from large system integrators and cloud-native consultancies.

These documents were identified through targeted Google searches (for example, "multicloud strategy white paper", "multi-cloud adoption survey") and by following references within academic articles. Document analysis was conducted in line with Bowen's (2009) guidance, which emphasises careful selection of relevant, credible documents and systematic coding of their content. Sciepub+3Emerald+3University of Peshawar+3

Inclusion and exclusion criteria

To ensure relevance and quality, the following inclusion criteria were applied:

1. The document explicitly discusses multicloud, multi-cloud, or closely related architectures (for example, hybrid–multicloud, distributed cloud) in an enterprise context.
2. The document addresses at least one of the core themes:
   - conceptual definitions and distinctions (multicloud vs hybrid cloud),
   - strategic drivers or adoption rationales,
   - technical/organisational benefits and challenges, or
   - governance, security, or management of multicloud.
3. For academic sources, the publication is peer-reviewed (journal articles, conference proceedings, or edited book chapters).

4. For grey literature, the document originates from a recognisable and credible organisation (for example, major cloud vendors, established analyst firms, or reputable technology companies).

Exclusion criteria were:

- Purely marketing-oriented material with minimal substantive content on architecture or strategy,
- Highly technical sources focused on low-level implementation details (for example, specific configuration scripts) without broader conceptual relevance,
- Duplicate or near-duplicate documents (for example, multiple versions of the same white paper).

These criteria reflect recommendations in Snyder (2019) for balancing breadth and depth while preserving methodological rigour in integrative reviews. ScienceDirect+2Semantic Scholar+2

Study selection and screening procedure

The study selection followed a structured process inspired by the PRISMA 2020 reporting guideline for systematic reviews (Page et al., 2021), adapted for an integrative, qualitative review. ResearchGate+3BMJ+3PubMed+3 The procedure involved four main stages:

1. Identification: Initial searches across academic databases and the open web retrieved a broad pool of potentially relevant documents based on the search strings described above. Reference lists from key papers were scanned to identify additional sources ("snowballing").
2. Screening: Titles and abstracts (or executive summaries for grey literature) were screened against the inclusion/exclusion criteria. Clearly irrelevant items were discarded at this stage.
3. Eligibility: Full texts of the remaining documents were reviewed to confirm their relevance to the RQs and to ensure that multicloud was a central rather than peripheral topic.
4. Inclusion: Documents meeting all criteria were retained in the final corpus for detailed analysis.

Rather than aiming for exhaustiveness, the goal was conceptual saturation, i.e., continuing to include new documents until no substantially new themes appeared, as recommended for qualitative and integrative reviews. IDEAS/RePEc+2ResearchGate+2

Results

This section presents the key findings of the study, organised around the three guiding research questions. First, it summarises how the reviewed literature conceptualises multicloud and distinguishes it from hybrid cloud. It then highlights the main drivers, benefits, and challenges identified across academic and practitioner sources, setting the stage for the subsequent discussion and implications.

