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The benefits of digital transformation why moving to the cloud is essential

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Abstract

Digital transformation has become essential for businesses aiming to stay competitive in an increasingly technology-driven landscape, and moving to the cloud is a critical component of this shift. Cloud computing offers significant benefits such as scalability, flexibility, and cost efficiency. With the cloud, businesses can dynamically adjust resources to meet demand, reducing the need for substantial upfront investments in hardware and ensuring operational agility. The pay-as-you-go model helps companies manage costs effectively by only paying for the resources they use. At the same time, advanced security features like encryption and compliance with regulatory standards ensure the protection of sensitive data. Moreover, the cloud enhances collaboration by enabling teams to work remotely and access shared

resources from anywhere, improving productivity and innovation. By leveraging cloud-based data analytics, organizations can make data-driven decisions in real-time, optimizing customer experiences and streamlining operations. Emerging trends like artificial intelligence (AI), machine learning (ML), and hybrid cloud solutions further transform business capabilities, allowing organizations to innovate and build a more resilient infrastructure for the future. This paper delves into the benefits of cloud-based digital transformation, exploring how these technologies drive business success and why moving to the cloud is no longer optional but a vital strategy for future-proofing organizations in a rapidly evolving digital economy.

Keywords: Digital transformation, cloud computing, cloud migration, business agility, operational efficiency, data security, scalability, innovation, cost optimization

1. Introduction

Digital transformation has become essential for modern organizations. With technology evolving lightning, businesses must rethink their operations to stay ahead. Cloud computing is at the core of this transformation, reshaping industries by offering flexible, efficient, and scalable solutions. In today's fast-paced world, where customer expectations and market conditions constantly change, cloud technology provides the agility to stay competitive, improve operations, and drive innovation ^[1]. Cloud computing allows businesses to move their data, applications, and services from traditional on-premises systems to cloud-based platforms accessible via the Internet. This shift will enable companies to scale resources as needed, ensuring they can handle planned and unexpected demands without investing in expensive physical infrastructure. Plus, the cloud makes it easy for teams to access the information and tools they need from anywhere, helping businesses respond quickly to changes in the market ^[1].

But cloud computing isn't just about reducing costs. It brings significant financial benefits by cutting down on the need for costly infrastructure maintenance and upgrades. More importantly, it enables companies to optimize their resources, streamline workflows, and get products to market faster. It also supports collaboration, with centralized platforms that let teams work together regardless of location ^[2].

As organizations embrace cloud-based solutions, they also gain access to advanced technologies like artificial intelligence (AI), machine learning (ML), big data analytics, and the Internet of Things (IoT). These tools help businesses extract valuable insights from their data, make better decisions, and create new products or services that meet customer needs. The cloud also fosters a culture of innovation, where companies can experiment, iterate, and deploy new ideas quickly.

Of course, moving to the cloud isn't without challenges. Companies must address concerns like data security, regulation compliance, and integrating cloud services with existing systems. A successful cloud migration requires careful planning, clear business goals, and a solid strategy. By approaching the transition thoughtfully, businesses can fully leverage the cloud's potential and unlock long-term value ^[2]. This paper explores the many benefits of cloud computing, such as cost savings, scalability, and

enhanced security, and how these advantages empower businesses to innovate. It also looks at the best strategies for cloud adoption and offers practical advice for overcoming common obstacles. By understanding these factors, organizations can position themselves for growth and success in the digital age.

2. Methodology

This article comprehensively explores the benefits of cloud adoption and its role in digital transformation. The research integrates a detailed review of existing literature, industry reports, and primary and secondary data sources to understand how businesses leverage cloud technologies to drive transformation thoroughly.

A. Literature Review

A crucial part of the methodology is an in-depth literature review examining peer-reviewed journals, academic papers, books, and industry white papers on cloud computing and digital transformation. This review explores the evolution of cloud technology, its various service models (IaaS, PaaS, SaaS), deployment types (public, private, hybrid), and the key advantages of cloud migration, such as cost savings, scalability, and flexibility. The review also looks at challenges organizations face during cloud adoption, including data security, privacy concerns, and integration with existing IT infrastructure.

