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A RESEARCH PROJECT SUBMITTED IN THE PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE BACHELOR OF SCIENCE (BSC) IN INFORMATION TECHNOLOGY DEGREE

TOPIC:

CLOUD COMPUTING A BETTER MEANS OF INFORMATION TECHNOLOGY OUTSOURCING.

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DECLARATION

This declaration certifies that Tizaanibeni Abuba Silas completed the research project entitled " Cloud Computing A Better Means Of Information Technology Outsourcing" under the supervision of the supervisor Dr. Seth Okyere-Dankwa a reputable lecturer of the Computer Science Department, Faculty of Applied Science and Technology.

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ABSTRACT

The research focuses on cloud computing as a better means of IT outsourcing. It provides an analytical framework for the nature of cloud computing, its characteristics, and its source models. It also provides a detailed study of cloud computing as a better means of outsourcing. The rapid advancement of technology and the exponential growth of data have led organizations to seek efficient and scalable solutions to manage their information technology (IT) infrastructure and operations. Cloud computing has emerged as a transformative technology that offers promising advantages in terms of IT outsourcing. This research project explores the concept of cloud computing as a better means of information technology outsourcing, assessing its benefits, challenges, and impact on businesses and industries.

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CHAPTER ONE

1.0 INTRODUCTION

Cloud computing is the process of storing data on cloud servers, which enables universal, availability-based, on-demand network access to a shared pool of configurable computing resources, such as storage, networks, servers, applications, and services, that can be rapidly provisioned and released with minimal management effort or service provider interaction. Edwin.s. (2014).

In the dynamic field of information technology (IT), companies are continuously searching for novel and effective approaches to oversee their IT setup. Once a popular strategy, traditional IT outsourcing is encountering new difficulties in addressing the demands of the fast-paced business climate of today. The advent of cloud computing has brought about a revolutionary change in the delivery of IT services by providing a substitute that offers increased cost-effectiveness, scalability, and flexibility. The goal of this research is to examine how cloud computing has changed the game and whether it can be a more effective way to outsource IT work. Cloud computing is composed of five important characteristics, three deployment models, and four service models. The essential characteristics consist of:

- On-demand self-service: users are able to position cloud computing resources without requiring human interaction,

mostly done through a web-based self-service portal (management console).

- Broad network access: cloud computing resources are accessible everywhere over the network, supporting diverse client platforms such as mobile devices and workstations.
- Resource pooling: service multiple customers from the same physical resources by securely separating the resources on a logical level.
- Rapid elasticity: the position and release of resources are on demand and/or automated based on triggers or parameters. This will make sure your application will have exactly the capacity it needs at any point in time.
- Measured service: The use of resources is monitored, measured, and reported by billing transparently based on user utilization of service.

Cloud computing, then, encompasses much more than just visualization. Basically, what's at stake is using technology as a service. The specifics of how a given service is implemented, including which hardware is used, how many CPUs are used, and other parameters, are mostly irrelevant to users. It is vital for a user to possess a comprehensive comprehension of the features and limitations of the service, together with the ability to utilize the self-help portal.

1.1 SUBJECT AND FIELD OF STUDY

This study examines how cloud computing can be a cutting-edge and revolutionary method of IT outsourcing. It dives into the IT and business management fields in an effort to comprehend how cloud computing affects IT outsourcing processes as well as the advantages, drawbacks, and factors that influence its acceptance in businesses. To analyze the evolution of IT outsourcing and the emergence of cloud computing as a prominent outsourcing solution. It is examine real-world case studies and best practices of organizations successfully implementing cloud-based IT outsourcing and provide recommendations and insights for businesses and IT professionals considering cloud computing as an IT outsourcing solution.

1.2 STUDY OBJECTIVES

1.2.1 GLOBAL (GENERAL) OBJECTIVES

The goals of "Cloud Computing as a Better Means of IT Outsourcing" are to thoroughly examine cloud computing's role in IT outsourcing. Assessments of the advantages of cloud adoption, associated challenges, factors influencing adoption, studies of real-world implementations, practical recommendations, evaluations of its effects on business competitiveness, and consideration of future trends are some of them. These goals add up to better knowledge of how cloud computing may improve IT outsourcing procedures, helping firms improve their strategic competitiveness, scalability, and

efficiency. And also, by highlighting the many benefits of using cloud computing as a superior method of IT outsourcing, these objectives together contribute to the broader project theme. They highlight cost-effectiveness, adaptability, efficiency, and security as significant advantages, ultimately increasing IT outsourcing processes across sectors.

1.2.2 SPECIFIC OBJECTVES

This could be done with the following specific objectives of the study.

- This project aims to develop migration strategies and a strategic plan for a smooth transition of existing IT infrastructure to the cloud.
- Aims to assess cloud service providers' security measures and compliance frameworks to ensure data security and adherence to industry regulations during IT outsourcing.
- Scalability Assessment to analyze the benefits of cloud computing outsourcing, analyzing how well cloud resources can be handled in cooperation expansion.

1.3 BACKGROUND OF THE STUDY

From early data center outsourcing to the introduction of managed services, the evolution of IT outsourcing has gone through numerous stages. But these approaches frequently ran into obstacles like vendor lock-in, restrictive infrastructure, and scalability problems. In order to overcome these constraints, the idea of cloud computing was developed, drawing influence from ideas like utility computing, virtualization, and distributed systems. The evolution of cloud computing may be seen as following a path from abstract ideas to practical

applications. Major vendors like Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform (GCP) have played a significant role in reshaping the cloud landscape.

A new paradigm called cloud computing makes it possible for businesses to use the internet to access computing resources, apps, and services whenever they need them. The fundamental shift to using virtualized resources instead of owning physical infrastructure is a disruptive force that could change how IT outsourcing A new paradigm called cloud computing makes it possible for businesses to use the internet to access computing resources, apps, and services whenever they need them. The fundamental shift to using virtualized resources instead of owning physical infrastructure is a disruptive force that could change how IT outsourcing is conducted. To meet a range of business demands, cloud computing provides a number of service models, including infrastructure as a service (IaaS), platform as a service (PaaS), and software as a service (SaaS).

When it comes to outsourcing, everyone has a tale of woe. Some software vendors that outsource new development projects could not meet the deadline because they were amateurs, so they switched from one platform to another. But the big question is: who reached the platform? Did the customer work daily? (NO). Did it have automated status reporting (it did not)?

Outsourcing is a key part of any modern IT group. The problem is that we still don’t seem to do it well. Hence, many business technology professionals fire vendors within a short period of time. Companies using IT outsourcing speak of the importance of managing outsourcing better.

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One of the growth initiatives of cloud computing and software as a service is:

IT outsourcing is moving up the stack as vendors take over increasingly strategic functions. Nearly six to ten IT shops outsource some critical functions. Management, engineering, or development: almost one-fourth keep executive and management functions in-house but look to outsource everything else as companies rely more on outsiders. A lack of oversight, management, and even monitoring can have catastrophic consequences.

Effective management of information technology (IT) infrastructure has become crucial for firms to preserve their competitive edge and ensure operational efficiency in today's fast-expanding or rapid technological world. For firms looking to offload their IT operations and concentrate on key business responsibilities, traditional IT outsourcing models have long been a viable option. However, with the development of cloud computing, a paradigm shift that offers a more adaptable, scalable, and effective method of IT outsourcing has evolved.

The increase in cloud computing has brought a wide range of benefits, as it provides even more conventional IT outsourcing approaches.

Cost effectiveness: Cloud computing has removed the need for huge investments in hardware devices and infrastructure. Cloud computing allows IT spending to move from capital expenditures

to operational expenditures. The pay-as-you-go business model enables cost optimization based on real consumption.

Scalability and Flexibility: Thanks to cloud computing's unmatched scalability, businesses may easily scale up or down in response to demand. This adaptability is especially important in the fast-paced business world of today.

Rapid Deployment: Compared to traditional outsourcing, cloud services may be provided and deployed much more quickly, allowing for a shorter time-to-market for new goods and services.

Global Accessibility: Cloud services are accessible from any location with an internet connection, allowing distributed teams to work remotely and collaborate without interruption.

Cloud computing blurs the lines between what had been conventional outsourcing and internal operations, and it will test IT’s managemen.

Lower Maintenance Costs: By managing the underlying infrastructure, cloud service providers relieve enterprises of routine maintenance duties and allow them to concentrate on strategic objectives.

Innovation and Agility: Rapid experimentation and innovation are made possible by cloud computing, allowing businesses to roll out new services and features more quickly.

1.4 SCOPE OF THE STUDY

This project scope offers the framework for a thorough investigation of cloud computing as a better means of IT outsourcing, specifying areas of concentration while taking into account specific boundaries and restrictions that guide the research. The study will also highlight the importance of data privacy and sovereignty and the legal and regulatory considerations related to data stored and processed in the cloud.

1.5 SIGNIFICANCE OF THE STUDY/JUSTIFICATION

This study holds significant relevance for both IT companies and professionals as it establishes a structured framework for the application of cloud computing as an improved approach to IT outsourcing, thereby serving as a valuable point of reference for cloud-related information and insights within the field.

1.6 METHODOLOGY:

The research will use a mix-method approaches, combining both the qualitative and quantitative methods to understanding cloud computing as a better means of its outsourcing.

The qualitative component of the study will involve interviews and case studies to investigate real-world scenarios where cloud computing has resulted in notable cost savings, increased

flexibility, and improved overall IT performance. Whiles the quantitative approach will involve surveys and data analysis to quantify the experiences and perceptions of IT managers and executives who have already implemented cloud-based IT outsourcing. The data collection will involve semi-structured interviews with some stakeholders, and surveys will be distributed online. The research study will integrate the findings, validate findings, and then ensure ethical considerations, including an informed consent and confidentiality.

1.7 EXPECTED RESULTS AND POSSIBLE USE OF THE STUDY

The quantifiable cost savings in Organizations may make wise financial decisions and manage their budgets by clearly identifying and quantifying the cost savings that can be realized through cloud-based IT outsourcing. Also, making well-informed decisions and gathering case studies and best practices showcase effective cloud-based IT outsourcing implementations and provide insightful information for strategic decision-making. Strategic planning in businesses can also utilize the anticipated outcomes to create thorough plans for shifting their IT outsourcing to cloud-based solutions while maximizing efficiency and costs.

1.8 PRESENTATION OF THESIS/SUMMARY THESIS

Chapter 1: INTRODUCTION

- Describe the study's topic: Cloud computing as a means of IT outsourcing.
- Draw attention to the study's importance in the context of current IT developments and organizational effectiveness.
- Indicate the goals of the study, the research questions, and the thesis structure.

Chapter 2: LITERATURE REVIEW

- Review the existing literature on cloud computing and IT outsourcing, highlighting each topic's unique benefits and drawbacks.
- Explore the development of cloud computing and its applicability to contemporary IT ecosystems.
- Analyze the potential benefits of combining cloud computing and IT outsourcing for organizations.

Chapter 3: METHODOLOGY

- Describe the research design, including the data collection methods, sources, and tools used.
- Outline the criteria for selecting case studies and organizations for analysis.
- Detail the quantitative and qualitative analysis techniques employed to evaluate cost, scalability, security, and other relevant factors.

Chapter 4: DATA ANALYSIS/PRESENTATION, FINDINGS AND DISCUSSIONS

- Present the findings of the study and cost analysis of cloud-based outsourcing.
- Quantify the cost reductions brought about by cloud based adoption while taking into account charges for hardware, software, maintenance, and operational costs.

Chapter 5: CONCLUSION AND RECOMMENDATIONS

The objectives of the study were to

- To determine the nature and characteristics of cloud computing.
- To determine the nature of IT outsourcing.
- To highlight the role of cloud computing as a better means of IT outsourcing.

Findings from the study revealed the following:

- Cloud computing has more benefits than making use of a local server or a personal computer.
- Cloud computing helps in getting more work done with less people and in less time.
- Storing information in the cloud gives almost unlimited storage capacity.
- The growth of cloud computing is high.
- The level of IT outsourcing is high.
- The impact of cloud computing on IT sourcing is high.

In conclusion, the project is aiming to unveil its transformational potential for businesses seeking improved operational efficiency, scalability, security, and cost optimization, this research explored cloud computing as a superior method of IT outsourcing. The study process has produced useful insights into the interaction between cloud computing and IT outsourcing, demonstrating how this synergy might enable firms to more efficiently achieve their IT goals. The project's findings and results highlight how important it is to implement cloud-based IT outsourcing solutions as a driver for company expansion, creativity, and sustainability.