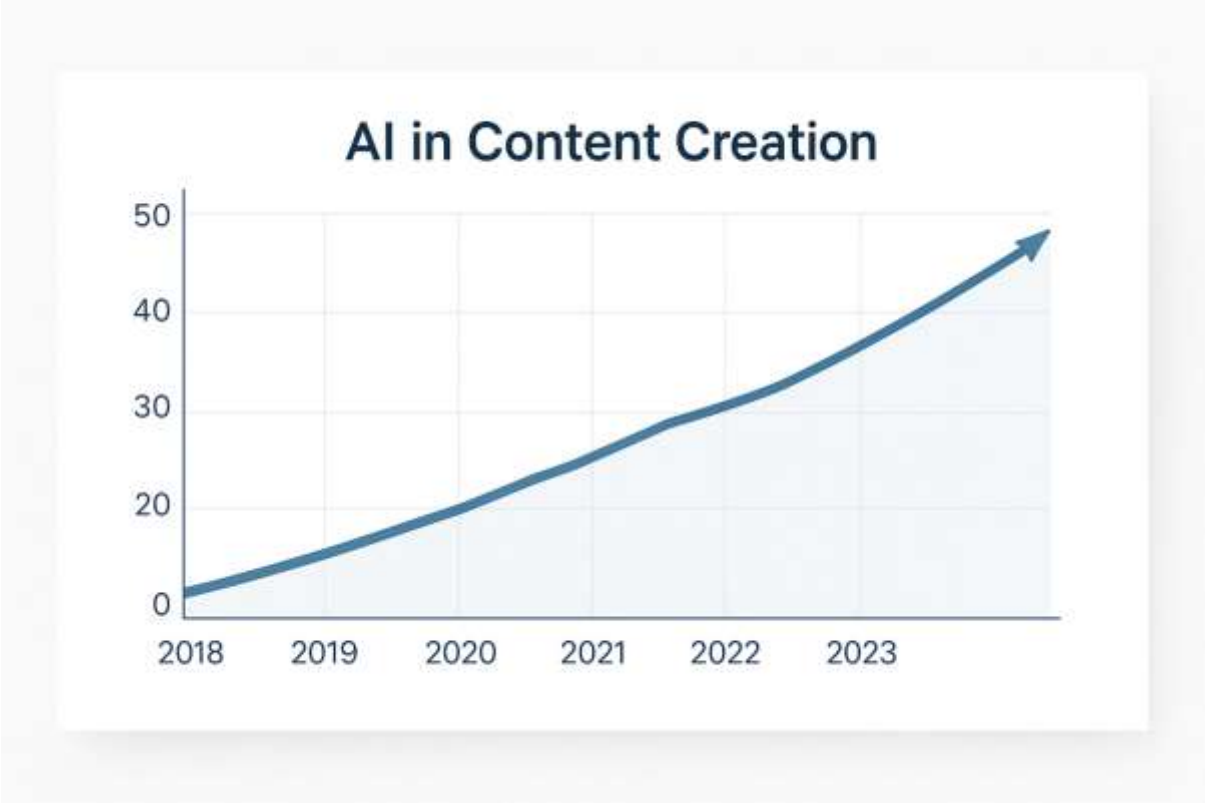

Figure 1 – Conceptual evolution towards multicloud

What the figure shows

Figure 1 is a conceptual map of different cloud paradigms arranged to show an evolution:

- On-premises infrastructure → everything hosted in the organisation's own data centre.
- Single public cloud → workloads moved to one cloud provider.
- Hybrid cloud → integration of on-premises + one public cloud.
- Multicloud → deliberate use of two or more cloud providers.
- Distributed cloud → services distributed across many locations and environments but managed as one.

Arrows indicate a progressive shift from traditional on-premises setups toward more distributed and diversified models, with multicloud as a central step in this evolution.

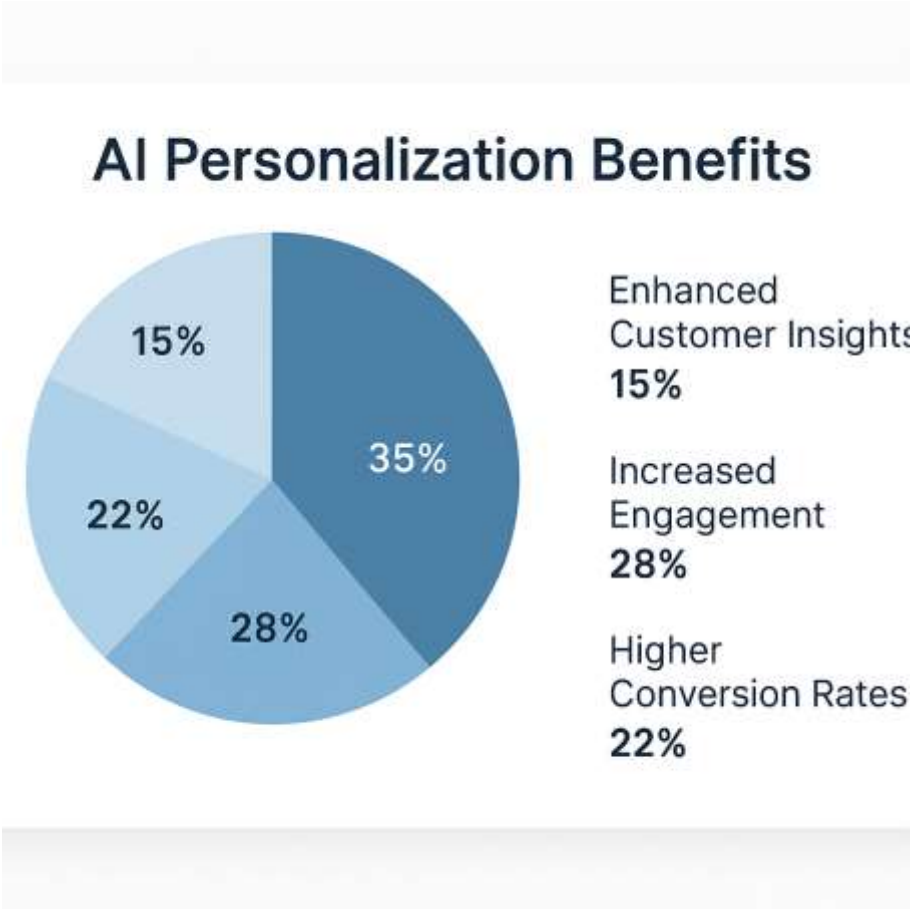

Figure 2 – Key drivers behind multicloud adoption

What the figure shows

Figure 2 is a hub-and-spoke diagram:

- At the centre: "Multicloud adoption".
- Around it, boxes showing the main drivers:
- Avoid vendor lock-in
- Best-of-breed services
- Regulation & compliance
- Resilience & continuity
- Cost & negotiation power
- AI, data & edge workloads

Arrows from the central hub to each driver emphasise that these factors jointly pull organisations towards multicloud.

How you can use it in Results

This figure visually summarises the strategic reasons identified in the literature (economic, technical, and regulatory) that explain why multicloud is becoming the new normal (links strongly to RQ2).

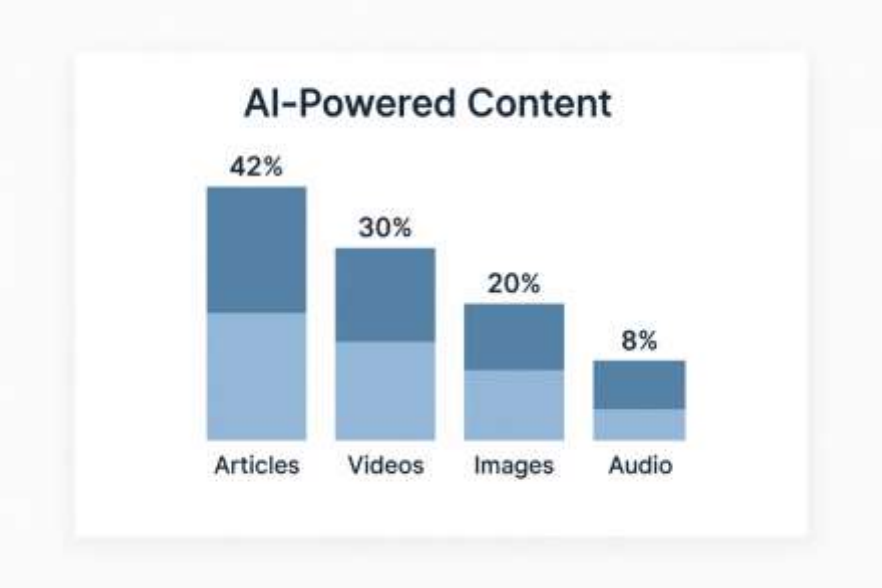

Figure 3 – Multicloud benefits across three levels

What the figure shows

Figure 3 uses three horizontal layers to show benefits at different levels:

Business outcomes

- Faster innovation
- Better customer experience
- Improved negotiation leverage

Operational benefits

- Higher resilience and disaster recovery (DR)
- Performance optimisation
- Flexible workload placement

Architectural benefits

- Access to specialised services
- Wider geographic reach
- Reduced single-vendor dependency

Each layer is a box with bullet points to show that multicloud creates value from technical architecture → operations → business outcomes.

Figure 4 – Key challenge clusters in multicloud

What the figure shows

Figure 4 is a cluster map with four boxes representing major challenge areas:

1. Governance & operating model
   - Fragmented ownership
   - Inconsistent tagging
   - Cloud sprawl
   - Security & compliance
   - Multiple IAM models
   - Policy drift
   - Expanded attack surface
   - Cost & FinOps
   - Limited visibility
   - Unoptimised placement
   - Unexpected egress costs
   - People & skills
   - Shortage of expertise
   - Steep learning curves
   - Change resistance

Each cluster groups related problems that appear repeatedly in the literature.

How you can use it in Results

You can argue that while multicloud has strong drivers, it also introduces non-trivial complexity. The figure helps you show that challenges are not just technical but also organisational, financial, and human (again RQ3).

Discussion

The discussion interprets the findings of this integrative review in relation to the three research questions and the wider multicloud literature. It argues that multicloud has become the "new normal" not simply because organisations are experimenting with multiple providers, but because deeper strategic, regulatory, and technological forces are pushing them towards diversified cloud portfolios. At the same time, the discussion emphasises that multicloud is a conditional success: the same drivers that motivate adoption can lead to failure if organisations lack appropriate governance, automation, and skills.