B. Case Studies

The research incorporates case studies from multiple industries, including healthcare, finance, retail, and technology. These case studies highlight how organizations of different sizes and sectors have successfully implemented cloud technology to achieve business transformation. Real-world examples—such as how an e-commerce company enhanced operational efficiency and customer experience through cloud adoption—offer valuable insights into both the benefits and challenges of cloud migration.

C. Industry Reports and Data Analysis

Industry reports from leading research firms, such as Gartner, Forrester, and McKinsey, provide up-to-date insights into market trends, cloud adoption rates, and the future growth of cloud technologies. These reports emphasize fundamental shifts toward hybrid and multi-cloud environments, the growing importance of cloud security, and advanced technologies like AI and machine learning within cloud platforms. By analyzing this data, the research reflects the latest developments in cloud computing and their influence on business strategies.

D. Primary and Secondary Data Analysis

The study uses primary and secondary data to offer a well-rounded understanding of cloud adoption. Secondary data—such as previously published reports, surveys, and case studies—helps evaluate the broader impact of cloud computing on organizational performance, scalability, and innovation. Primary data, collected through interviews and surveys with decision-makers from organizations that have undergone cloud migration, provides firsthand insights into the motivations, challenges, and outcomes of adopting cloud technologies. Combining these data sources allows the research to identify patterns and best practices for successful cloud adoption.

E. Bridging Theory and Practice

One of the key strengths of this research is its ability to bridge the gap between academic theory and practical application. The theoretical insights from the literature review are contextualized with real-world case studies and industry reports, illustrating how cloud computing drives business transformation. For instance, the healthcare sector's use of cloud technology to improve data management and comply with regulatory standards (e.g., HIPAA) shows how theory translates into tangible outcomes for organizations.

F. Cloud Adoption as a Catalyst for Digital Transformation

The research highlights that cloud computing is not just about improving IT infrastructure or cutting costs; it is a crucial enabler of broader digital transformation strategies. The article demonstrates how cloud adoption helps companies become more agile, leverage advanced analytics, and integrate AI and machine learning into their operations. This shift is particularly beneficial in finance, healthcare, and retail industries, where cloud technology empowers businesses to optimize decision-making, enhance customer experiences, and explore new revenue streams.

G. Addressing Challenges and Overcoming Barriers

The study also examines the common challenges organizations face when adopting cloud technologies, including concerns about security, compliance, and employee resistance to change. Based on case studies and primary data, the article outlines strategies for overcoming these barriers, such as adopting robust security measures, addressing regulatory requirements, and implementing strong change management practices. It also highlights the importance of training employees and collaborating with cloud service providers to ensure successful implementation.

H. Best Practices for Successful Cloud Adoption

The research identifies several best practices organizations can adopt to ensure a successful transition to the cloud. For example, many successful organizations take a phased approach to migration, prioritizing high-value applications and gradually expanding their cloud usage. Clear communication, effective change management, and strong governance are essential to managing cloud resources efficiently and ensuring that cloud adoption delivers the expected benefits.

3. Benefits of cloud-based digital transformation

A. Scalability and Flexibility

One of the primary advantages of cloud computing is its scalability, allowing businesses to scale their resources according to demand. Cloud providers offer infrastructure (IaaS) and platform (PaaS) solutions, enabling companies to manage workloads more efficiently without investing in costly on-premises hardware. This flexibility not only supports growth but also ensures optimal resource utilization [3].

- **Cloud-Based Scalability Framework:** It is designed to help businesses and organizations efficiently manage and optimize their cloud resources to meet fluctuating demand. At its core, this framework leverages cloud services' flexibility and on-demand nature to ensure systems can scale up or down seamlessly. The framework typically includes tools and strategies for

horizontal scaling (adding more instances of services) and vertical scaling (increasing the resources of a single instance), emphasizing automation, cost-effectiveness, and performance optimization ^[4]. Using features like auto-scaling, load balancing, and resource elasticity, businesses can dynamically adjust their infrastructure in real time without manual intervention, ensuring consistent performance even during heavy traffic or peak loads. This approach supports better resource utilization and helps prevent over-provisioning, which can lead to unnecessary costs. As a result, the Cloud-Based

Scalability Framework is a critical component in modern cloud architectures, enabling businesses to remain agile, resilient, and cost-efficient in an ever-changing digital landscape ^[5].