1.9 STUDY WORK PLAN (TIMELINE)

Week 1: Planning and Project Launch

Week 2: Literature Review

Week 3-4: Research Methodology and Data collection/Analysis

Week 5: Data Presentation

Week 6: Conclusion and Recommendations

CHAPTER TWO

2. LITERATURE REVIEW

Cloud Computing Definition

Cloud computing is a computing model that enables users to access a shared pool of reconfigurable computing resources (such as networks, servers, storage, and database services) anywhere, at any time, with little effort or service provider interaction, according to the National Institute of Standards and Technology (NIST) of the US government. (Mellol and Grance, 2011)

Some definitions of cloud computing that help provide a more comprehensive view and comprehension of the technology are as follows:

- Cloud-based cyber infrastructure: This is a collection of computer resources that increases efficiency, quality and reliability by capturing commonality among application needs that facilitates the efficient sharing of equipment's and services (Vouk, 2014).
- Cloud computing is a new business model that encircles existing technologies, like server virtualization, to lower the cost of accessing IT resources. It is not a new technology. It makes use of web-based technology.
- A cloud is a kind of distributed, parallel system made up of several virtualized, networked computers that are dynamically supplied and shown.

History of Cloud Computing

Information technology has witnessed ongoing paradigm transformations, from mainframe computers to modern desktop computers and, most recently, mobile computing. Peer-to-peer networks took the role of peer-to-peer, client-server, distributed systems, standalone computers, and the internet—the greatest invention ever made—in 1990 (David, 2009).

Following Google's announcement of collaboration in the cloud computing space in October 2007, IBM announced "Blue Cloud," platform as a service (PaaS), infrastructure as a service (Iaas), and software as a service (Saas) are among the cloud computing services offered by this suite. In Vouk (2004)

Cloud computing gained popularity in October 2007 when IBM, which is a suite of cloud computing services that offers both platform as a service (Paas), infrastructure as a service (Iaas), and software as a service (Saas), and Google announced collaboration in the domain. IBM followed up by announcing "Blue Cloud". (Vouk, 2004)

Cloud Computing Predecessor Paradigm

Buyya (2009) describes cluster computing and grid computing as the immediate building blocks of cloud computing. He gives the following description:

Cluster: the resources in a cluster are located in a single administrative domain and managed as a single entity.

Grid system: the resources are geographically distributed across multiple administrative domains with their own management policies and goals.

Cloud computing: the cloud platform possesses characteristics of clusters and grids plus its own special attributes and capabilities, such as virtualization, dynamic services with web services interfaces, and support for creating 3rd party value-added computing storage and application services.

Cloud Computing Service Models:

The models are based on the NIST (National Institute of Standards and Technology) definition of cloud computing (Mell and Grance, 2011).

Cloud Software as a Service (SaaS)

SaaS provides the consumer with the ability to use the provider's applications running on a cloud infrastructure. The applications are accessible from various client devices through a thin client interface such as a web browser (e.g., web-based e-mail, Gmail, Yahoo, cooperative email). The implication is that this consumer rents services from the provider rather than buying, installing, and running their own software.

Cloud Platform as a Service (PaaS).

PaaS provides the consumer with the ability to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages and tools supported by the provider. It implies that customers can develop and execute applications in abstraction of the underlying infrastructure, e.g., Microsoft Azure and Google App Engine.

Cloud Infrastructure as a Service (IaaS).

IaaS is a platform that provides the consumer with the ability to process, store, and use networks. Other fundamental computing resources enable the consumer to deploy and run arbitrary software, which can include operating systems and applications. The provider provides a solution that offers computing power and storage space on demand. E.g., Rackspace and Amazon S3.

Characteristics of cloud computing:

On-demand self-service

On-demand self-service: This is the essential feature of cloud computing, which enables customers to provide and manage computing resources without seeking help from the service provider. It enables users to access and customize resources as required, frequently through an automated procedure, without having to communicate with the administrators. A consumer can unilaterally get computing capabilities such as server time and network usage automatically without human interaction (Mell and Grance, 2011).

Broad network access

“Broad network access" is one of the essential characteristics of cloud computing, emphasizing the ability to offer users access to cloud services and resources over the internet from a wide range of devices and locations. It complements the "self-service" aspect of cloud computing by providing users with the freedom to connect to and interact with cloud resources using various devices and network connections. This is very vital, for it helps in providing high-capacity connectivity where large amounts of data can be transmitted.

Resource pulling

One of the essential aspects of cloud computing that promotes its effectiveness and scalability is resource pooling. Aggregating and sharing computing resources, such as processing power, storage, and memory, in a way that enables different users or applications to access a shared pool of resources in accordance with their requirements is referred to as this approach. A key component of how cloud providers may effectively distribute and manage resources among a large number of users and workloads is resource pooling. The provider’s computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand. (Mell and Grance, 2011).

Rapid elasticity

Capabilities can be rapidly and elastically provisioned, in some cases automatically, to quickly scale out and rapidly released to quickly scale in. To the consumer, the capabilities available for provisioning often appear to be unlimited and can be purchased in any quantity at any time. (Mell and Grance, 2011).

Measured services

This is where consumers are billed for what they used. Resource usage is monitored, controlled, and reported, providing transparency for both the provider and the consumer of the utilized service. (Mell and Grance, 2011).

Abstraction of infrastructure

Abstraction of infrastructure is a fundamental concept in cloud computing that involves hiding the complex underlying hardware details and technical complexities from users and applications. It provides a simplified and standardized view of computing resources, allowing users to interact with and utilize those resources without needing to understand the intricate technical details of the infrastructure. Computer, network, and storage infrastructure resources are abstracted from application and information resources as a function of service delivery; this is made possible by a high level of virtualization (Beaker, 2009).

Resource Democratization

The abstraction of infrastructure yields the notion of resource democratization—whether infrastructure, applications, or information—and provides the capability for pooled resources to be made available and accessible to anyone or anything authorized to utilize them using standardized methods for doing so. (Beaker, 2009)

Service oriented Architecture

As the abstraction of infrastructure from applications and information yields well-defined and loosely coupled resource democratization, the notion of utilizing these components in whole or in part, alone or with integration, provides a services-oriented architecture where resources may be accessed and utilized in a standard way. In this model, the focus is on the delivery of services and not the management of infrastructure. (Beaker, 2009)

Cloud deployment models:

According to the National Institute of Standards and Technology (NIST) (Mell et al., 2011), there are four cloud deployment models, namely:

Private cloud

Cloud infrastructure is operated solely for an organization. It may exist on or off the organization's premises, and management could be outsourced or not. Private clouds could be shared by several organizations that are interrelated and have shared concerns like mission, security requirements, policy, compliance considerations, and business and client bases.

Public

A public cloud is a type of cloud computing model in which cloud services and resources are offered to multiple users over the internet by a third-party cloud service provider. In a public cloud, the underlying infrastructure, such as servers, storage, and networking components, is shared among various users and organizations while remaining hosted and managed by the provider. This model contrasts with private clouds, which are dedicated to a single organization, and hybrid clouds, which combine elements of both public and private clouds. This is made available to the general public or a large industry group and is owned by an organization selling cloud services.

Hybrid

A hybrid cloud is a cloud computing deployment model that combines elements of both public and private clouds. In a hybrid cloud environment, organizations integrate and orchestrate their private cloud resources with public cloud services, allowing

data and applications to be shared between them. This model offers greater flexibility and optimization, as it enables organizations to leverage the benefits of both public and private clouds while addressing specific business requirements and concerns. This could be the composition of two or more clouds bound together by standardized or proprietary technology that enables data and application portability.

Source: 2010 International Conference on Computer Application and System Modeling (ICCASM 2010) (Jingyu, 2010). Figure 2.1: Conceptual Model of Cloud Computing

Benefits of cloud computing

According to David (2009), cloud computing offers a number of benefits, including the potential for:

- Rapid scalability and deployment capabilities (providing just-in-time computing power and infrastructure)
- Decreased maintenance and upgrades.
- Improved resource utilization—elasticity, flexibility, efficiencies
- Improved economies of scale.
- Improved collaboration capabilities.
- Ability to engage in usage-based pricing, making computing a variable expense rather than a fixed capital cost with high overhead.

- Reduced information technology (IT) infrastructure needs—both upfront and support costs.
- Improved disaster recovery capabilities.
- Nein (2009) cites the following benefits: cost reduction, increased flexibility, access anywhere, ease of implementation, service quality, delegating non-critical applications, always having the latest software, sharing, and group collaboration.

Source: International Journal of Advancements in Technology (Motahari et al., 2009). Figure 2.2: Benefits of Cloud Adoption

Challenges of Cloud Computing

The Federal Government CIO (Kundra, 2011) underscores security, interoperability, and portability as major barriers to further adoption and use of cloud computing services. At the IEEE 2010 conference, Tharam et al. (2010) pointed out charging model, costing model, security, service level agreement, and what to identify to migrate to cloud computing as part of the adoption challenges for cloud computing.

From a more specific angle, David (2009) highlights the following 7 issues as the major challenges government leaders face while shifting to cloud computing:

- The Need for Scalability
- The need for high reliability

- The Need for Securing Data in the Cloud
- The need for open standards and interoperability
- The Need to Regulate the "Cloud Market"
- The Need for Government Cloud Coordination
- The need to redefine the roles of the IT workforce

Cloud Computing in the Public Sector

Governments and the public sector should come up with progressive, supportive, and adoptable government policies that encourage the development of cloud computing in the public sector. They should also address issues of technology and standards for interoperability. This should be done in line with existing laws and regulations on the land (Michael, 2009).

It means that the government will be the leading sector in the development of cloud computing across the wider economy (David, 2010). Experience shows that the benefit of a new technology can only be realized when enterprises change their structure and processes to take advantage of technological innovation (Khajeh et al., 2010).

Federal Government, US

Cloud computing offers the government an opportunity to be more efficient, agile, and innovative through more effective use of IT investments and by applying innovations developed in the private sector (Kundra, 2011). The federal cloud computing

strategy states that if governments are going to become early adopters of cloud services, they must overcome bureaucratic, regulatory, and cultural barriers to resource sharing that could slow the adoption of cloud computing. Government IT procurement rules covering the purchase of hardware and software must be updated to enable the purchase of cloud services (Nelson, 2009).

The federal government has instituted massive changes in its IT strategy, both in mindsets and operations. It believes that cloud computing represents a 'tectonic shift' in computing technology and predicts that the cloud will do for government what the internet did in the '90s' (David, 2010).

Federal Government cloud strategy

In February 2011, the Federal Government's cloud strategy stated that the current information technology (IT) environment is characterized by low asset utilization, a fragmented demand for resources, duplicative systems, environments that are difficult to manage, and long procurement lead times. These inefficiencies have a direct negative impact on the Federal Government's ability to serve the American public; the strategy reckons that there could be massive improvement with the adoption of cloud computing (Kundra, 2011).

The main highlights of the federal cloud computing strategy articulate how individual organizations should go about adopting

cloud computing and how the government should assist organizations in the same endeavor.

These are listed below, as extracted from the strategy.

- Agencies should articulate the benefits, considerations, and trade-offs of cloud computing.
- Provide a decision framework for migrating to cloud computing.
- Highlight cloud computing implementation resources.
- Identify federal government activities, roles, and responsibilities for catalyzing cloud adoption.

Federal Government Decision Framework for Cloud Migration

The strategy decision framework for cloud migration highlights how the agencies should decide on the migration processes. It also underscores that organizations should see IT in the form of commoditized computing services, not as investments in servers, applications, and networks owned by departments.

Decision Framework for Cloud Migration (Kundra, 2011)

Selecting a service to move to the cloud

This is a road map to prioritize services that have high expected value and readiness to maximize the benefit received and minimize delivery risk.

It’s important to note that the strategy directs that for organizations to determine their value, they should consider efficiency, agility, and innovation. For cloud readiness determination, security requirements, statutory compliance, data characteristics, privacy, confidentiality, integrity, data controls, access policies, and governance should be considered.

G-cloud strategy in the UK

Digital British initiative G-cloud strategy

G-Cloud is a government-wide cloud computing network, according to David (2010).

Through the Digital British initiative, the G-Cloud strategy is written by representatives from public sector organizations and the ICT industry. Its objective is to set out how the public sector will realize the benefits of cloud computing. It outlines the following interrelated initiatives as the driving force: (Vouk, 2010).

The government cloud (G-Cloud) infrastructure will provide a secure and resilient shared environment through which public sector bodies can resource ICT services at greater speed and lower cost.

