

CHALLENGES AND OPPORTUNITIES IN CLOUD COMPUTING

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Abstract

The use of cloud computing to store and access data, applications and other vital resources can help organisations effectively. However, challenges can also be seen in the use of cloud computing. The overall service of CC has been distributed in three parties that are infrastructure as a service or IaaS, platform as a service or PaaS and software as a service or SaaS. Handling all this efficiently is needed unless misconfiguration of the cloud resources can lead to security threats. Primary quantitative methods have been chosen for this study where 60 participants have been chosen randomly. Concern has been taken from the participants before provisioning survey questions. Graphical analysis has been done in this study to gather information regarding all opportunities of cloud computing and the challenges present in it. The use of CC in companies can help in managing IT-expenses and bring opportunities. However, challenges can occur in the operation of the business. Misconfiguration, hacking and other challenges can damage the smooth work of individuals and companies effectively. A brief explanation throughout the study helped in reaching the aim of the study and the survey has helped in gathering all relevant information.

Key words- *Cloud computing, centralised data, data security, hacking, misconfiguration*

Introduction

Cloud computing is a process of accessing multiple services over the internet such as applications, resources and many more. The use of cloud computing can increase the speed of work for an individual and enhance the quality of the work (Sadeeq et al. 2021). Challenges and opportunities have been observed in the process of using cloud computing.

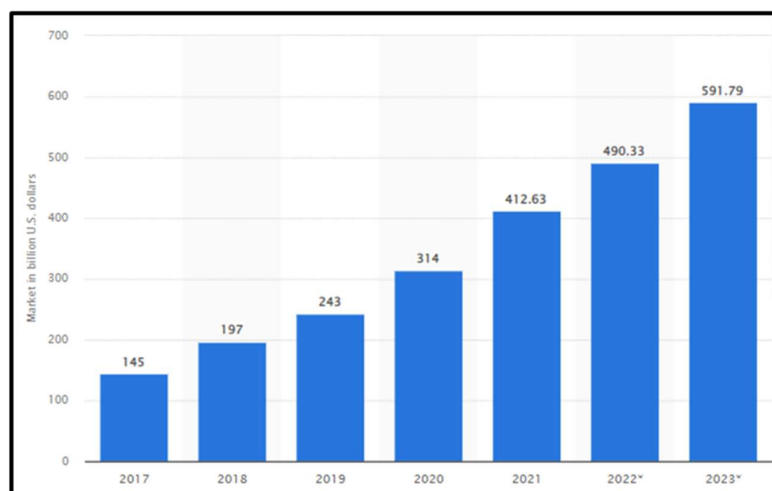


Figure 1: Market size for the public clouds across the world from 2017 to 2023

(Source: Statista, 2023)

The market size of cloud computing is increasing rapidly and Figure 1 has reflected the growth of the market from 2017 to 2023. The continuous growth of the market predicted the growth can reach 490 billion U.S. dollars in 2022. The growth can also increase in the year 2023 by 20.25% more than the previous year (Statista, 2023).

Research Aim and Objectives

Aim

This study targeted to discover the opportunities that can be adhered to and challenges that need to manage in the case of using cloud computing.

Objectives

- To discuss the concept of cloud computing and the way it function
- To elaborate on the opportunities that can be gained through the use of Cloud computing
- To analyse the challenges present in the cloud computing process
- To recommend a solution to prevent any harm that can cause by Cloud computing

Research Questions

- What is cloud computing and how does it work?
- What opportunities can be seen in the use of Cloud computing
- How does cloud computing bring challenges to the working process?
- Which solution can fit best to mitigate challenges in cloud computing?

Rationale

The use of cloud computing has eased the IT working system and many other functional areas of companies. However, the challenges in the use of cloud computing are also highly acknowledgeable (Sriram, 2022). Centralised security system has increased the safety of the data and resources of companies and individuals although the risks are associated with account hacking. Data breaching has been recorded in the past few years and cloud computing failed to prevent such operations from happening (Agrawal, 2021). Therefore, mitigating all the challenges need to be done for assenting the valuable opportunities of cloud computing.