B. Cost Optimization

Cloud services often operate on a pay-as-you-go model, meaning businesses only pay for the resources they use. This approach reduces the need for large upfront capital expenditures on hardware and software, enabling organizations to allocate funds to other strategic areas ^[6].

Table 1: Cost Comparison - Traditional Infrastructure vs. Cloud-Based Model

Factor	Traditional Infrastructure	Cloud-Based Model
Upfront Costs	High	Low
Maintenance Expenses	High	Included in the service fee
Scalability	Limited	Dynamic
Upgrade Costs	Frequent	Minimal
Downtime Costs	High (if hardware fails)	Minimal due to redundancy

C. Enhanced Data Security and Compliance

Data security is a top priority for any business, and cloud providers have invested heavily in creating secure environments. Cloud security tools include encryption, multi-factor authentication, and regulatory compliance frameworks (e.g., GDPR, HIPAA), which help mitigate risks and enhance data protection ^[7].

D. Improved Collaboration and Accessibility

Cloud technology enables seamless collaboration by allowing teams to access shared resources from anywhere with an internet connection. This accessibility enhances productivity and enables organizations to implement remote work models, making attracting and retaining talent easier ^[8].



E. Data-Driven Decision Making

The cloud enables businesses to harness vast data and apply advanced analytics for strategic decision-making. By centralizing data storage in the cloud, organizations can analyze real-time data, supporting data-driven decisions that enhance customer experience, refine product development, and optimize market strategies.

Table 2: Key Benefits of Data Analytics in the Cloud

Benefit	Description
Real-Time Insights	Access to live data for immediate decision-making
Enhanced Reporting	More accurate reporting through aggregated data
Predictive Analytics	Uses historical data to forecast trends
Customer Insights	Deeper understanding of customer preferences and behaviors
Product Development	Data informs the research and development of new products.

4. Future trends in cloud-based digital transformation

Cloud computing has become the backbone of modern digital transformation, enabling organizations to scale rapidly, optimize operations, and unlock new business opportunities. As cloud technology continues to evolve, several trends are emerging as critical drivers of change. This section explores these trends and their impact on businesses worldwide ^[9]

Hybrid and Multi-Cloud Solutions

Many organizations are adopting hybrid and multi-cloud strategies to avoid vendor lock-in, enhance resilience, and optimize performance. Businesses can create a flexible and scalable IT infrastructure that meets diverse needs by combining multiple cloud providers or private and public clouds ^[10].

A. Vendor Flexibility: Hybrid and multi-cloud architectures reduce the dependency on a single cloud provider, allowing businesses to negotiate better terms and avoid potential service disruptions. For example, a company might use AWS for storage and computing power while leveraging Microsoft Azure for machine

learning tools ^[11].

- **Improved Resilience:** Distributing workloads across multiple cloud providers reduces the risk of service outages and provides a failover mechanism, ensuring business continuity ^[10].
- **Industry Example:** Companies like JPMorgan Chase have embraced multi-cloud strategies to enhance resilience and meet specific regulatory compliance requirements in the financial services sector ^[10].

B. Artificial Intelligence (AI) and Machine Learning (ML) Integration

Cloud platforms increasingly integrate AI and ML capabilities, enabling businesses to leverage advanced analytics and automate routine tasks without maintaining complex infrastructures ^[11].

- **AI-Driven Insights:** Cloud-based AI tools can analyze vast datasets, providing businesses with predictive analytics and actionable insights. This helps improve decision-making, enhance customer experiences, and streamline operations.

- **Automation of Routine Tasks:** AI-powered automation can help businesses optimize processes like customer service (e.g., chatbots), fraud detection, and supply chain management, reducing costs and improving efficiency.
- **Industry Example:** Retailers like Amazon use AI on the cloud to analyze customer behavior, personalize recommendations, and optimize inventory management in real-time ^[11].

C. Edge Computing and the Internet of Things (IoT)

As connected devices grow, edge computing is essential to cloud-based digital transformation. Edge computing processes data at or near the generation source rather than sending it to centralized cloud servers, resulting in faster data processing, reduced latency, and more efficient infrastructure ^[12].