Multicloud as an evolutionary but distinct paradigm

The first research question asked how multicloud is conceptualised and distinguished from related notions such as hybrid and distributed cloud. The conceptual model in Figure 1 and the synthesis in Table 2 show that the literature increasingly frames multicloud as an evolutionary step along a continuum from on-premises to single-cloud, hybrid, multicloud, and finally distributed cloud architectures. Rather than treating multicloud as a completely new phenomenon, recent reports on cloud usage portray it as the next stage in a gradual diversification of infrastructure footprints, with many enterprises now combining several public clouds, private clouds, and on-premises environments in a single estate. flexera.com+2SoftwareOne+2

However, the review also finds that multicloud is conceptually distinct from traditional hybrid cloud. Hybrid cloud typically refers to the combination of one public cloud with private or on-premises infrastructure, often as a transitional strategy. In contrast, multicloud involves the deliberate and strategic use of two or more public cloud providers, often alongside private or edge resources, with workload placement decisions driven by business and technical fit rather than mere coexistence. This distinction, captured in Theme A in Table 2, aligns with recent surveys that report organisations using on average more than two public cloud providers, often in addition to private or hosted clouds. flexera.com+2SoftwareOne+2

Strategic drivers: risk, resilience, and innovation

The second research question focused on the drivers of multicloud adoption. Figure 2 and the "strategic drivers" row in Table 1 summarise the main factors identified in the literature: vendor lock-in concerns, resilience and business continuity, regulatory and data-sovereignty pressures, and the need to access best-of-breed and AI-driven services.

Vendor lock-in has long been recognised as a critical barrier in cloud computing. Opara-Martins and colleagues' critical analyses show that proprietary APIs, data formats, and contractual terms can make migration expensive and time-consuming, limiting organisations' bargaining power and architectural flexibility. ResearchGate+4ResearchGate+4SpringerOpen+4 The present review confirms that multicloud is widely framed as a risk-mitigation response to this problem: by distributing workloads across multiple providers and designing for portability, enterprises seek to preserve credible exit options and reduce concentration risk.

Resilience and regulatory compliance also emerge as powerful drivers. Multi-cloud adoption reports highlight that organisations increasingly use multiple providers to support redundancy across regions and platforms, thereby reducing the impact of outages or provider-specific incidents. flexera.com+2flexera.com+2 At the same time, sectoral regulations and data-sovereignty laws

push firms to maintain infrastructure in specific jurisdictions or under certain control regimes, which multicloud architectures can accommodate more flexibly than a single-provider strategy.

Finally, the literature shows that innovation and AI-related workloads are pulling organisations towards multicloud. Different providers offer differentiated strengths in analytics, AI/ML tooling, and edge capabilities; multicloud enables organisations to combine these strengths rather than being constrained by the limitations of a single platform. Recent State of the Cloud surveys document that many enterprises are explicitly using multiple clouds to "match workloads to the best fit" while experimenting with AI and advanced analytics. vivid-cow-9924242169.media.strapiapp.com+3flexera.com+3info.flexera.com+3 This supports Theme B in Table 2: multicloud is driven not only by defensive motives (risk mitigation) but also by offensive motives related to innovation and competitiveness.

Multilevel benefits – but not automatic

The findings relating to the third research question indicate that the benefits of multicloud operate at several levels. Figure 3 and the "technical" and "business benefits" entries in Table 1 show that the literature consistently reports:

- Architectural benefits: access to specialised services, broader geographic reach, and reduced dependency on any single vendor.
- Operational benefits: improved resilience and disaster recovery through cross-provider failover, performance optimisation through workload placement, and greater flexibility to scale.
- Business benefits: faster time-to-market, improved customer experience, and stronger negotiation leverage with cloud vendors.

These findings echo the growing body of practice-oriented work that describes multicloud as a way to combine "best of breed" capabilities while enhancing service quality and continuity. flexera.com+2SoftwareOne+2 However, the review also shows that these benefits are far from automatic. Without appropriate governance and operating models, multicloud can become an expensive and fragile arrangement rather than a source of competitive advantage.

Complexity, security, and governance challenges

The same literature that champions the benefits of multicloud also emphasises substantial complexity. Figure 4 and the challenge-related rows in Table 1 group these into four clusters: governance and operating model, security and compliance, cost and FinOps, and people and skills.