- The Application Store for Government (ASG) will be a marketplace to review, compare, and select online G-Cloud business applications on a pay-by-use basis.

- The Data Center Strategy will significantly reduce the number of data centers used by the central government to host G-Cloud and other ICT services. This will bring substantial savings in cost and energy consumption.
- Lower ICT costs, faster and more flexible services, and more joined-up government services

Japanese Kasumigaseki cloud

The Japanese' Kasumigaseki cloud' is a national government initiative seeking to have a private cloud environment that would eventually host all the Japanese government's computing. According to Japan's ministry of internal affairs and communication, the Kasumigaseki Cloud will allow for greater information and resource sharing and promote more standardization and consolidation in the government's IT resources. (David, 2010)

Source: Government of Japan, Ministry of Internal Affairs and Communications (2009)

The Japanese Government's Kasumigaseki Cloud

Virtual Computing Laboratory (VCL)

(Vouk, 2004) describes VCL as the implementation of a secure production-level on-demand utility computing and services-oriented technology for wide-area access to solutions based on virtualized resources, including computational, storage, and

software resources. VCL has been piloted on University of North Carolina campuses, the North Carolina Community College system, and universities that are members of the IBM Virtual Computing Initiative.

Access to the cloud is through an application program interface (API) or web portal, where the image and other accessed information are stored in a database on a computer within the cloud or a different cloud. The computers share information provided by licenses and other constraints, e.g., standards.

VCL has been in production use at NC State University since 2004 and is a suitable vehicle for the dynamic implementation of almost any current "cloud" computing solution.

NC State "Cloud".

Cloud Business Model Framework (CBMF)

This is a model that describes the infrastructural implementation by all cloud service providers. It is categorized into three layers similar to the technical layers in cloud realization, such as the infrastructure-as-a-service layer, the platform-as-a-service layer, and the application-as-a-service layer on top (Weinhardt et al., 2009).

Infrastructure in the cloud: the enabler layer that provides basic technologies for cloud computing E.g., storage and computing **power Platform in the cloud: this** provides a solution

on top of infrastructure that provides value-added services. It could be categorized as a business platform or a development platform. The application layer in the cloud is the customer interface layer.

Cloud Migration Strategy

In his paper, a model-based approach to implementing cloud computing in e-government (David, 2010) highlights eight fundamental elements that are vital for cloud computing concepts that should be used in both the public and private sectors.

- **Universal connectivity:** users must have near-ubiquitous access to the internet.
- **Open Access:** Users must have fair, non-discriminatory access to the internet.
- **Reliability:** the cloud must function at a level equal to or better than current standalone systems.
- **Interoperability and user choice:** users must be able to move among cloud platforms.
- **Security: The user's** data must be safe.
- **Privacy: The user's** rights to their data must be clearly defined and protected.
- **Economic value:** the cloud must deliver tangible savings and benefits.
- **Sustainability:** the cloud must raise energy efficiency and reduce ecological impact.

The paper further discusses the cloud migration strategy in a six-stage process that should be followed for successful migration to cloud computing. The six stages are:

- **Learning** (knowledge transfer): this involves learning about cloud computing basics through seminars, networking, talking with vendors, and reading.
- **Organizational assessment—baseline** assessment. The IT manager should conduct an assessment of their present IT needs, structure, and capacity utilization.
- **Cloud pilot: One** area should be used as the pilot.
- **Cloud-**Readiness assessment

After the pilot run, the managers should conduct an overall cloud readiness assessment to determine if their organization has data and applications that could readily move to a cloud environment. The manager should have a modality to determine which services are eligible and which are not.

- **Cloud Rollout Strategy**

At this stage, you roll out your cloud computing strategy, gaining buy-in from both organizational leadership and IT staffers. You communicate with external and internal stakeholders about the goals, progress, and cost benefits of the cloud project. This is the step where cloud computing becomes a normal organizational operation.

- Continuous cloud improvement.

HP Government Cloud Roadmap Service

HP proposes the HP Transformation Planning Tool and HP Cloud Capability Framework (HP, 2011).

The model that helps the organization do self-assessment before implementing the cloud is in this line:

- Identify the services that are right for the cloud and which are not.
- What is the cost trade-off and the best way to build an effective private cloud for posterity?
- It guides organizational compliance with legislation and regulations.
- It focuses on security.
- That the cloud will guarantee the achievement of expected benefits.
- Assists in building a flexible environment and accommodating changing business requirements.
- Create a business return on investment (ROI) case and payback analysis, as well as alternative scenarios.

Australian Cloud Computing Strategic Direction

The Australian Department of Finance and Deregulation draft paper on Cloud Computing Strategic Direction (Austrian

Government, 2011) recognizes three streams that need to be resolved before critical government services can be transitioned to the cloud, as follows:

- Stream One: provide agencies with guidance and documentation.
- Stream two: Encourage agencies to adopt public services for public-facing unclassified government services and to undertake proof-of-concept studies to fully understand the risks of the cloud environment.
- Stream Three: Encourage a strategic approach to cloud computing.

Aneka Cloud Applications

Aneka is a platform for developing resource-intensive and elastic applications and their deployment on clouds. It can harness a huge variety of physical and virtual resources, ranging from desktops and clusters to virtual datacenters, to provide a single logical "application execution layer". The key components of the platform are depicted in the diagram, which gives an overall view of Aneka from its foundations to the applications and the end-user services. The platform is based on an extensible

Service-Oriented Architecture (SOA), which makes the integration of new components, incremental development of new features, and

infrastructure deployment and configuration seamless tasks (Rajkumar and Karthik, 2011).

Key metrics and scenarios for government cloud computing

Metrics

Some important metrics (Nein, 2009) to be considered for cloud adoption are:

- The net present value (NPV) is calculated for each cloud scenario.

Discounted net benefits (i.e., the cloud scenario's reduced operations and support [O&S] costs relative to the SQ environment's O&S costs) minus the cloud's discounted one-time investment costs A positive dollar figure indicates a positive economic benefit versus the SQ environment. NPV is an absolute economic metric.

- The benefit-to-cost ratio (BCR) is calculated for each cloud scenario's discounted net benefits divided by its discounted investment costs. A number greater than 1.0 indicates a positive economic benefit versus the SQ environment. BCR is a relative economic metric.
- Discounted Payback Period (DPP) reflects the number of years (from FY10) it takes for each scenario's accumulated annual benefits to equal its total investment costs.

nalysis scenario

For the choice of the cloud model (Nein, 2009), the following considerations should be taken:

- To use public clouds

Key Agency Characteristic: Migrates low-sensitivity data to an existing public cloud.

Assumptions: Transition to the new cloud environment will occur steadily over 3 years; workload remains constant (i.e., no increase in capacity demand).

- Build private clouds.

Key Agency Characteristic: Builds its own private cloud solution or participates in an interagency cloud solution (i.e., community cloud).

Broad mission sensitivity results in the need to maintain control of infrastructure and data.

Assumptions: Transition to the new cloud environment will occur steadily over 3 years; existing facilities will be used (i.e., no new investment is required in physical facilities); workload remains constant (i.e., no increase in capacity demand).

- Adopt a hybrid approach.

Key Agency Characteristic: Uses a private cloud solution to handle the majority of its IT workload; also uses a public cloud solution to provide "surge" support and/or support for low-sensitivity data.

Assumptions: Seventy-five percent of the IT server workload will migrate to a private cloud, and the remaining 25 percent will transition to a public cloud; transition to the new cloud environments will occur steadily over 3 years; existing facilities will be used (i.e., no new investment is required in physical

Summary

The literature review indicates that the researchers have concentrated on the infrastructural frameworks, and there is a common understanding in this regard. All the vendors and users of the cloud have a common agreement on the cloud implementation framework. What they refer to as an architectural framework

This is lacking in the way organizations can achieve implementation. They are not providing specific strategies, policies, guidelines, or rules. The human factor is missing in these frameworks or models. An indication that with the cloud architecture available, it’s the sole duty of the organization to come up with the cloud computing strategies, policies, guidelines, and rules.

This research will borrow heavily from existing works and propose an implementation of the framework.

CHAPTER THREE

3. RESEARCH METHODOLOGY

INTRODUCTION

This chapter covers the description and discussion on the various techniques and procedures used in the study to collect and analyze the data as it is deemed appropriate.

It is organized under the following sub-headings:

3.1 Type of Research

3.2 Population of the study

3.3 Sample

3.4 Sampling technique

3.5 Method of Data Collection

3.6 Type of Data to be collected

3.7 Instrument of Data Collection

3.8 Instrument validity and reliability

3.9 Instrument structure to meet research objectives

3.10 Method of Data Analysis

3.11 Instrument (i.e. questionnaire, experiment design, interview questions,)

3.12 Computer Simulation of Instrument.

3.1 TYPE OF RESEARCH

According to Asika (2009), research designs are often referred to as the structuring of an investigation aimed at identifying variables and their relationships to one another. And research types consist of several types that are used to carry out every research project, depending on the choice of research type. These research types consist of qualitative research, quantitative research, survey research, and mismatch research. But in this study, both quantitative qualitative research is used (a questionnaire serves as a useful guide to the effort of generating data for this study). The quantitative type of research is used because it helps in collecting a large range of data through the use of questionnaires. The survey research design, through the administration of questionnaires, was used for the study.

3.2 POPULATION

The study is taken at the Asesewa government hospital with a population of 3,562, which consists of 264 staff members of the hospital population in the eastern region of Ghana, Asesewa. According to research and interaction with the IT manager of the hospital, there are a total of 264 staff members, excluding casual workers and clients, in the hospital.

3.3 SAMPLE

The study will be conducted in Asesewa, in the eastern region of Ghana, which is one of the fastest-growing towns in the region with a population of 35,620. The study is taken at the Asesewa government hospital, which has a population of 3,562 staff members and non-staff members, including both their clients.

3.4 SAMPLING TECHNIQUE

In research sampling technique, there are several methods of sampling technique used for data collection. These methods include stratified sampling, systematic sampling, probability sampling, and convenience sampling. But in this research, the most convenient sampling technique, which is probability sampling, was used in selecting 50 staff members from various departments in the hospital from the entire population to carry out the study. This was chosen due to the various positions of the researcher, coupled with time constraints, in order to carry out this study.

3.5 DATA COLLECTION METHOD

These are the tools or methods used to get data from respondents. In this study, questionnaires and interviews are the research instruments used. A questionnaire is the main research instrument used for the study to gather the necessary data from the sample respondents. The questionnaire is structured and provides answers to the research questions and hypotheses

therein. This instrument is divided and limited into two sections: Sections A and B. Section A deals with the personal data of the respondents, while Section B contains the research statement postulated in line with the research question and hypothesis in Chapter 1. Options or alternatives are provided for each respondent to pick or tick.

3.6 TYPE OF DATA TO BE COLLECTED

The project aims to investigate and analyze the efficacy of cloud computing as a means of IT outsourcing compared to traditional outsourcing methods. The research will encompass various aspects of cloud computing and traditional outsourcing, including cost-effectiveness, scalability, security, performance, and overall efficiency. The project will involve data collection, analysis, and presentation to determine whether cloud computing represents a more advantageous approach to IT outsourcing for businesses and organizations. By conducting this comprehensive data collection and analysis, the project aims to provide valuable insights into the advantages and disadvantages of cloud computing as a means of IT outsourcing, helping businesses and organizations make informed decisions about their IT outsourcing strategies.

3.7 INSTRUMENT FOR DATA COLLECTION

The instrument used for the data collection is a form of questionnaire that you can use to gather information on the

topic of the research. This questionnaire is designed to be administered to IT professionals, business owners, and organizations with experience in both cloud computing and traditional IT outsourcing. You can adapt and expand it as needed for your specific research objectives. Also, this instrument is designed to provide a structured approach for collecting data through various methods, including surveys, interviews, and observations, to comprehensively analyze the advantages and disadvantages of cloud computing in comparison to traditional IT outsourcing.

3.8 INSTRUMENT VALIDITY & RELIABILITY

Reliability means the accuracy and precision of a measuring instrument, while validity means the extent to which the research instrument measures what it is supposed to measure. In order to determine the reliability and validity of the study, the test-retest method was used. To have a valid instrument, the questions in the questionnaire will be free from ambiguity (i.e., they will not be too complex). To have a reliable instrument, the questionnaire will be followed by an interview with a sample of respondents to know their views on the subject.