Literature review

The basic concept of cloud computing and its functional areas

An open pool of resources can be accessed through cloud computing or CC. Opportunities of CC are vast and it provides two distinct using options that are private and public (Duan et al. 2020). The use of cloud computing to store and access data, applications and other vital resources can face challenges as well, which need to be registered by the user to prevent any risk. Here, Tang et al. (2021) mentioned, the use of cloud computing has enormous benefits starting from data safety and easing the work process in any organisation.

The overall service of CC has been distributed in three parties that are infrastructure as a service or IaaS, platform as a service or PaaS and software as a service or SaaS.

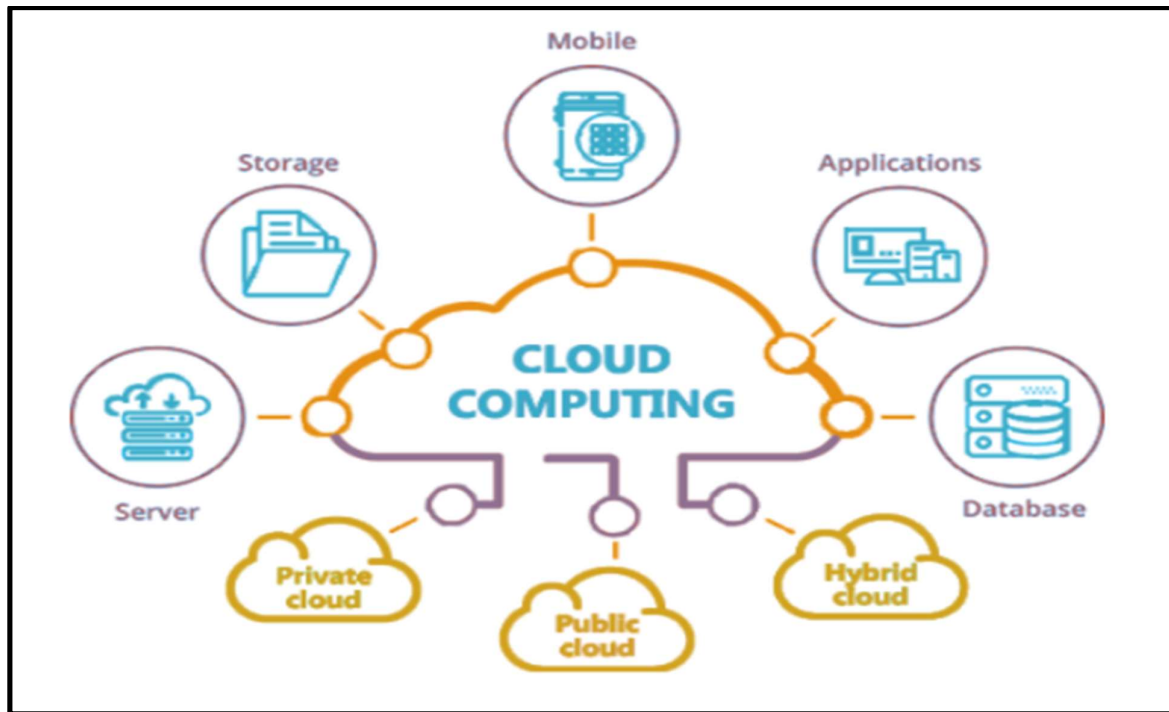


Figure 2: Process in cloud computing

(Source: Influenced by Masdari et al. 2020)

Both public and private cloud computing options are easily accessible from anywhere. On the other hand, using CC can reduce the load of using Heradwares, software for storing data or the use of routers and other accessories (Masdari & Zangakani, 2020). The use of CC can manage the cost reduction for technological operations effectively. Using CC can eliminate the option of backups in both onsite and offsite functions by providing a centralised data safety facility (Masdari et al. 2020). It has been found that the use of cloud computing can increase the input and output functioning per second which leads to greater performance by a company. Therefore, multiple opportunities can be observed in the use of cloud computing.