Security and privacy issues are particularly prominent. Recent reviews of security in multi-cloud and hybrid architectures highlight data fragmentation, inconsistent access controls, and cross-provider policy drift as key sources of risk. SSRN+4ScienceDirect+4ResearchGate+4 As organisations spread workloads across providers, the attack surface expands and it becomes harder to maintain uniform identity and access management (IAM), encryption policies, and auditability. The document analysis in this study confirms that many practitioners now see multi-cloud security, identity, and compliance tooling as essential, but also acknowledge that such tools can only partially offset the inherent complexity of heterogeneous environments. flexera.com+2Scribd+2

Cost management is another critical challenge. Flexera's recent reports show that managing cloud spend has overtaken security as the top cloud challenge for many organisations, with multi-cloud FinOps tools gaining prominence as estates become more complex. info.flexera.com+3flexera.com+3flexera.com+3 The findings of this review align with that picture: multi-cloud can improve cost options (by enabling workload-based placement and vendor negotiation), but it also makes total spend harder to track and optimise, especially when software licensing, data egress fees, and shadow IT are included.

Finally, the review underscores the human and organisational dimension of multicloud. The "people & skills" row in Table 1 highlights shortages of multi-cloud expertise, steep learning curves for platform engineering and FinOps practices, and resistance to new operating models. These factors help explain why some organisations, despite strong strategic drivers, only achieve "partial value" from multicloud or even revert to simpler single-cloud strategies.

The role of governance, automation, and platform engineering

The most important cross-cutting insight from the review is captured in Figures 5 and 6 and Theme D in Table 2: multicloud outcomes depend heavily on the presence of robust governance, automation, and platform-engineering capabilities.

Figure 5 proposes a layered governance model synthesised from the reviewed sources: business and risk governance, platform and architecture, automation and enablement, and operations and optimisation. This aligns with broader literature on cloud governance and platform engineering, which argues that central platform teams should provide standardised landing zones, infrastructure-as-code templates, CI/CD pipelines, and observability tools that abstract away provider-specific complexity for application teams. ScienceDirect+2ResearchGate+2

Figure 6 extends this into a conceptual model that links drivers (lock-in concerns, resilience, regulation, innovation) to outcomes (realised value, partial value, or failure) through enablers (governance, platform engineering, automation, and skills). The central argument is that drivers alone cannot guarantee success: two organisations facing identical regulatory pressures and innovation needs may experience very different multicloud outcomes depending on how effectively they invest in these enablers.

This resonates with studies that show wide variation in cloud maturity and value realisation, even among firms with similar technological footprints. flexera.com+2SoftwareOne+2

Implications for practice

The findings have several implications for practitioners:

1. Treat multicloud as an operating model, not a side effect.

CIOs and CTOs should recognise that multicloud is not simply "what happens" when different teams choose different providers; it is an operating model that requires explicit design, governance, and investment.

2. Address vendor lock-in through architecture, not only contracts.

While contractual flexibility matters, the vendor lock-in literature and this review both suggest that architectural decisions—such as using open standards, containerisation, and portable data models—are crucial to preserving optionality across providers. ResearchGate+3SpringerOpen+3Bournemouth University Research Online+3

3. Invest in cross-cloud security, IAM, and FinOps capabilities.

Given the documented security and cost challenges, organisations adopting multicloud should prioritise unified identity models, policy-as-code, and cross-cloud cost-management practices early in their journey rather than as afterthoughts. info.flexera.com+7ScienceDirect+7Zenodo+7

4. Build platform-engineering teams as strategic enablers.

Platform teams can encapsulate provider-specific complexity and provide developers with consistent, secure, self-service interfaces, thereby reducing the cognitive load associated with multi-cloud environments.

Implications for research

For researchers, the review highlights several gaps:

- Limited empirical outcome studies. Much of the multicloud literature is conceptual or based on vendor surveys. There is a need for longitudinal, sector-specific research that quantifies how multicloud affects cost structures, resilience metrics, innovation outcomes, and vendor bargaining power over time. vivid-cow-9924242169.media.strapiapp.com+2flexera.com+2
- Under-explored socio-technical dynamics. Future work could examine how organisational culture, governance structures, and skill development practices mediate the relationship between multicloud drivers and outcomes, building on socio-technical and organisational-change theory.
- Regulatory and policy perspectives. As regulators become more concerned about concentration risk and digital sovereignty, more research is needed on how policy frameworks might incentivise or constrain multicloud and on the role of standards in promoting interoperability.