3.9 INSTRUMENT STRUCTURE TO MEET RESEARCH OBJECTIVES

Since the research instrument used was the questionnaire, it was designed using the Liker scale

method. The questionnaire was designed in the following ways:

- Strongly Agreed (SA) -5
- Agreed (A) -4
- Undecided (U) -3
- Disagreed (D) -2
- v) Strongly Disagreed (SD) - 1

3.10 METHOD OF DATA ANALYSIS

Having gathered the data through the administration of a questionnaire, the collected data will be coded, tabulated, and analyzed according to the research question and hypothesis.

In order to analyze the data collected effectively and efficiently for easy management and accuracy, the simple percentage method was the analytical tool used for this research project, and a sample size of two hundred (200) will be represented by 100% for easy analysis of the responses.

Also, correlation statistical analysis methods will be used in the research work. Correlation, as a statistical technique, is used in the testing of hypotheses so as to predict what the relationship between two variables should be. It is used in drawing and reaching conclusions by collecting the observed values from the questionnaire administered to respondents,

testing the degree of freedom, and carrying out a decision in determining the critical value of the hypothesis.

$$r = \frac{n\pounds X\ y - \pounds X\ y}{\sqrt{[n\pounds x^2 - (\pounds x)^2]\ [n\pounds y^2 - (\pounds y)^2]}}$$

Where x = independent factor

y = dependent factor.

3.11INSTRUMENT (i.e., INTERVIEW QUESTIONS AND QUESTIONNAIRES)

In taking decision for "r", the following rules shall be observed;

- If the value of "r" tabulated is greater than "r" calculated, accept the alternative hypothesis (H_1) and reject the null hypothesis (H_0).
- If the "r" calculated is greater than the "r" tabulated, accept the null hypothesis (H_0) while the alternative hypothesis is rejected.

3.12 COMPUTER SIMULATION OF INSTRUMENT

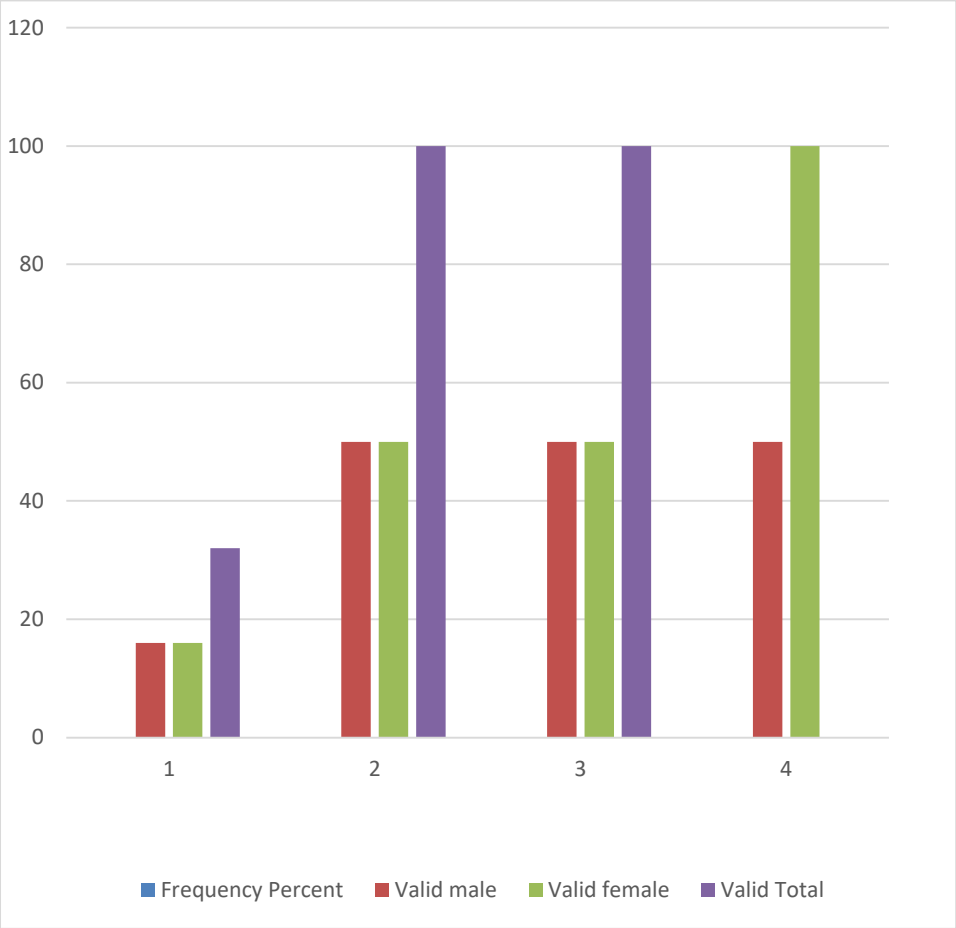
This computer simulation tool is made to mimic cloud computing adoption as an IT outsourcing solution and evaluate its benefits in comparison to conventional outsourcing. The simulation will help in understanding how various factors affect the outcomes.

CHAPTER FOUR

4. DATA ANALYSIS AND INTERPRETATION

BIO DATA OF RESPONDENTS – QUANTITAVE FINDINGS

Graph 1: Respondents.Sex of



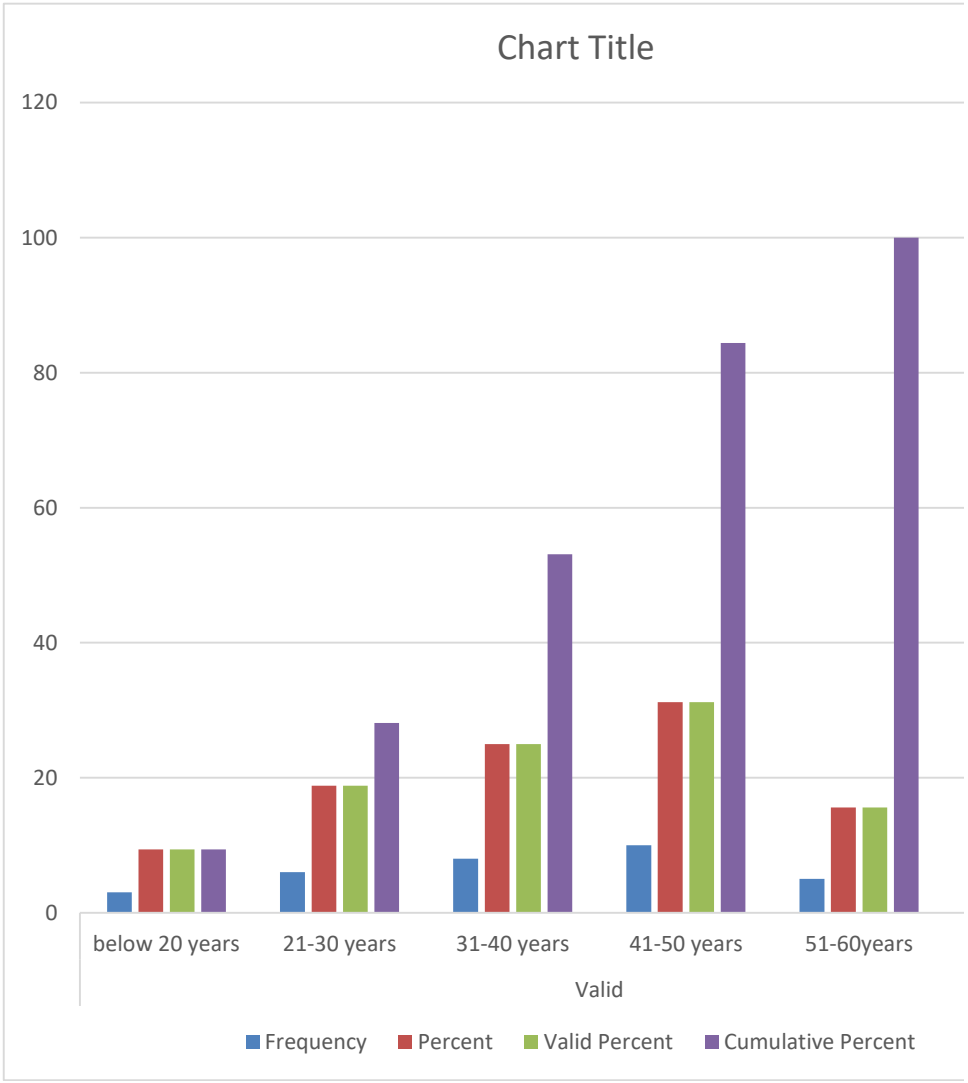
Source: field survey, October, 2023.

Graph 1 above shows the gender distribution of the respondents used for this study.

16 respondents which represent 50.0percent of the population are male.

16 respondents which represent 50.0percent of the population are female.

Graph 2: Age grade of respondents.



Source: field survey, October, 2023.

Graph 2 above shows the age grade of the respondents used for this study.

3 respondents which represent 9.4 percent of the population is below 20yrs.

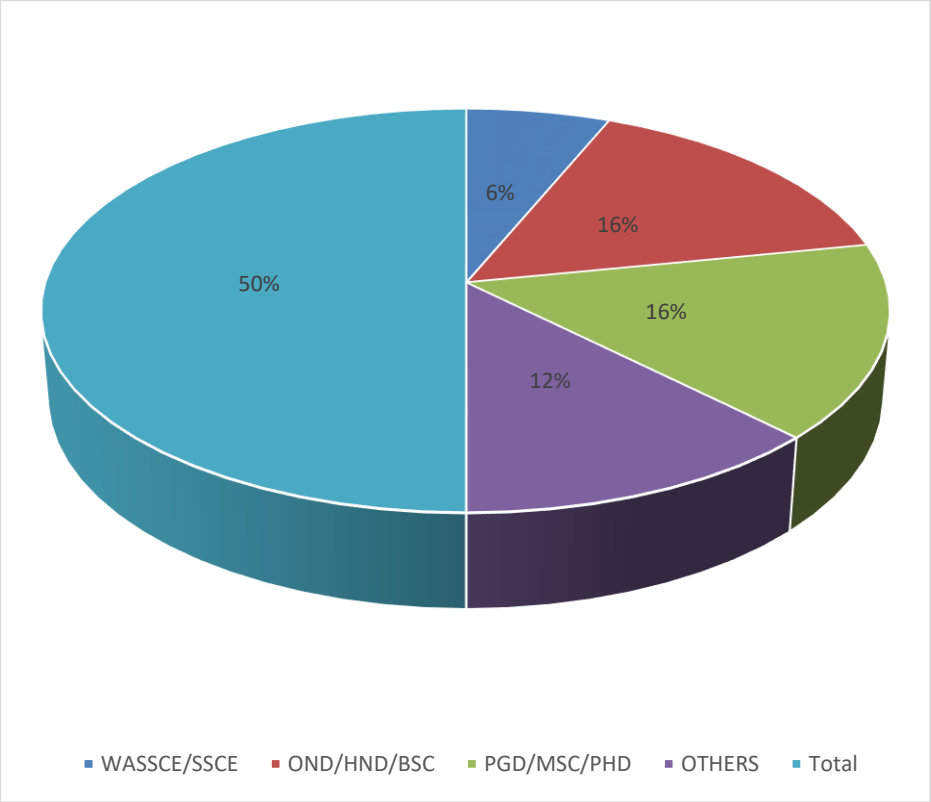
6 respondents which represent 18.8percent of the population are between 21-30yrs.

8 respondents which represent 25.0 percent of the population are between 31-40yrs

10 respondents which represent 31.2 percent of the population are between 41-50yrs.

5 respondents which represent 15.6 percent of the population are between 50-60yrs.

Graph 3: Educational Qualification of Respondents.



Source: field survey, October, 2023.

Graph 3 above shows the educational background of the respondents used for this study.

Out of the total number of 32 respondents, 4 respondents, which represent 12.5 percent of the population, are WASSCE/SSCE holders.

10 respondents, which represent 31.2 percent of the population, are OND, HND, or BSC holders.

10 respondents, which represent 31.2 percent of the population, Table 3 above shows the educational background of the respondents used for this study.

Out of the total number of 32 respondents, 4 respondents, which represent 12.5 percent of the population, are FSLC holders.