Challenges present in the use of cloud computing

Cloud computing is a popular means of accessing required resources remotely that can save up high costs. However, misconfiguration of the cloud resources can lead to security threats (Pande et al. 2021). The centralisation of data can help in increasing safety however, malfunctioning can bring challenges of cyber threats. Hackers can enter the channels of the storage and the centralised can be wiped out in a single run (Mekala & Viswanathan, 2019). Hijacking accounts are no longer tough due to technological advances. And companies. The use of authorised access decreases visibility and creates confusion in accessing permission.



Figure 3: Challenges in Cloud computing

(Source: Influenced by Aldossary et al. 2019)

Apart from all the above-mentioned problems, challenges can also occur in the internal matter of an organisation. Lack of skill in operating such an advanced technological setup among the worker can bring restrictions for companies (Kruekaew & Kimpan, 2020). On the other hand, a lack of funds for regular inspection and reviving encryption systems can increase the threats of using cloud services (Aldossary et al. 2019). The threats are inevitable. However, the lack of management and problems skills of company leaders can bring failure in the use of cloud computing in the business process.

Solutions for increasing efficiency while using the cloud computing process

Using a cloud service from providers offers encryption or access control. Increasing knowledge among employees for better use and proper handling can be helpful (Butt et al. 2020). In order to ensure the safety of data, increasing the authorised access can be performed.

Methodology

The use of cloud computing and its opportunities along with its challenges have been discussed in this study. In order to collect all relevant information primary quantitative methods have been chosen. 60 participants have chosen randomly to conduct the survey and the concern has taken before sending survey questions. Closed-ended questions have been presented through a survey that helps in gaining real-time information from people. This has led to the analysis of all the information through graphical analysis.

Findings

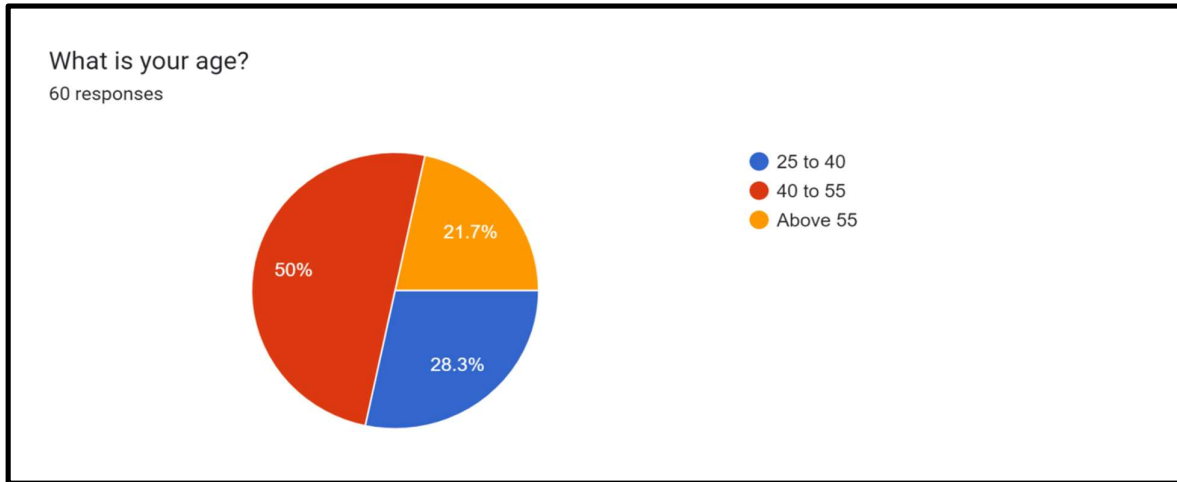


Figure 4: Age Clarification

Figure 4 has reflected the age of participants where the maximum population, 50%, was form the 25 to 40 age group.