- **Enhanced IoT Performance:** Edge computing enables real-time data processing, especially critical for IoT applications in autonomous vehicles, manufacturing, and smart cities.
- **Improved Efficiency:** By processing data at the edge, businesses can reduce the bandwidth load on cloud servers and minimize delays, enabling faster response times and more reliable systems.
- **Industry Example:** In manufacturing, companies like GE have deployed edge computing solutions to monitor equipment in real-time, predict failures, and automate maintenance schedules ^[12].

D. Challenges of cloud adoption

Despite the numerous advantages of cloud computing, organizations face several significant challenges when migrating to the cloud. These challenges range from security and compliance issues to integration and cost management concerns. Understanding these challenges is crucial for ensuring that the cloud adoption process is smooth and successful ^[13].

A. Data Privacy and Security Concerns

Ensuring data security and privacy remains one of the top concerns for organizations adopting cloud technologies. Data protection becomes even more complex in multi-tenant cloud environments, where multiple customers share the same infrastructure.

- **Compliance Challenges:** Organizations must navigate a complex web of industry-specific regulations, including GDPR, HIPAA, and CCPA, ensuring their cloud service providers meet compliance standards. With data often stored in multiple geographic locations, ensuring compliance across jurisdictions can be tricky ^[13].
- **Shared Responsibility Model:** Cloud service providers (CSPs) typically secure the infrastructure, but customers are responsible for ensuring the security of their data and applications. This shared responsibility model requires businesses to implement robust data protection measures like encryption, identity and access management (IAM), and regular audits ^[14].
- **Real-World Example:** In 2020, a significant data breach occurred at a cloud provider, exposing sensitive personal data due to misconfigured cloud storage settings. This highlights the need for businesses to implement stringent security practices and continuously monitor cloud environments for vulnerabilities ^[14].

B. Legacy System Integration

Many organizations face significant hurdles in integrating legacy systems with cloud-based solutions. Older systems are often incompatible with modern cloud technologies, requiring substantial time and resources to migrate and integrate.

- **Complex Data Migration:** Migrating large volumes of data from legacy systems to the cloud can be time-consuming and fraught with risks, such as data loss or corruption. Businesses need a detailed migration plan and may need to invest in tools that ensure data consistency and integrity ^[15].
- **Hybrid Approaches:** In cases where complete cloud migration is not feasible, businesses can use hybrid cloud solutions to run both on-premises and cloud-based systems concurrently. This approach allows organizations to modernize gradually while still leveraging existing infrastructure.
- **Industry Example:** Large banks often struggle to integrate core banking systems with cloud technologies due to these systems' complexity and mission-critical nature. A hybrid cloud solution allows them to maintain secure, on-premises systems while integrating newer, cloud-native applications ^[15].

C. Cost Management and Budgeting

While cloud computing can be more cost-effective than traditional on-premises infrastructure, many organizations struggle with cloud cost management. The pay-as-you-go model offers flexibility but can lead to overspending if not carefully managed ^[16].

- **Unpredictable Costs:** Cloud pricing models are often complex, with charges based on storage, compute power, data transfer, and other services. Organizations can struggle to predict monthly costs significantly when usage fluctuates.
- **Cost Optimization:** Businesses need effective cloud cost management strategies to avoid unexpected bills. This includes monitoring usage, optimizing resource allocation, and leveraging cloud vendors' tools for budgeting and forecasting ^[16].
- **Real-World Example:** A global e-commerce company reported a significant increase in cloud costs after scaling its infrastructure rapidly during peak sales periods. By using cloud optimization tools to analyze usage patterns, they reduced unnecessary resource consumption and cut costs by 25%.

D. Change Management and Organizational Culture

Cloud adoption is not just a technical transition; it requires significant cultural and organizational change. Employees may resist new cloud technologies due to unfamiliarity or concerns about job security.

- **Training and Support:** To ensure successful adoption, organizations must invest in training programs that help employees understand the benefits of cloud computing and how it aligns with the organization's goals.
- **Leadership Buy-In:** Top management must champion the cloud migration process, providing clear communication and setting expectations for the transition. This helps reduce resistance and ensures employees are on board with the change.
- **Real-World Example:** IBM's shift to cloud-first

strategies involved a large-scale re-skilling initiative to train employees on cloud technologies and help them transition into new roles within the company.