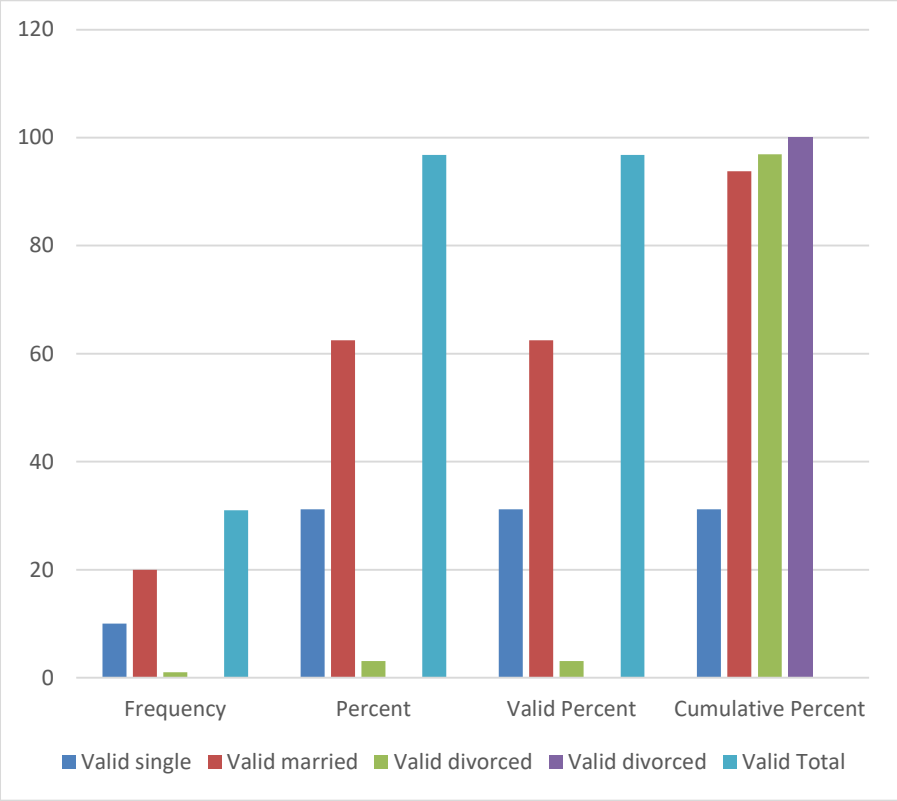
10 respondents, which represent 31.2 percent of the population, are SSCE/WASSCE holders.

10 respondents, which represent 31.2 percent of the population, are OND, HND, or BSC holders.

8 respondents, which represent 21.0 percent of the population, are MSC/PGD holders.

8 respondents, which represent 21.0 percent of the population, have other types of certificates.

Graph 4: Marital Status of Respondents.



Source: field survey, October, 2023.

Graph 4 above shows the marital status of the respondents used for this study.

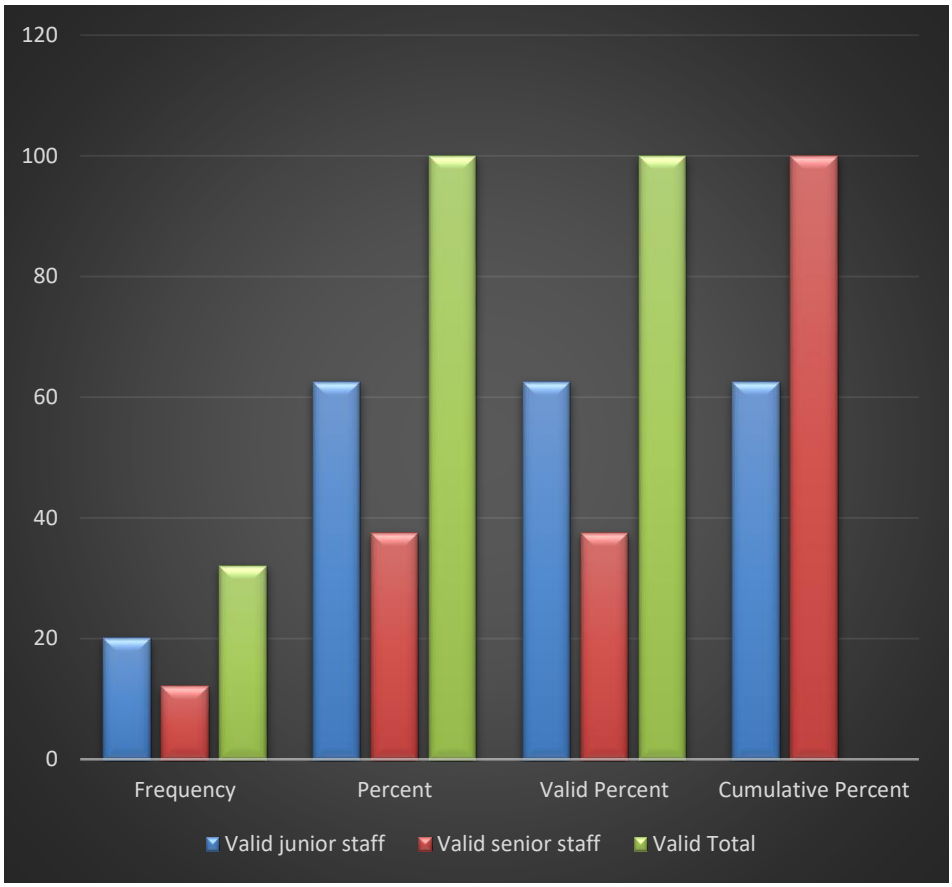
'Out of the total number of 32 respondents, 10 respondents, which represent 31.2 percent of the population, are single.

20 respondents, which represent 62.5 percent of the population, are married.

1 respondent, which represents 3.1 percent of the population, is divorced.

1 respondent, which represents 3.1 percent of the population, is widowed.

Graph 5: Position of Respondents.



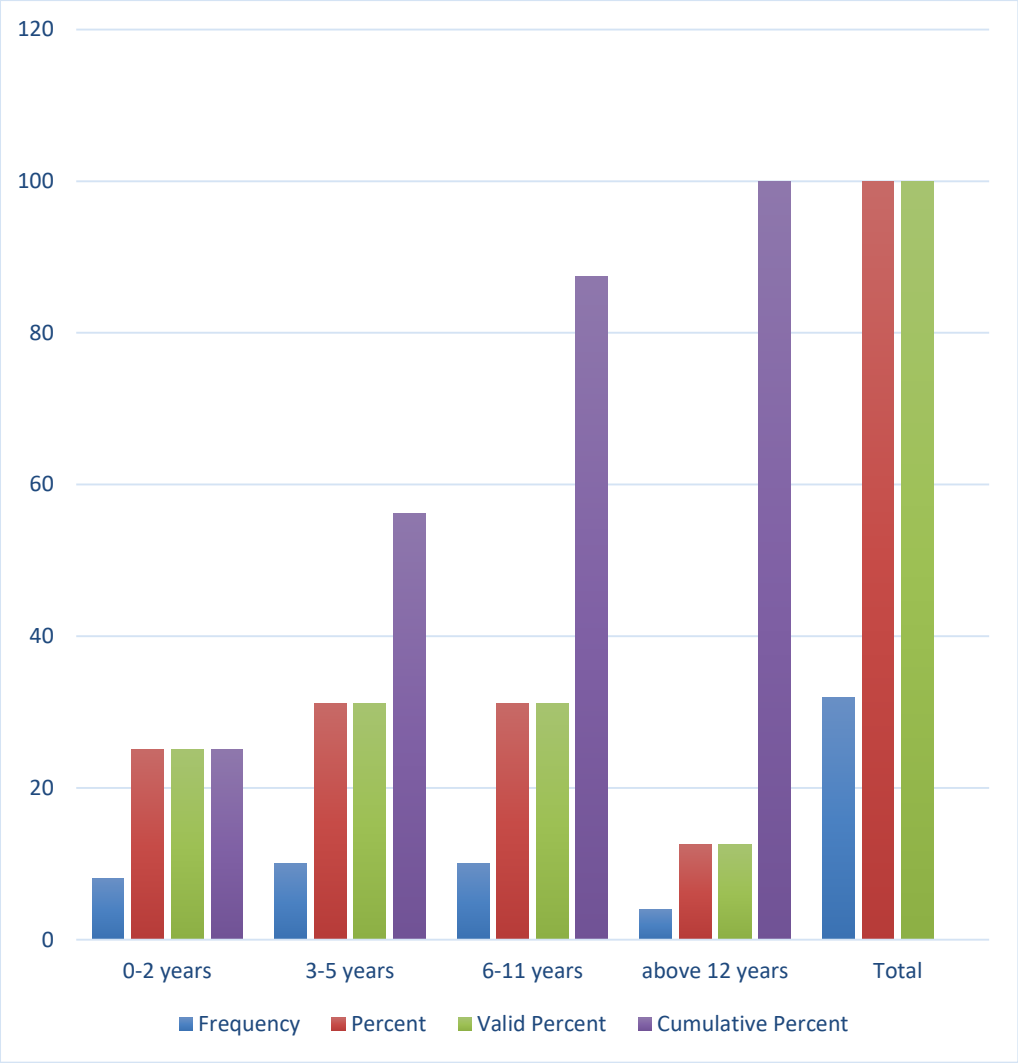
Source: field survey, October, 2023.

Graph 5 above shows the level or position of respondents used for this study.

Out of the 32 respondents, 20, which represent 62.5 percent of the population, are junior staff.

12 seniors, which represent 37.5 percent of the population, are senior staff.

Graph 6: Years of Service of Respondents



Source: field survey, October, 2023.

Graph 6 above shows the years of experience of the respondents used for this study.

Out of the 32 respondents, eight, which represent 25.0 percent of the population, have had 0-2 years of experience at work.

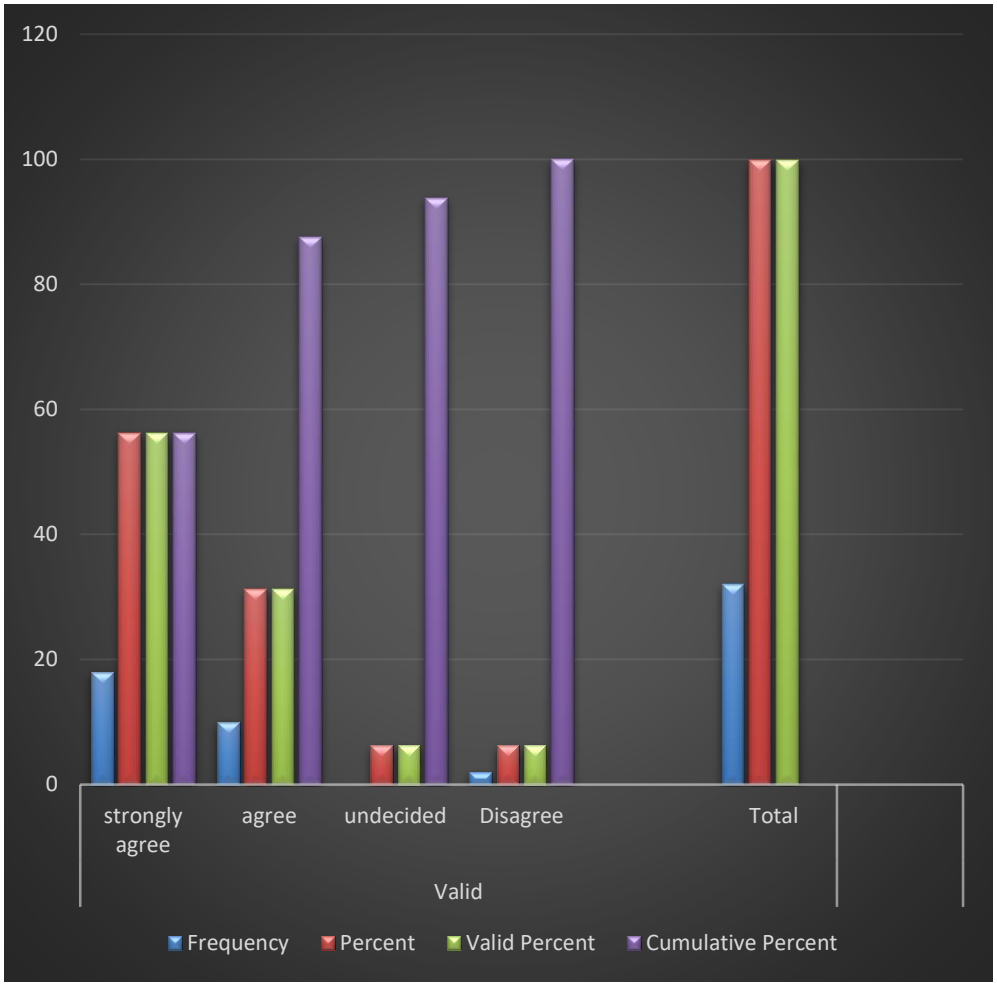
10 people, which represent 31.2 percent of the population, have had 3-5 years of experience.

