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A Study on the Effectiveness of Implementing Cloud Computing in Today's Business and Educational Sector

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Abstract*: *In today's era where data size has increased exponentially, challenges in storing and maintaining the data have also increased not only with storage perspective but also considering the overall cost of maintaining the data. We need an effective source to manage and store the data. cloud computing has proved to be an optimum solution to this problem. cloud computing is the on-demand delivery of Information technology over the internet with pay -as -you -go. Instead of buying, owning, and maintaining physical data centers and servers, you can access technology services, such as computing power, storage, and databases, as on an as-needed basis. As businesses are emerging, the need for a more efficient way of handling the resource is a need, cloud service can be the best option for business, as they provide the infrastructure, hardware, software needed for it in a cost-efficient way. The same can be used in the educational field for students for accessing educational material, assigning educational work over the internet. This paper provides an overview of the effectiveness of implementing cloud computing in today's business and educational sector and additionally it also demonstrates how data storage in the cloud can reduce the time, infrastructure and storage, over the traditional method.

Keywords:* *Cloud Computing, cloud deployment models, cloud computing service, Data mining, Security and privacy.

I. INTRODUCTION

Cloud computing is basically storing and accessing data (hardware and software) service through the internet rather than the traditional storage method. In traditional methods, there are huge limitations of accessing and storing data but with cloud computing technologies data be accessed, stored, and retrieved anywhere, anytime with an active online connection. Business uses many cloud computing service like software-as-a-service(SaaS) which provides you with a complete application or product that is controlled and managed by the service provider (such as a web-based email service). With SaaS as a service, you don't have to worry about the infrastructure and maintenance you just need the knowledge of the application and how to use it. In SaaS business basically take a subscription to a product or application provided by the cloud. Now with Platform-as-a-service (PaaS) here business can create its own application for the people in the company or for the customer, in PaaS, the need for you to manage the infrastructure (hardware and operating system) is not required you don't have to bother about the software Maintenance, resource availability or any other thing involved in running the application. And Finally, the Infrastructure-as-a-service (IaaS)where instant computing infrastructure is provided, provisioned, and managed over the internet. It contains the building block of cloud technology. It provides access to companies with networking features, computers (virtual or hardware), and data storage space. IaaS provides you with flexibility and control over managing your business resources. Data mining techniques are used in cloud computing to extract the potential information from the raw data, data mining technique help business to predict future trends, take a knowledge-driven decision in various fields. In this study, we will check the awareness of implementing cloud computing in the business and educational sector and how it will help us to overcome the difficulties faced in the traditional method of managing, storing, and accessing data and what is the Security issue in implementing cloud computing service. The objective would be carried out by conducting a survey on various business and Educational fields to analyze the effectiveness and awareness of cloud computing in the following sector.

II. CLOUD DEPLOYMENT MODELS

Cloud service deployment can be in any one of the following [2]

1) Public Cloud: It is available from a third party service provider through the Internet and is very cost effective for SMBs to deploy IT solutions. For example, Google Apps.
2) Private Cloud: It is managed within an organization and is suitable for large enterprises (managed within the walls of the enterprises).
3) Community Cloud: It is used and controlled by a group of enterprises, which have shared interests.
4) Hybrid Cloud: It is a combination of public and private cloud.

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III. OBJECTIVE OF THE STUDY

1) To check the effectiveness of implementing cloud computing in the Business and educational sector
2) To do a comparative study of cloud computing vs the traditional method of data storage in business and educational sectors
3) To understand the security concerns for major business and educational sectors for implementing cloud computing services.

IV. HYPOTHESIS

1) *H1:* Cloud computing services are very much effective in the business and educational sector
2) *H2:* Cloud computing is better than the traditional method of data storage
3) *H3:* Cloud computing services provide more security compared to the traditional method.

V. LITERATURE REVIEW

In a study published by C, Dr. Lakshmi Devasena[1] in 2014, emphasizes the consequences of adopting Cloud Technology in business organizations (micro, Small Medium Businesses (SMBs) and Small Medium Enterprises (SMEs)) and how it affects business development. . The study perceived that adoption of Cloud Technology has a positive impact on business development.