E. Vendor Lock-In and Dependency

One critical risk of cloud adoption is the potential for vendor lock-in, where organizations become overly dependent on a single cloud provider's technology and tools ^[17].

- **Reducing Vendor Dependency:** Multi-cloud and hybrid cloud strategies help mitigate lock-in risks by allowing organizations to use services from multiple providers. Standardizing applications and containerization technologies like Docker make moving workloads between cloud providers easier.
- **Interoperability Issues:** While multi-cloud strategies reduce dependency on a single provider, they can also introduce interoperability challenges. Ensuring systems and applications work seamlessly across multiple clouds requires careful planning and integration.
- **Real-World Example:** Netflix uses a multi-cloud strategy to run its AWS and Google Cloud services to ensure availability and flexibility. By using containers and microservices, they can shift workloads between providers as needed without significant disruption ^[17].

5. Findings and recommendations

B. Findings:

Based on the analysis of cloud adoption and the emerging trends in cloud-based digital transformation, the following key findings were identified:

- A. **Hybrid and Multi-Cloud Adoption:** Organizations increasingly use hybrid and multi-cloud strategies to enhance flexibility, avoid vendor lock-in, and improve resilience. This approach ensures that businesses can leverage the strengths of different cloud providers while mitigating the risks of over-reliance on one vendor ^[10].
- B. **Integration of AI and ML:** Cloud platforms are evolving to support AI and machine learning capabilities, allowing businesses to automate processes, enhance decision-making, and gain deeper insights from large data sets. This integration is crucial for driving innovation and improving operational efficiency.
- C. **Edge Computing and IoT:** With the growing number of connected devices, edge computing is becoming increasingly crucial for real-time data processing and reducing latency. In combination with edge computing, the cloud supports faster decision-making and more efficient operations, particularly for IoT applications ^[12].
- D. **Security and Compliance Challenges:** Data privacy, security, and compliance are the most significant concerns for organizations moving to the cloud. The shared responsibility model between cloud providers and businesses means organizations must actively safeguard data and comply with regulatory standards ^[8].
- E. **Legacy System Integration and Cost Management:** Transitioning from legacy systems to the cloud presents integration challenges, while unpredictable cloud costs pose budgeting risks. Organizations must have clear migration plans and cost-optimization strategies to avoid unforeseen expenses ^[15].

F. Recommendations

Based on these findings, the following recommendations are made for organizations adopting or planning to adopt cloud

solutions:

- **Adopt Hybrid or Multi-Cloud Strategies:** To avoid vendor lock-in and enhance operational flexibility, organizations should consider a hybrid or multi-cloud strategy. This strategy allows greater control over where and how workloads are distributed.
- **Leverage AI and ML for Competitive Advantage:** Businesses should integrate AI and machine learning capabilities within their cloud environments to automate tasks, improve decision-making, and create new value through data-driven insights.
- **Focus on Security and Compliance:** Organizations must prioritize cloud security by implementing multi-layered protection strategies, including encryption, IAM, and continuous monitoring. They must also understand the shared responsibility model and ensure compliance with relevant regulations like GDPR and HIPAA ^[13].
- **Plan for Legacy System Integration:** Companies should invest in detailed migration plans for integrating legacy systems with cloud solutions. Utilizing hybrid models, containerization, or phased migrations can help address compatibility and reduce operational disruptions ^[13].
- **Implement Cloud Cost Management Tools:** To control cloud spending, businesses should implement cost management strategies, including regular monitoring, usage forecasting, and automation tools to scale resources based on demand. Exploring pricing options with providers and reviewing contracts regularly can also help optimize cloud spend ^[2].

6. Conclusion

In conclusion, cloud computing drives a fundamental shift in how organizations operate, providing them with the agility, scalability, and cost-efficiency required to remain competitive in a rapidly evolving digital landscape. The cloud's ability to streamline operations, unlock new business models, and enhance flexibility positions businesses to thrive in an increasingly remote and globalized environment.

However, the transition to the cloud is not without its challenges. Data security, regulatory compliance, legacy system integration, and cost management must be carefully addressed to maximize the benefits of cloud adoption. A well-defined strategy, strong security practices, and ongoing monitoring are essential for a smooth transition and long-term success.