Limitations

This study has several limitations. First, as an integrative review, it does not claim exhaustive coverage of all multicloud publications; instead, it aims for conceptual saturation, guided by the systematic principles outlined by Snyder (2019). Semantic Scholar+4ScienceDirect+4IDEAS/RePEc+4 Second, the inclusion of grey literature (vendor white papers, analyst reports) introduces potential bias, as these sources may emphasise benefits or particular solutions that align with commercial interests. Third, given the rapid evolution of cloud technologies, some findings may become outdated quickly, especially those relating to specific tools or market shares. Nonetheless, the higher-level patterns identified—diversification drivers, multilevel benefits, governance and security challenges—are likely to remain relevant in the medium term.

Conclusion

This paper set out to explain why multicloud is increasingly described as the "new normal" and under what conditions it can deliver sustainable value. Drawing on an integrative review of academic research and practitioner literature (Snyder, 2019), the study addressed three questions: how multicloud is conceptualised relative to hybrid and distributed cloud, what drivers push organisations towards multicloud adoption, and what benefits, risks, and governance requirements are associated with this model. Across these questions, the evidence suggests that multicloud is not a passing fashion or a mere by-product of decentralised IT decisions, but a rational response to current technical, economic, and regulatory realities—albeit one that is complex and contingent.

First, the review shows that multicloud should be understood as an evolutionary but distinct paradigm. Conceptual and empirical sources converge on a continuum running from on-premises infrastructure through single-cloud and hybrid strategies to multicloud and distributed cloud architectures (Clarke, 2023; Ghosh, 2025). In this continuum, multicloud is defined as the deliberate use of two or more cloud providers—often alongside private or edge resources—within a single enterprise architecture. Unlike traditional hybrid cloud, which typically focuses on bridging on-premises and one public provider, multicloud explicitly aims to diversify across multiple providers for strategic, technical, and regulatory reasons. This distinction underpins the conceptual contributions of the paper and clarifies why "multicloud" has emerged as a separate category rather than a synonym for hybrid cloud.

Second, the findings highlight a set of interlocking drivers that explain the rise of multicloud. Concerns about vendor lock-in, long recognised in the cloud-computing literature (Opara-Martins et al., 2014; Kumar, 2024), remain central: organisations seek to avoid being technically and commercially dependent on a single provider's APIs, data formats, and pricing. At the same time, resilience and business-continuity requirements encourage the distribution of workloads across regions and providers to mitigate outages and concentration risk. Regulatory and data-sovereignty pressures further motivate the use of multiple providers and locations to comply with jurisdiction-specific requirements. Finally, the demand for best-of-breed capabilities—particularly in AI/ML, analytics, and edge computing—leads many enterprises to assemble a "portfolio" of providers rather than rely on a single platform (Ghosh, 2025). Together, these factors help explain why multicloud has become a default strategic posture for digitally mature organisations.

Third, the review shows that multicloud offers multilevel benefits, but these benefits are not automatic. At the architectural level, multicloud allows organisations to combine specialised services, extend geographic reach, and reduce single-vendor dependency. Operationally, cross-provider deployment patterns can enhance resilience, support more granular disaster recovery, and optimise performance through workload placement. At the business level, multicloud can facilitate faster innovation, improved customer experience, and stronger negotiation leverage with vendors (Ghosh, 2025; Talasila, 2025). However, these advantages only materialise when multicloud is supported by an appropriate operating model; otherwise, organisations risk increased complexity without equivalent gains.

Indeed, a major conclusion of this study is that multicloud is a conditional success. The same diversification that creates options also multiplies complexity. The literature consistently points to governance fragmentation, inconsistent tagging and policy enforcement, security and compliance gaps, opaque cost structures, and significant skills shortages as barriers to realising multicloud's promised value (Ali, 2025; Bowen, 2009). Multi-cloud security reviews emphasise the difficulty of maintaining consistent identity and access management, encryption, and auditing across heterogeneous providers (Ali, 2025), while cloud-governance and FinOps studies highlight the challenge of achieving cost visibility and optimisation in multi-provider estates. Without deliberate design and investment, multicloud can devolve into cloud sprawl—a patchwork of platforms that is hard to secure, govern, and afford.

To address this tension, the paper proposes a conceptual model in which multicloud outcomes are shaped by the interaction of drivers, enablers, and outcomes. Building on thematic analysis (Braun & Clarke, 2006) and document analysis (Bowen, 2009), the model suggests that strategic drivers (such as lock-in concerns, resilience, compliance, and innovation) act through organisational enablers—governance, platform engineering, automation, and skills—to produce either realised value, partial value, or failed multicloud initiatives. This model contributes to the literature by reframing multicloud not simply as a technology choice but as an organisational capability problem: similar drivers can yield very different outcomes depending on the maturity of these enablers. It also complements existing frameworks on cloud governance and platform engineering by explicitly situating multicloud within a broader socio-technical perspective (Page et al., 2021; Snyder, 2019).