10 of them, which represent 31.2 percent of the population, have had 6-11 years of experience.

4, which represent 12.5 percent of the population, have had more than 12 years of experience.

TABLES BASED ON RESEARCH QUESTIONS

Graph 7: Cloud computing has more benefits than making use of local servers or a personal computer.



Source: field survey, October, 2023.

Graph 7 above shows that cloud computing has more benefits than making use of local servers or a personal computer.

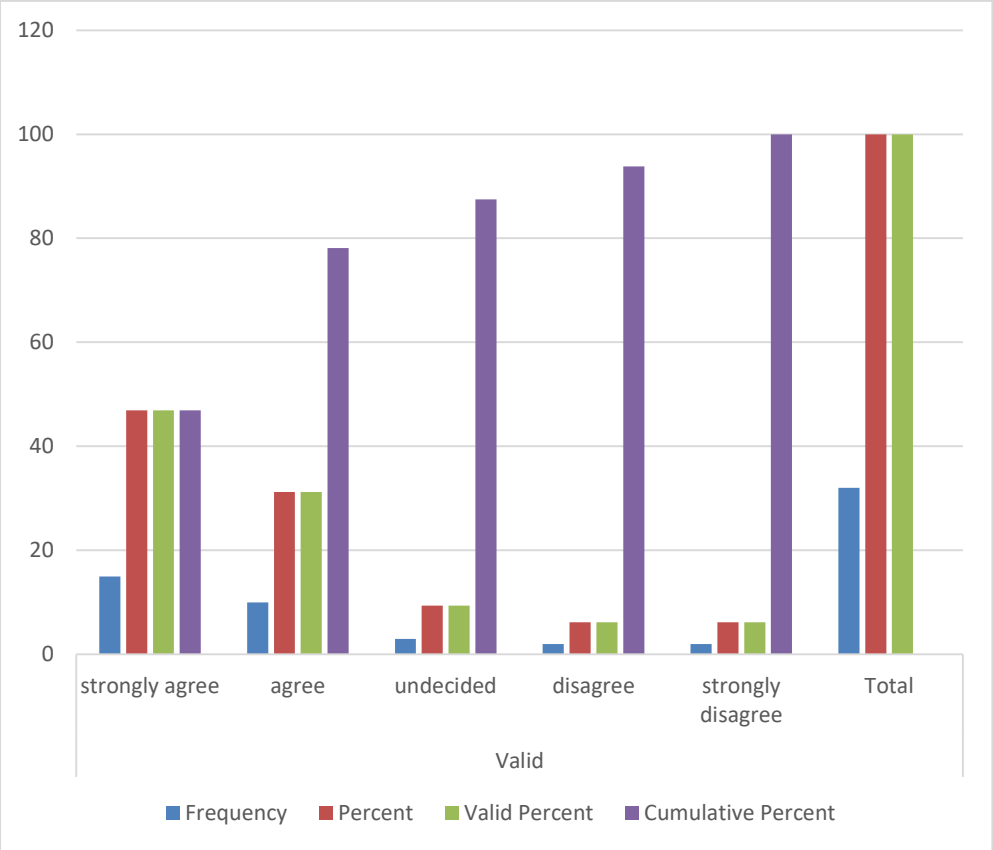
18 respondents, which represent 56.2 percent of the population, strongly agreed.

10 respondents, which represent 31.2 percent of the population, agreed.

Two respondents, which represent 6.2 percent of the population, were undecided.

Two respondents, which represent 6.2 percent of the population, disagreed.

Graph 8: Cloud computing helps in getting more work done with less people and less time.



Source: field survey, October, 2023.

Graph 8 above shows that cloud computing helps get more work done with fewer people and less time.

15 respondents, which represent 46.9 percent of the population, strongly agreed.

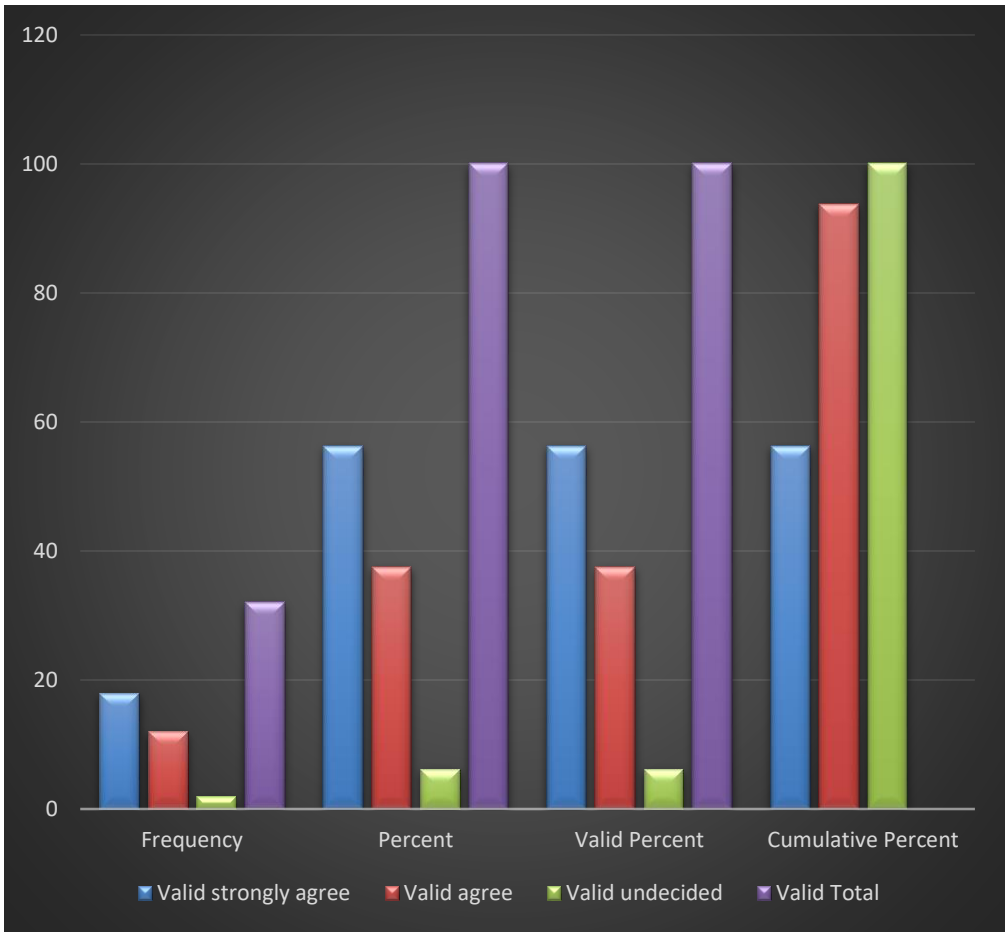
10 respondents, which represent 31.2 percent of the population, agreed.

Three respondents, which represent 9.4 percent of the population, were undecided.

Two respondents, which represent 6.2 percent of the population, disagreed.

2 respondents which represent 6.2 percent of the population strongly disagreed.

Graph 9: Storing information in the cloud gives almost unlimited storage capacity.



Source: field survey, October, 2023.

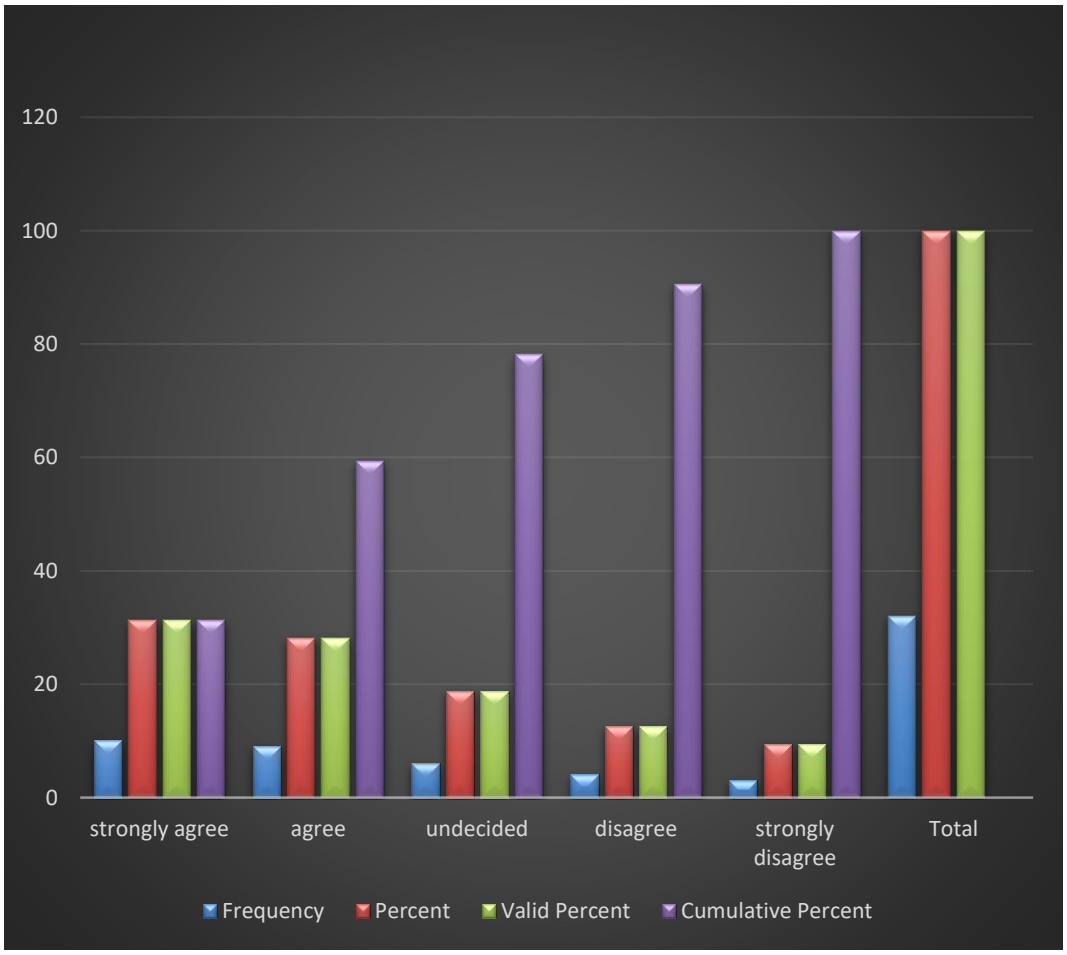
Graph 9 above shows that storing information in the cloud gives almost unlimited storage capacity.

18 respondents, which represent 56.2 percent of the population, strongly agreed.

12 respondents, which represent 37.5 percent of the population, agreed.

Respondents, who represent 6.2 percent of the population, were undecided.

Graph 10: There is an increase in the use of cloud computing in Ghana.



Source: field survey, October, 2023.

Graph 10 above shows that there is an increase in the use of cloud computing in Ghana.

10 respondents, which represent 31.2 percent of the population, strongly agreed.