In a study published by Ercan, Tuncay[2] in 2010, A review on what the cloud computing infrastructure will provide in the educational arena, especially in the universities where the use of computers is more intensive, and what can be done to increase the benefits of common applications for students and teachers. This study proposed implementing cloud computing as an exciting development and is a significant alternative for today's educational perspective. Students and administrative personnel have the opportunity to quickly and economically access various application platforms and resources through the web pages on-demand.

In a study Published by Attaran, Mohsen & Woods, Jeremy[3] in (2018). This study reviews key attributes of successful cloud computing technology and illustrates some of the routes that might be taken to implement this technology in small businesses. This study concluded that cloud computing introduces both challenges and new possibilities to many aspects of Internet architecture, protocols, services, and applications.

In a study published by Dimitrov, M., & Osman [4]. This research shows several major implications that organizations should keep in mind while utilizing cloud computing and provides some suggestions on how to avoid the cost and security risks identified. This research has shown several major implications. First, at present organizations consider staff reduction and respectively reduction of the operational and administrative costs which it brings as the most essential cost-benefit. Second, cloud computing is better for small and medium-sized organizations. Also, the hybrid cloud is considered as the most appropriate cloud deployment model for them, representing a perfect balance between the sensitive data issue and cost savings.

In a study published by Kumbhar, D. M.[5] in 2013, focus on how the implementation of cloud computing is possible at less cost as compared to traditional ERP system in the educational sector. As well as it considers the cost for implementing cloud computing with respect to various service models like Infrastructure as a service(IAAS), Software as a service (SAAS), and Platform as a service(PAAS) as per users' requirements. This paper concluded that large proportions of people today refrain from using these facilities due to security reasons or reliability with cloud computing. This means that the IT professionals usually go for just internet services or intranet within the organization without implementing cloud computing which results in increased cost.

In a study published by Anegundi, R. Madhusudhan.R.Anegundi [6] in 2015 provides an overview of Data Mining Trends, Data Mining Tools, How data mining is used in cloud computing. This paper concluded that data mining technologies, Tools provided through Cloud computing is an absolutely necessary characteristic for today's businesses to make proactive, knowledge-driven decisions, as it helps them have future trends and behaviors predicted.

In a study published by Venkatesh, A., and Venkatesh Eastaff[7] in 2018 provides a detailed review of the different techniques that are used for secure data storage on the cloud. Confidentiality, integrity, availability should be encapsulated in a CSP's Service-Level Agreement (SLA) to its customers. Otherwise, ensure that any sensitive information is not put into a public cloud and if any it is to be stored in encrypted form. Effective auditing mechanisms also can be used for providing data integrity.

In a study published by McAfee, A.[8] in 2011 provides the awareness of cloud computing among the companies and the perks of using implementing cloud service.

In a study published by Pazowski, P [9] in 2013presents the conception of cloud computing, its definitions, main service, and implementation models. The objective is to compare the traditional way of managing and implementing IS/IT in enterprises with the idea of cloud computing. The intent of this work is to juxtapose the main economical benefits of adopting cloud solutions and examine its impact on business organization and market approach.

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In a study published by Aljabre, A. [10] in 2012 the paper determines which types of businesses would most benefit from using cloud computing as part of their everyday operations. . with a conclusion that Making use of cloud computing correctly and efficiently in a business can not only increase profits for a company by allowing fewer employees to work remotely, but it can also increase the productivity of a company.

In a study published by Khadair K. Hmood and Faisal N. Al-Madi [11] in 2013 presented the cloud computing structure, benefits and challenges, and the impact of cloud solutions on business. With the conclusion, cloud computing technique opens new opportunities for new business at the same time provide more chances for other companies to use the cloud solutions instead of buying new equipment and pay for using licensed software at a higher price while training the employee for each new technology or service the company needs.