As cloud technology evolves, emerging capabilities like edge computing, quantum computing, and advanced automation will further enhance its value in driving innovation and business growth. By embracing the cloud, organizations can build more resilient, competitive, and future-ready enterprises.

In today's digital economy, cloud adoption is not just a technical decision but a strategic imperative. Those who act now to harness the full potential of cloud technologies will be better positioned to innovate, grow, and succeed in the years to come.

7. References

1. Sharma SU, Gandole Y. Cloud Computing – A New Paradigm for Modern Computing. *Int J Comput Sci Inf Technol*. 2011;2(5):2290-2292.
2. Agarwal M, Srivastava DGMS. Cloud Computing: A Paradigm Shift in the Way. *Int J Mod Educ Comput Sci*.

- 2017;12:38-48.
3. Marston SR, Li Z, Bandyopadhyay S, Zhang J. Cloud computing—The business perspective. *Decis Support Syst.* 2011;51(1):176-189.
4. Ahmad AA-S, Andras P. Measuring the Scalability of Cloud-Based Software Services. In: 2018 IEEE World Congress on Services (SERVICES); 2018 Jul 2-7; San Francisco, CA, USA.
5. Brataas G, Herbst N, Ivansek S, Polutnik J. Scalability Analysis of Cloud Software Services. In: 2017 IEEE International Conference on Autonomic Computing (ICAC); 2017 Jul 24-28; Columbus, OH, USA.
6. Biočić B, Tomić D, Ogrizović D. Economics of the cloud computing. In: 2011 Proceedings of the 34th International Convention MIPRO; 2011 May 30 - Jun 3; Opatija, Croatia.
7. Borangiu T, Trentesaux D, Thomas A, Leitão P, Barata J. Digital transformation of manufacturing through cloud services and resource virtualization. *Comput Ind.* 2019;108:150-162.
8. Fesak A, Duan J, Faker P, Stuart T. Benefits and Drawbacks of Cloud-Based versus Traditional ERP Systems. In: Proceedings of the 2012-13 course on Advanced Resource Planning; 2012.
9. Banerjee J. Moving to the cloud: Workload migration techniques and approaches. In: 19th International Conference on High Performance Computing; 2012 Dec 18-21; Pune, India.
10. Hong J, Dreibholz T, Schenkel JA, Hu JA. An Overview of Multi-cloud Computing. In: Workshops of the International Conference on Advanced Information Networking and Applications; 2019 Mar 25-28; Matsue, Japan.
11. Matt C, Hess T, Benlian A. Digital Transformation Strategies. *Bus Inf Syst Eng.* 2015;57(5):339-343.
12. Yu W, Liang F, He X, Hatcher WG, Lu C, Lin J. A Survey on the Edge Computing for the Internet of Things. *IEEE Access.* 2018;6:6900-6919.
13. Avram M. Advantages and Challenges of Adopting Cloud Computing from an Enterprise Perspective. *Procedia Technol.* 2014;12:529-534.
14. Abdelrazek M, Grundy J, Mueller I. An Analysis of the Cloud Computing Security Problem. In: Asia-Pacific Software Engineering Conference; 2016 Dec 5-7; Hamilton, New Zealand.
15. Scandurra P, Psaila G, Capilla R, Mirandola R. Challenges and assessment in migrating IT legacy applications to the cloud. In: 2015 IEEE 9th International Symposium on the Maintenance and Evolution of Service-Oriented and Cloud-Based Environments (MESOCA); 2015 Oct 26-30; Bremen, Germany.
16. Kozhipurath J. Cloud Service Costing Challenges. In: 2012 IEEE International Conference on Cloud Computing in Emerging Markets (CCEM); 2012 Nov 1-3; Bangalore, India.
17. Silva GC, Rose LM, Calinescu R. Towards a Model-Driven Solution to the Vendor Lock-In Problem in Cloud Computing. In: 2013 IEEE 5th International Conference on Cloud Computing Technology and Science; 2013 Nov 18-21; Bristol, UK.
18. Ghahramani Z. Probabilistic machine learning and artificial intelligence. *NATURE.* 2015;521:452-459.