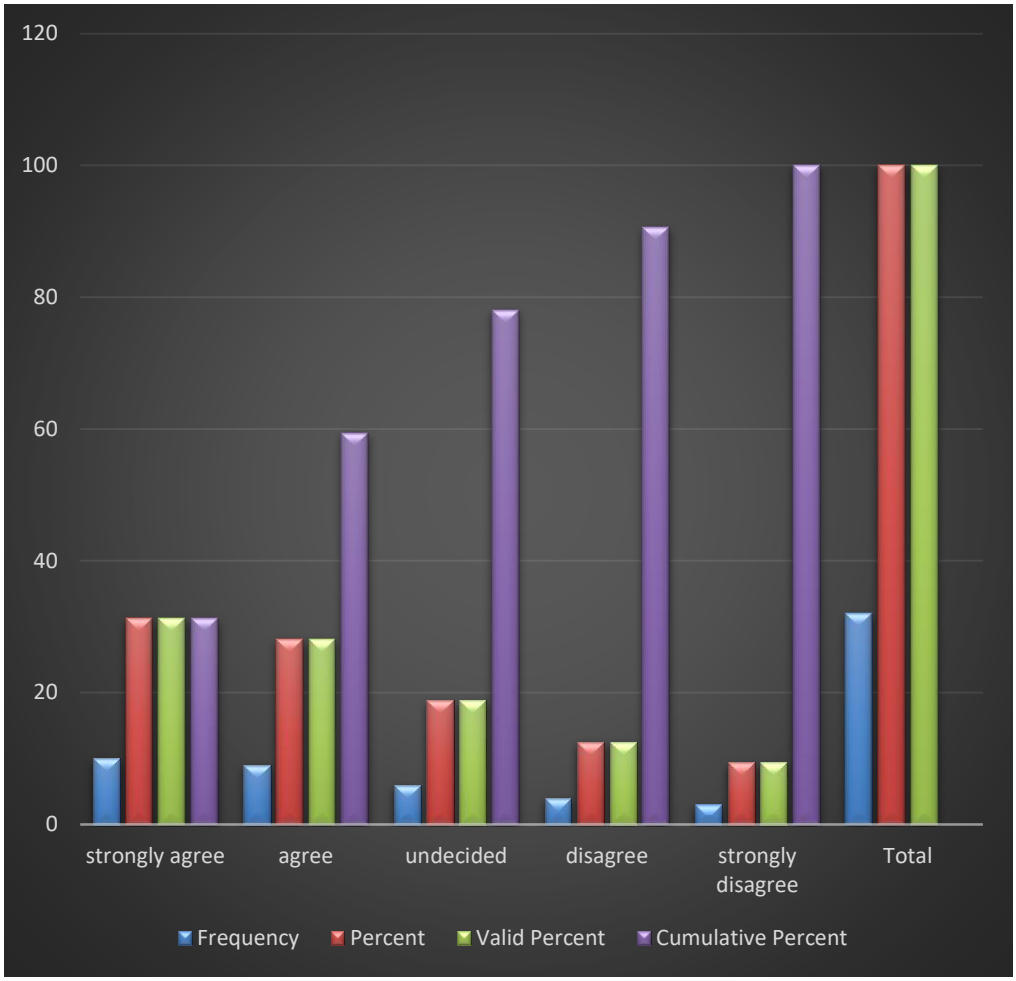
Nine respondents, which represent 28.1 percent of the population, agreed.

Six respondents, which represent 18.8 percent of the population, were undecided.

4 respondents, which represent 12.5 percent of the population, disagreed.

Two respondents, which represent 9.4 percent of the population, strongly disagreed.

Graph 11: The level of IT outsourcing in Ghana is high.



Source: field survey, October, 2023.

Graph 11 above shows the responses of respondents that the level of IT outsourcing in Nigeria is high.

10 respondents, which represent 31.2 percent of the population, strongly agreed.

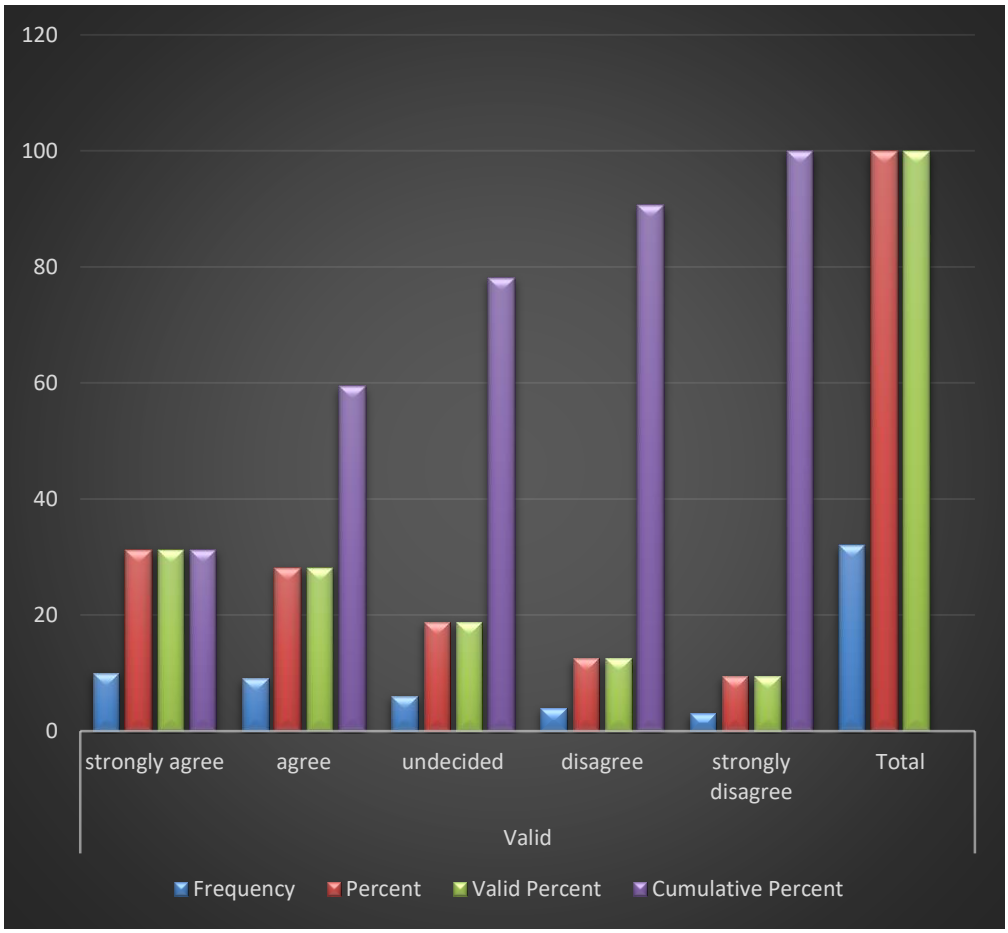
Nine respondents, which represent 28.1 percent of the population, agreed.

Six respondents, which represent 18.8 percent of the population, were undecided.

4 respondents, which represent 12.5 percent of the population, disagreed.

1 respondent, which represents 9.4 percent of the population, strongly disagreed.

Graph 12: The impact of cloud computing on IT sourcing is high.



Source: field survey, October, 2023.

Graph 12 above shows that the impact of cloud computing on IT sourcing is high.

10 respondents, which represent 31.2 percent of the population, strongly agreed.

Nine respondents, which represent 28.1 percent of the population, agreed.

Six respondents, which represent 18.8 percent of the population, were undecided.

4 respondents, which represent 12.5 percent of the population, disagreed.

Three respondents, which represent 9.4 percent of the population, strongly disagreed.

QUALITATIVE RESEARCH FINDINGS:

Participants highlighted their knowledge on cloud computing and how they understand its importance in this digital era. Participants highlighted the various benefits of cloud computing, such as the following:

- Essay access of resources: Because cloud computing is Internet base service, access of resources becomes much easier since resources can be accessed by individuals anytime, anywhere, as far as there is internet connection.
- Cost Reduction: Participants highlighted that cloud computing has the ability to get rid of most or all hardware and software. For with cloud computing there is no need having your own servers, cables, network switches, backup generators, redundant routers and so on.
- High performance and availability: Participants responded on the greater performance gains of cloud computing than by having your own dedicated server hardware in storing of data resources.
- Centralized data security: Participants also talk about data security in cloud computing where data backups are centralized and backup without many issues.

FINDINGS

Cloud computing helps in getting more work done with less people and in less time. Cloud computing enhances productivity by enabling organizations to accomplish more tasks with fewer personnel and in less time. This is achieved through efficient resource scalability, streamlined collaboration, and the automation of routine tasks. With the ability to quickly scale computing resources based on demand, businesses can optimize their operations without the need for extensive manpower or time-consuming hardware management.

Cloud computing has more benefits than making use of a local server or a personal computer. Cloud services offer businesses a range of benefits, including scalability, cost-efficiency, accessibility, reliability, and automatic updates. The ability to scale resources up or down based on demand allows for flexible adjustments to computing power and storage needs without significant upfront investments.

Storing information in the cloud gives almost unlimited storage capacity. Because cloud storage offers almost infinite capacity, customers can increase their data storage requirements without running into the limitations that come with conventional storage devices. Cloud services remove the worry of running out of storage capacity and make it easier to handle massive volumes of data by providing the flexibility to easily extend storage resources based on demand. Because of its scalability,

businesses may store and retrieve the data they require without being constrained by conventional storage methods.

The growth of cloud computing is high in this digital era. The rise of cloud computing in the digital age is noteworthy. People and companies are using cloud services more and more because they are accessible, affordable, scalable, and flexible.

The impact of cloud computing on IT sourcing is high. Cloud computing has a significant impact on IT sourcing. Because cloud computing offers scalable, on-demand services via the internet, it has completely changed the traditional IT sourcing landscape over the internet.

The level of IT outsourcing is high. There is a significant degree of IT outsourcing, which suggests that companies are increasingly assigning different IT tasks to outside service providers. Companies frequently contract with outside experts to handle projects like infrastructure management, software development, and technical assistance.

The project's findings show that cloud computing is unquestionably a better option for many businesses looking to outsource their IT needs. It is a desirable option due to its scalability, usability, cost-effectiveness, and security features. The choice to move a business to the cloud should be made following a careful analysis of its particular needs, difficulties, and long-term goals. Cloud computing will remain a key part of IT strategy as technology develops further, fostering innovation and influencing the direction of IT outsourcing. Also, cloud computing has proven to be a better option for IT outsourcing for many businesses. The discussions covered here demonstrate the need for a systematic approach to cloud adoption, despite the substantial benefits. To fully realize the transformative potential of cloud computing in IT outsourcing, organizations must take into account their particular needs, difficulties, and long-term goals. Cloud computing is positioned to be a driving force in influencing the future of IT outsourcing processes as technology continues to advance. Cloud Computing Technology: A Viable Option for Small and Medium-Sized Businesses (2018, August 1). *Journal of Strategic Innovation and Sustainability*, *13(2)*

DISCUSSIONS

The project delves into the discussions surrounding the assertion that cloud computing represents a superior means of information technology outsourcing compared to traditional models. The objective is to critically analyze various aspects, including cost-effectiveness, scalability, security, and overall efficiency, to ascertain the advantages of leveraging cloud services for IT outsourcing.

Cost-Effectiveness: The cost-effectiveness of cloud computing as an outsourcing solution is a major topic of discussion. The pay-as-you-go nature of cloud services removes the need for large upfront hardware investments. In addition to offering a certain financial advantage over conventional outsourcing techniques, the study looks into the possible savings obtained from lower energy and hardware costs as well as the elimination of maintenance overhead.

Flexibility and Scalability: The discussions delve into the inherent scalability and flexibility offered by cloud computing. Cloud services empower organizations to dynamically scale resources based on demand, ensuring optimal performance without the need for extensive hardware upgrades. This adaptability is crucial for businesses experiencing variable workloads and planning for future growth, as opposed to the limitations posed by traditional outsourcing methods.

Security Measures: One of the main topics of discussion for the project is security. Trustworthy cloud service providers make large investments in security features like authentication procedures, data encryption, and compliance certifications. The research assesses how these safeguards stack up against the security procedures that businesses that depend on conventional IT outsourcing put in place. The objective is to ascertain whether cloud computing provides a more reliable and consistent method of protecting confidential data.

Future Developments and Trends: The future of cloud computing in relation to IT outsourcing is covered in the project discussions. New technologies including serverless architectures, edge computing, and artificial intelligence are examined to see how they can reinforce cloud computing's position as the go-to option for businesses looking for creative and effective IT outsourcing solutions.

Adoption Challenges and Mitigations: The project includes discussions on potential obstacles related to the use of cloud computing for IT outsourcing in order to present a complete picture. These could include worries about data privacy, the difficulties of migration, and organizational resistance to change. In order to facilitate a more seamless transition to cloud-based outsourced solutions, strategies and mitigations are investigated to solve these problems.

Functional Effectiveness: Discussions mostly focus on how cloud computing improves IT outsourcing's operational effectiveness. Cloud services can dramatically affect overall productivity by encouraging collaboration, optimizing resource consumption, and streamlining operations. Examined are case studies and real-world examples that demonstrate how the adoption of cloud technologies has led to measurable improvements in operational efficiency for enterprises.

The project discussions conclude with a thorough assessment of cloud computing as an improved method of outsourcing information technology. Through an analysis of critical elements like affordability, expandability, safety, productivity, and emerging patterns, the project seeks to offer insightful information to businesses considering a shift to cloud-based IT outsourcing.