VI. METHODOLOGY

A. Data Collection

The study was conducted to prove the various objective of the research. A survey was chosen as a method of collecting the data from the participant. Specific as well as the random audience were selected for the response. The survey was conducted through google forms within the business and educational institute of Mumbai city. Total of 61 participant took the survey out of which 18 belonged to the various business (public and private) sector, 43 belonged to the educational institute

B. Material

Google form was used as a source for collecting the data from the targeted as well as random audience consisting of a questionnaire. Total of 61 response was received over the course of 2 weeks

.

C. Sampling Method

Simple sampling method and convenience sampling method were used to select the audience for the research as the research included a purposive or deliberate selection of a particular audience as well as probability sampling where each and every item in the population has an equal chance to respond to the research objective.

VII. EXPERIMENT

1) *H1:* Implementing Cloud computing services are very much effective in the business and educational sector.
a) *H0:* Implementing Cloud computing services are not effective in the business and educational sector.
b) *HA:* Implementing Cloud computing services are very much effective in the business and educational sector.
c) Hypothesis was carried out using the chi-square test, keeping level of confidence 95% and considering the observed and expected value. Basis on the survey question and the response received from the 61 participant

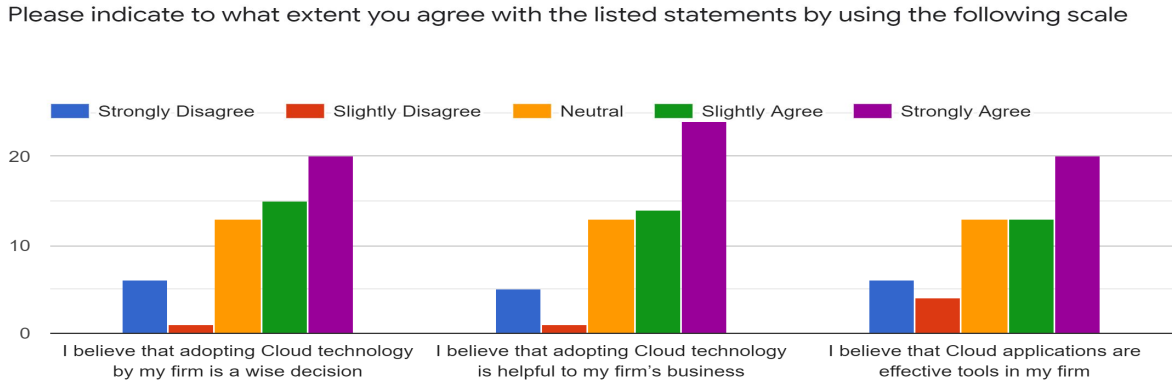


Fig 1.Survey response for cloud implementation

We got a value of p (probability) is 0.03765 < 0.05, level of significance. Hence Null hypothesis is rejected and Alternate hypothesis is accepted. Therefore, proved H3"Implementing Cloud computing services are very much effective in the business and educational sector."

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2) H2: Cloud computing is better than the traditional method of data storage
a) H0: cloud computing is not better than the traditional method of data storage
b) HA: Cloud computing is better than the traditional method of data storage

Hypothesis was carried out using the chi-square test, keeping level of confidence 95% and considering the observed and expected value. Basis on the survey question and the response received from the 61 participants.

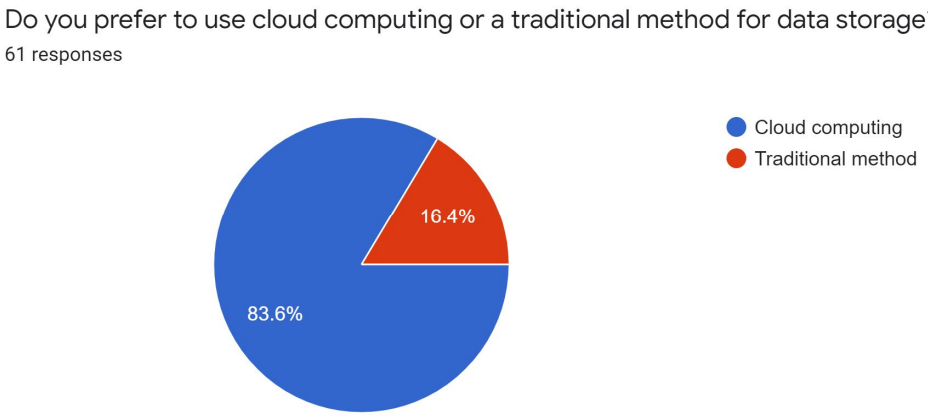


Fig 2. Survey response (cloud computing vs Tradional data)