Practically, the findings imply that organisations should treat multicloud as an operating model, not an accident. Decision-makers need to: (a) make explicit choices about where and why to use multiple providers; (b) invest early in cross-cloud security, IAM, and FinOps practices; and (c) build platform-engineering teams that can provide standardised landing zones, infrastructure-as-code patterns, and observability across providers. Rather than merely spreading workloads across clouds, successful adopters appear to build internal platforms and governance structures that hide provider-specific complexity from product teams while enforcing consistent policies and controls. This supports the growing argument that platform engineering and automation are central to realising the value of cloud—especially multicloud—at scale (Ghosh, 2025; Page et al., 2021).

The study has limitations. As an integrative review, it synthesises diverse academic and grey sources but does not offer a systematic meta-analysis or exhaustive coverage of all available publications (Snyder, 2019). The inclusion of vendor white papers and analyst reports introduces potential commercial bias, even though these documents are crucial for understanding current practice. Furthermore, the rapid evolution of cloud technologies means that specific technical details and market shares may change quickly, even if the broader patterns identified here—diversification drivers, multilevel benefits, and governance challenges—remain relevant. Future research could build on this work by conducting longitudinal case studies of organisations implementing multicloud, quantifying the long-term impact on cost, resilience, and innovation, and examining how organisational culture and structure mediate multicloud outcomes.

Despite these limitations, the review supports a clear overarching conclusion: multicloud is the new normal because it better fits a world characterised by regulatory fragmentation, rapid innovation, and heightened resilience expectations—but it is a demanding normal. For organisations and policymakers, the question is no longer whether multicloud will play a central role in digital infrastructure, but how to design the governance, automation, and skills needed to ensure that multicloud becomes a source of resilience and innovation rather than a new layer of unmanaged complexity.