CHAPTER FIVE

5. CONCLUSION AND RECOMMENDATIONS

SUMMARY OF THE FINDINGS

According to the study, the following findings are revealed:

- **Cloud computing has more benefits than making use of a local server or a personal computer.** Cloud services offer businesses a range of benefits, including scalability, cost-efficiency, accessibility, reliability, and automatic updates. The ability to scale resources up or down based on demand allows for flexible adjustments to computing power and storage needs without significant upfront investments.
- **Cloud computing helps in getting more work done with less people and in less time.** Cloud computing enhances productivity by enabling organizations to accomplish more tasks with fewer personnel and in less time. This is achieved through efficient resource scalability, streamlined collaboration, and the automation of routine tasks. With the ability to quickly scale computing resources based on demand, businesses can optimize their operations without the need for extensive manpower or time-consuming hardware management.
- **Storing information in the cloud gives almost unlimited storage capacity.** Because cloud storage offers almost

infinite capacity, customers can increase their data storage requirements without running into the limitations that come with conventional storage devices. Cloud services remove the worry of running out of storage capacity and make it easier to handle massive volumes of data by providing the flexibility to easily extend storage resources based on demand. Because of its scalability, businesses may store and retrieve the data they require without being constrained by conventional storage methods.

- **The growth of cloud computing is high in this digital era.** The rise of cloud computing in the digital age is noteworthy. People and companies are using cloud services more and more because they are accessible, affordable, scalable, and flexible.
- **The level of IT outsourcing is high.** There is a significant degree of IT outsourcing, which suggests that companies are increasingly assigning different IT tasks to outside service providers. Companies frequently contract with outside experts to handle projects like infrastructure management, software development, and technical assistance.
- **The impact of cloud computing on IT sourcing is high.** Cloud computing has a significant impact on IT sourcing. Because cloud computing offers scalable, on-demand services via the internet, it has completely changed the traditional IT sourcing landscape over the internet.

GOALS ARCHIEVED

The study not only achieved its objectives of understanding the nature of cloud computing and IT outsourcing but also highlighted the transformative impact of cloud computing on IT outsourcing practices. The findings underscored the myriad benefits of cloud computing, positioning it as a key driver in the high growth of this technology and its significant role in reshaping the landscape of IT outsourcing. This research contributes valuable insights for organizations seeking to optimize their IT strategies in the evolving digital era.

The study found out that Cloud computing has more benefits than making use of a local server or a personal computer. Cloud services offer businesses a range of benefits, including scalability, cost-efficiency, accessibility, reliability, and automatic updates. And this finding has linked in answering the objective which states the ability of cloud computing to scale resources up or down based on demand allows for flexible adjustments to computing power and storage needs without significant upfront investments. Scalability Assessment to analyze the benefits of cloud computing outsourcing, analyzing how well cloud resources can be handled in cooperation expansion.

The research evaluated that the level of IT outsourcing to the cloud is high. There is a significant degree of IT outsourcing, which suggests that companies are increasingly assigning different IT tasks to outside service providers. Companies frequently contract with outside experts to handle projects like

infrastructure management, software development, and technical assistance. This finding does not really answer this objective completely, but it support its aims to assess cloud service providers' security measures and compliance frameworks to ensure data security and adherence to industry regulations during IT outsourcing.

The impact of cloud computing on IT sourcing is high. Cloud computing has a significant impact on IT sourcing Because, cloud computing offers scalable, on-demand services via the internet, it has completely changed the traditional IT sourcing landscape over the internet. And this finding has to do with the project's aim to develop migration strategies and a strategic plan for a smooth transition of existing IT infrastructure to the cloud.

5.1 CONCLUSION

The conclusion of the research states that, Cloud computing remains important in this digital era. It is aiming to unveil its transformational potential for businesses and organizations seeking improved operational efficiency, scalability, security, and cost optimization, this research explored cloud computing as a superior method of IT outsourcing. As a result of its unmatched scalability, flexibility, accessibility, and cost-efficiency, cloud computing has emerged as a revolutionary force in the field of IT outsourcing. Although there are still challenges, it has unquestionable advantages for enterprises. Cloud computing is positioned to play a major role in determining the future of IT outsourcing as technology develops. Businesses that embrace this paradigm shift and adjust to the new business

climate will have an advantage over their competitors. It is obvious that cloud computing is a crucial driver of innovation and progress in the digital age and not just a better method of IT outsourcing. Rekik, M., Boukadi, K., & Abdallah, H. B. (2015). A decision-making method for business process outsourcing to the cloud based on business motivation model and AHP. *International Journal of Cloud Computing*, *4*(1), 47.

5.2 RECOMMENDATIONS

The adoption of cloud computing as a better means of IT outsourcing can offer substantial benefits to organizations, including scalability, cost efficiency, and improved accessibility. However, a strategic and well-considered approach is crucial to realizing these advantages while mitigating potential challenges and risks. By following these recommendations and tailoring them to your organization's unique needs, you can harness the transformative potential of cloud computing effectively and position your business for success in the digital age.

Cost-Benefit Analysis: To assess the financial effects of using cloud computing as a method of outsourcing information technology, undertake a thorough cost-benefit analysis. Compare the typical in-house infrastructure's total cost of ownership

(TCO) with that of cloud outsourcing. Draw attention to possible cost reductions by highlighting things like lower costs for hardware and maintenance and better operational efficiency. Stakeholders will have a comprehensive grasp of the financial benefits of cloud migration from this analysis.

Planning for Scalability and Flexibility: Emphasize the advantages of cloud computing's scalability and flexibility, and create a customized strategic strategy to take advantage of these features. Provide a plan for transferring workloads to the cloud step-by-step, beginning with non-essential apps and working your way up to mission-critical systems. Stress that resources can be scaled up or down in response to demand, guaranteeing best practices and financial viability. With this strategy, the company will be able to easily adjust to evolving business requirements.

Evaluation of Security and Compliance: Evaluate cloud service providers' security protocols and compliance certifications in-depth to allay worries about data security and legal compliance. Suggest cloud providers who have strong security measures in place, data encryption, and industry-specific compliance certifications. To guarantee a safe and legal move to cloud computing, create a thorough plan for access control, data security, and regulatory compliance.

REFERENCES

Beaker. (2009). Cloud Computing security architectural framework, rational survivability.

and Emerging IT Platform: Vision, Hype and reality for Delivering

Computing as a 5th utility. *Future generation computer system.*

Cater-Steel and Al-Hakim. (2008). Information Systems Research Methods,

Epistemology, and Applications

Creswell. (1994). Quantitative and Qualitative Approaches.

David, C. W. (2009). 2010-07 IBM Business of Goverment Cloud Computing in

Goverment.

David, C. W. (2010). A model Based approach to Implement Cloud Computing in EGoverment

. *International Journal of Computer Applications IJCA.*

Gay and Airasian. (2000). Selecting a Quantitative or Qualitative Research.

HP. (2011). Cloud consulting.

Jingyu, D., Jiajin, L., Rui, X., and Yaohui, J. (2010). Data center consolidation with

Virtualized Private Network: A step towards Enterprise Cloud.

Khajeh, H., Sommerville, I., and Sriram, I. (2010). Research challenges for

enterprise cloud computing.

Kundra, V. (2010). State of public sector cloud computing. Washington, DC: CIO
Council.
Kundra, V. (2011). Federal cloud computing strategy. February.
Mell, P., & Grance, T. (2011). The NIST definition of cloud computing (draft). NIST
Special Publication, 800, 145
68
Michael, P., and Grance, T. (2011). The NISTdefinition of Cloud Computing. *NIST*
Special Publication.
Michael, R. N. (2009). The Cloud, Crowd and Public policy. *EBSCO Host.*
Mirzaei, N. (2008). Cloud Computing. *Pervasive Technology Institute Report,*
Community Grids Lab, Indiana University.
Motahari, N., Stephenson, & Singhal. (2009). Outsorcing business to computing
Services: Opportunities and Challanges. *IEEE Internet Computing.*
Mugenda and Mugenda. (2003). Research Methods – Quantitative & Qualitative
Approaches.
Nein. (2009). Analysis of conversion from Legacy "Client Based" solution to a
Cloud computing model.

Nelson. (2009). The cloud, the crowd, and public policy issues in science and
Techology.
Paul, T. J., Jimmy, L., Justin, M., Grimes, & Shannon Simmons, N. (2009). Where is
the cloud? Geography, economics, environment and jurisdiction in cloud computing.
Rajkumar, B., & Karthik, S. (2011). Deploying Application for cloud Computing.
Saunders et al (2009) Research Methods for Business Students.
Snia. (2009). Managing Data Public Cloud.
Srivastava et al. (1993). Sequential Monte Carlo methods.
Silas T., Asesewa government hospital, Godwin B., 21-9-2023
Tharam, D., Chen, W., and Elizabeth, C. (2010). Cloud Computing: Issues and
Challanges.
Vouk, M. A. (2004). Cloud computing-issues, research and implementations. *Journal*
of Computing and Information Techology.
Weinhardt, C., Anandasivam, Blau, Borissov, Meinl, Michalk, et al. (2009). Cloud
Computing - A classification, Business Models, and Research Directions.
Business and Information Systems Engineering.
Yin. (2002). Case Study Research: Design and Methods.

QUESTIONNAIRE ADMINISTRATION

INSTRUCTION: Please endeavor to complete the questionnaire by ticking the correct answer (s) from the options or supply the information required where necessary.

SECTION A: Personal Information/Data

1. Gender
   a. Male
   b. Female
2. Age grade
   a. Below 20yrs
   b. 21-30yrs
   c. 31-40yrs
   d. 41-50yrs
   e. 51-60yrs
   Above 60yrs
3. Educational qualification
   a. WASCE/SSCE
   b. OND/HND/BSC
   c. MSC/PGD/PHD
   d. Others
4. Marital status
   a. Single

b. Married

c. Divorced ☐

d. Widowed ☐

5. Experience/years of service

a. 0-2yrs ☐

b. 3-5yrs ☐

c. 6-11yrs ☐

d. Above 12yrs ☐

6. Level/position

a. Junior staff ☐

b. Senior staff ☐

SECTION B:

Questions on cloud computing a better means of IT outsourcing.

7. Cloud computing has more benefits than making use of a local server or a personal computer.

a. Strongly agreed ☐

b. Agreed ☐

c. Undecided ☐

d. Disagreed ☐

e. Strongly disagreed ☐

8. Cloud computing helps in getting more work done with less people and in less time.

a. Strongly agreed ☐

b. Agreed ☐

c. Undecided ☐

d. Disagreed ☐

e. Strongly disagre ☐

9. Storing information in the cloud gives almost unlimited storage capacity.

a. Strongly agreed ☐

b. Agreed ☐

c. Undecided ☐

d. Disagreed ☐

e. Strongly disagreed ☐

10. There is an increase in cloud computing in Nigeria.

a. Strongly agreed ☐

b. Agreed ☐

c. Undecided ☐

d. Disagreed ☐

e. Strongly disagreed ☐

11. The level of IT outsourcing is high.

a. Strongly agreed ☐

b. Agreed ☐

c. Undecided ☐

d. Disagreed ☐

e. Strongly disagreed ☐

12. The impact of cloud computing on IT sourcing is high.

a. Strongly agreed ☐

b. Agreed ☐

c. Undecided ☐

d. Disagreed ☐

e. Strongly disagreed ☐

13. In your own words, enumerate the nature of IT outsourcing

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14. Highlight the role of cloud computing as a better means of IT outsourcing?

_ _ ___ __ _ _ _ __ _ _ _ _ _ _ _ _ _ __ _ _ _ _ _ _ _ _ _

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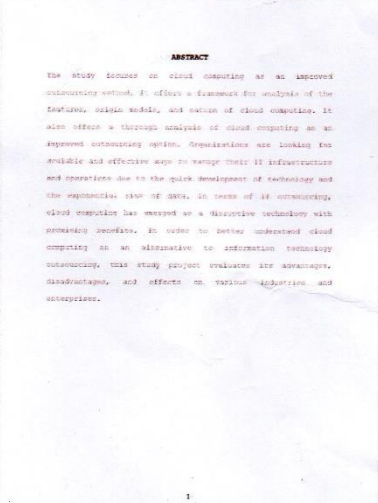

ABSTRACT

The study focuses on cloud computing as an improved outsourcing method. It offers a framework for analysis of the features, origin models, and nature of cloud computing. It also offers a thorough analysis of cloud computing as an improved outsourcing option. Organizations are looking for workable and effective ways to manage their IT infrastructure and operations due to the quick development of technology and the exponential rise of data. In terms of IT outsourcing, cloud computing has emerged as a disruptive technology with promising benefits. In order to better understand cloud computing as an alternative to information technology outsourcing, this study project evaluates its advantages, disadvantages, and effects on various industries and enterprises.

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