We received a value of p is 0.047 < 0.05, level of significance. Hence Null hypothesis is rejected and the Alternate hypothesis is accepted. Therefore proved H1": Cloud computing is better than the traditional method of data storage"

3) H3: Cloud computing services provide more security compared to the traditional method.
a) H0: Cloud computing services does not provide more security compared to the traditional method
b) HA: Cloud computing services provide more security compared to the traditional method.

Hypothesis was carried out using the chi-square test, keeping level of confidence 95% and considering the observed and expected value. Basis on the survey question and the response received from the 61 participants

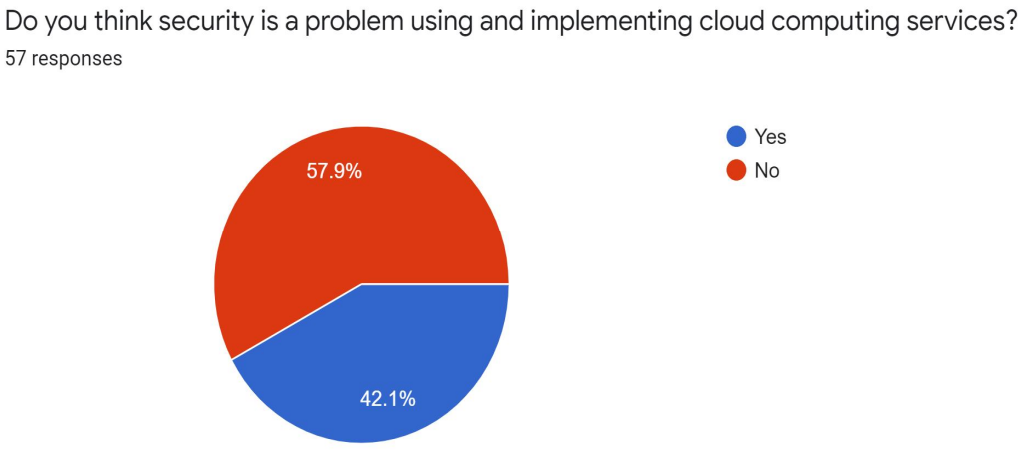


Fig 3. Survey response regarding security in cloud computing

We received a value of p as 0.0256582 < 0.05, level of significance. Hence Null hypothesis is rejected and Alternate hypothesis is accepted. Therefore proved ": Cloud computing services provide more security compared to the traditional method."

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VIII.RESULT

Based on the survey conducted on the specific and random pollution of the various business and educational sector it was observed that the cloud proved to be an effective alternative for the traditional way of accessing and storing data. Out of 61 participants, 90% population believes cloud computing is an effective solution to the current business and educational system, also hypothesis H1 proves the same. 83% population believes that the cloud is the best alternative instead of the traditional data storage method proving hypothesis H2 right .57.9% population thinks security is not a concern for using cloud service still 42.1% population believe there is a security concern to implement or use the cloud services. But our hypothesis proves that security is not a concern to use a cloud environment.

IX. CONCLUSION

Cloud computing has evolved in the past few years. Today top cloud deployment models and services are provided by big companies like Amazon, Microsoft, Google, IBM, etc. Based on the study it can be easily said that most of the population are already using the services provided by the cloud through various providers. This concludes that the cloud is an effective way of managing the business through the internet rather than the traditional way where the cost of managing is high compared to cloud services. A hybrid model of cloud can be implemented for business and educational systems. This research was conducted purely to understand the effectiveness of implementing the cloud in the business and educational sector. the study shows that the cloud will be the best alternative to the traditional way of data management and services in the current as well as the coming future for business and educational system to predict, to take a knowledge-driven decision and to reduce the infrastructure and storage cost .