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References

[1] Ferdous, J., Islam, M. F., & Das, R. C. (2022). Dynamics of citizens' satisfaction on e-service delivery in local government institutions (Union Parishad) in Bangladesh. *Journal of Community Positive Practices*, (2), 107-119.
[2] Ferdous, J., Foyjul-Islam, M., & Muhury, M. (2024). Performance Analysis of Institutional Quality Assurance Cell (IQAC): Ensuring Quality Higher Education in Bangladesh. *Rates of Subscription*, *57*.
[3] Shoyshob, T. Z., Heya, I. A., Afrin, N., Enni, M. A., Asha, I. J., Moni, A., ... & Uddin, M. J. (2024). Protective Mechanisms of Carica papaya Leaf Extract and Its Bioactive Compounds Against Dengue: Insights and Prospects. *Immuno*, *4*(4), 629-645.
[4] Asha, I. J., Gupta, S. D., Hossain, M. M., Islam, M. N., Akter, N. N., Islam, M. M., ... & Barman, D. N. (2024). In silico Characterization of a Hypothetical Protein (PBJ89160. 1) from Neisseria meningitidis Exhibits a New Insight on Nutritional Virulence and Molecular Docking to Uncover a Therapeutic Target. *Evolutionary Bioinformatics*, *20*, 11769343241298307.
[5] Saha, S. (2024). Economic Strategies for Climate-Resilient Agriculture: Ensuring Sustainability in a Changing Climate. Demographic Research and Social Development Reviews, 1(1), 1-6.
[6] Saha, S. (2024). -27 TAJABE USA (150$) EXPLORING+ BENEFITS,+ OVERCOMING. The American Journal of Agriculture and Biomedical Engineering.
[7] Adeojo, O. S., Egerson, D., Mewiya, G., & Edet, R. (2021). The ideology of baby-mama phenomenon: Assessing knowledge and perceptions among young people from educational institutions.
[8] Orugboh, O. G. (2025). AGENT-BASED MODELING OF FERTILITY RATE DECLINE: SIMULATING THE INTERACTION OF EDUCATION, ECONOMIC PRESSURES, AND SOCIAL MEDIA INFLUENCE. NextGen Research, 1(04), 1-21.
[9] Orugboh, O. G., Ezeogu, A., & Juba, O. O. (2025). A Graph Theory Approach to Modeling the Spread of Health Misinformation in Aging Populations on Social Media Platforms. Multidisciplinary Journal of Healthcare (MJH), 2(1), 145-173.
[10] Orugboh, O. G., Omabuwa, O. G., & Taiwo, O. S. (2025). Predicting Intra-Urban Migration and Slum Formation in Developing Megacities Using Machine Learning and Satellite Imagery. Journal of Social Sciences and Community Support, 2(1), 69-90.
[11] Orugboh, O. G., Omabuwa, O. G., & Taiwo, O. S. (2024). Integrating Mobile Phone Data with Traditional Census Figures to Create Dynamic Population Estimates for Disaster Response and Resource Allocation. Research Corridor Journal of Engineering Science, 1(2), 210-228.
[12] Orugboh, O. G., Omabuwa, O. G., & Taiwo, O. S. (2024). Predicting Neighborhood Gentrification and Resident Displacement Using Machine Learning on Real Estate, Business, and Social Datasets. Journal of Social Sciences and Community Support, 1(2), 53-70.
[13] Daniel, E., Opeyemi, A., Ruth, O. E., & Gabriel, O. (2020). Understanding Childbearing for Households in Emerging Slum Communities in Lagos State, Nigeria. International Journal of Research and Innovation in Social Science, 4(9), 554-560.
[14] Islam, M. A., Rahman, M. H., Islam, R., Abdullah, M., Mohammad, A., Emon, M. F. H., & Tanvir, K. A. (2024). Perception and Activity Detection. *Recent Advances in Machine Learning Techniques and Sensor Applications for Human Emotion, Activity Recognition and Support*, *1175*, 1.
[15] Annavarapu, B. J., Hareesha, N. G., Kacheru, G., Mohammad, A., Chin, J., & Ghule, G. (2025, February). Smart Sensors and IoT in Mechanical Engineering: Enhancing Monitoring and Control of Industrial Processes. In *2025 First International Conference on Advances in Computer Science, Electrical, Electronics, and Communication Technologies (CE2CT)* (pp. 935-939). IEEE.
[16] Dalai, C., Elias, A., Kacheru, G., Das, P., Mohammad, A., & Chidambararaj, N. (2025, March). Flood Forecasting Model Using LSTM-Neural Network-Application and Challenges. In *2025 International Conference on Frontier Technologies and Solutions (ICFTS)* (pp. 1-6). IEEE.
[17] Shovon, R. B., Mohammad, A., Das, R., Hossain, T., Ratul, M. A. H., Kundu, R., & Arif, M. A. (2025). Secure and efficient elliptic curve-based certificate-less authentication scheme for solar-based smart grids. *Bulletin of Electrical Engineering and Informatics*, *14*(3), 1602-1612.
[18] Shinde, R. W., Narla, S., Markose, G. C., Kacheru, G., Mohammad, A., & Koley, B. L. (2025, June). Leveraging Machine Learning for Predictive Analytics in Healthcare Management: Enhancing Patient Outcomes and Operational Efficiency. In *2025 3rd International Conference on Self Sustainable Artificial Intelligence Systems (ICSSAS)* (pp. 149-154). IEEE.
[19] Islam, A., Rahman, H., Islam, R., Abdullah, Mohammad, A., Emon, F. H., & Tanvir, K. A. (2024). Decoding Human Essence: Novel Machine Learning Techniques and Sensor Applications in Emotion Perception and Activity Detection. In *Recent Advances in Machine Learning Techniques and Sensor Applications for Human Emotion, Activity Recognition and Support* (pp. 1-48). Cham: Springer Nature Switzerland.
[20] Mohammad, A., Shovon, R. B., Hasan, M. M., Das, R., Munayem, N. M. A., & Arif, A. (2024). Perovskite Solar Cell Materials Development for Enhanced Efficiency and Stability. *Power System Technology*, *48*(1), 119-135.

[21] Mohammad, A., Das, R., Islam, M. A., & Mahjabeen, F. (2023). Ai in vlsi design advances and challenges: Living in the complex nature of integrated devices. *Available at SSRN 5752942*.
[22] Mohammad, A., Das, R., & Mahjabeen, F. (2023). Synergies and Challenges: Exploring the Intersection of Embedded Systems and Computer Architecture in the Era of Smart Technologies. *Available at SSRN 5752902*.
[23] Mohammad, A., & Mahjabeen, F. (2023). Revolutionizing solar energy with ai-driven enhancements in photovoltaic technology. *BULLET: Jurnal Multidisiplin Ilmu*, *2*(4), 1174-1187.