X. ACKNOWLEDGMENT

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XI. GLOSSARY

A. H0= Null Hypothesis
B. HA= Alternate Hypothesis
C. p= Probability

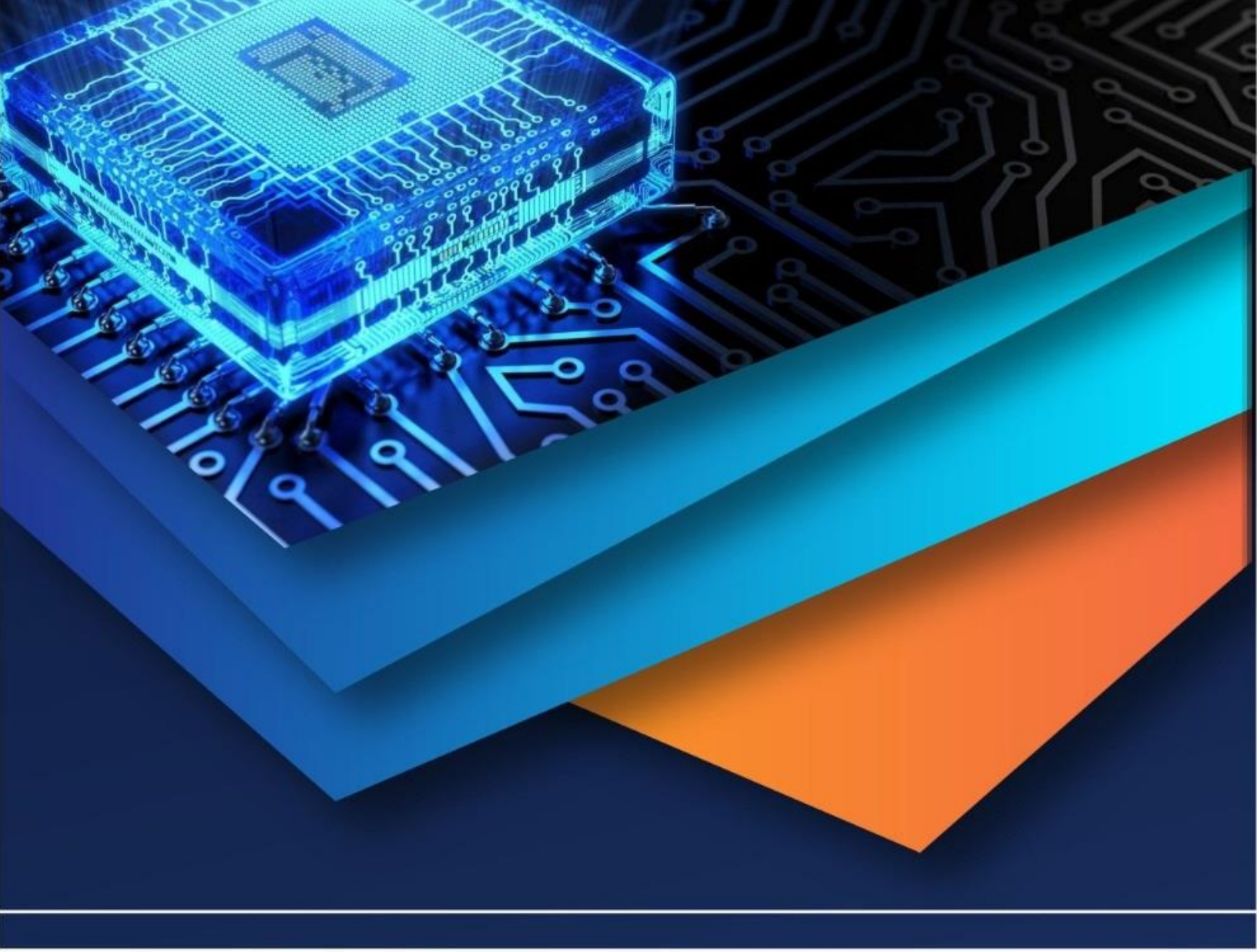
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