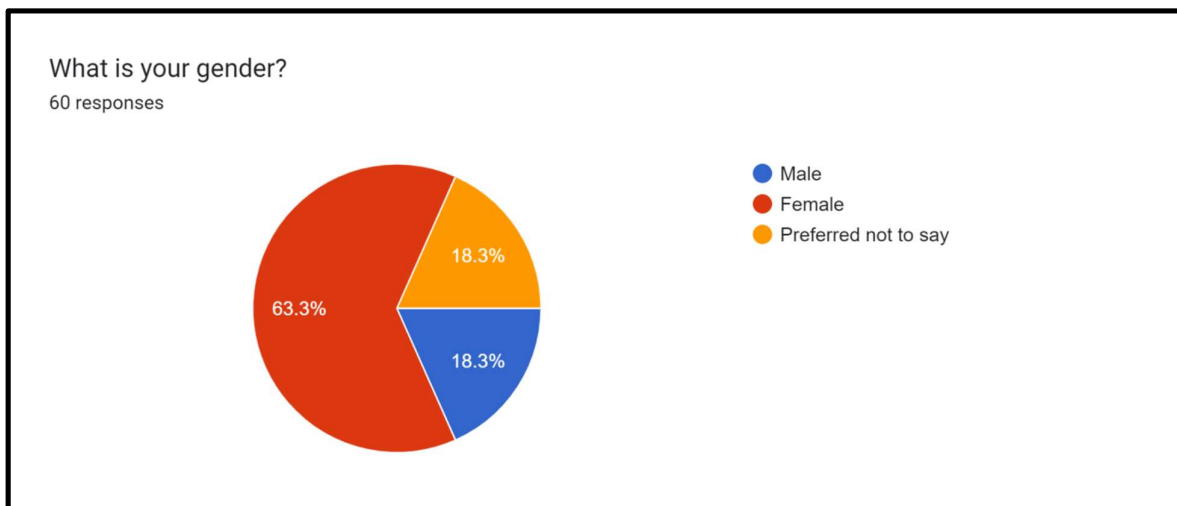


Figure 5: Gender identification

The genders of the participant have also been identified that as presented in Figure 5. The maximum number of people was female in the survey which is 63.3%

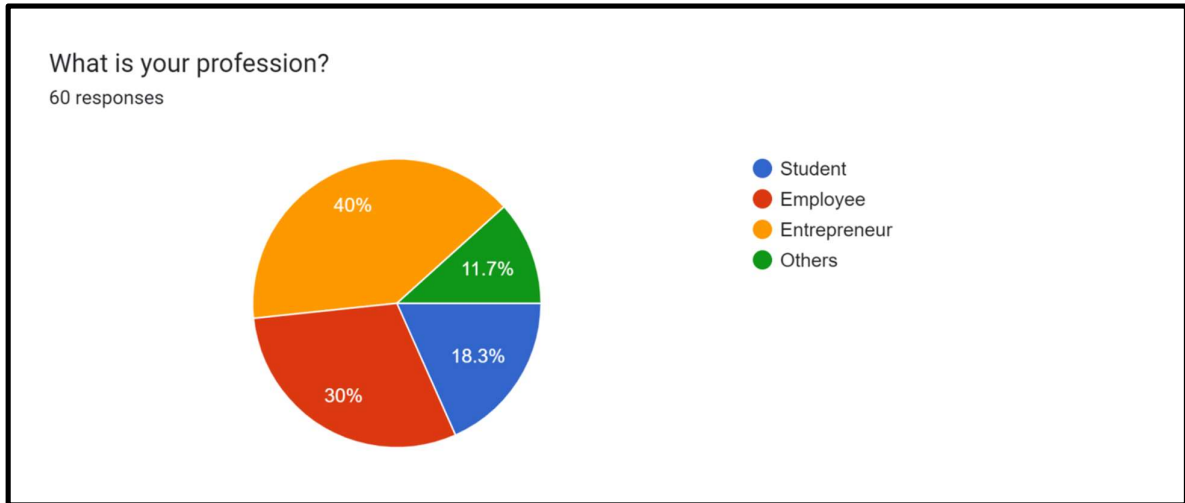


Figure 6: Profession

The professions of people in the survey have been identified and highlighted in Figure 6. Among all the participants 30% are employees and 40% of entrepreneurs in the survey.

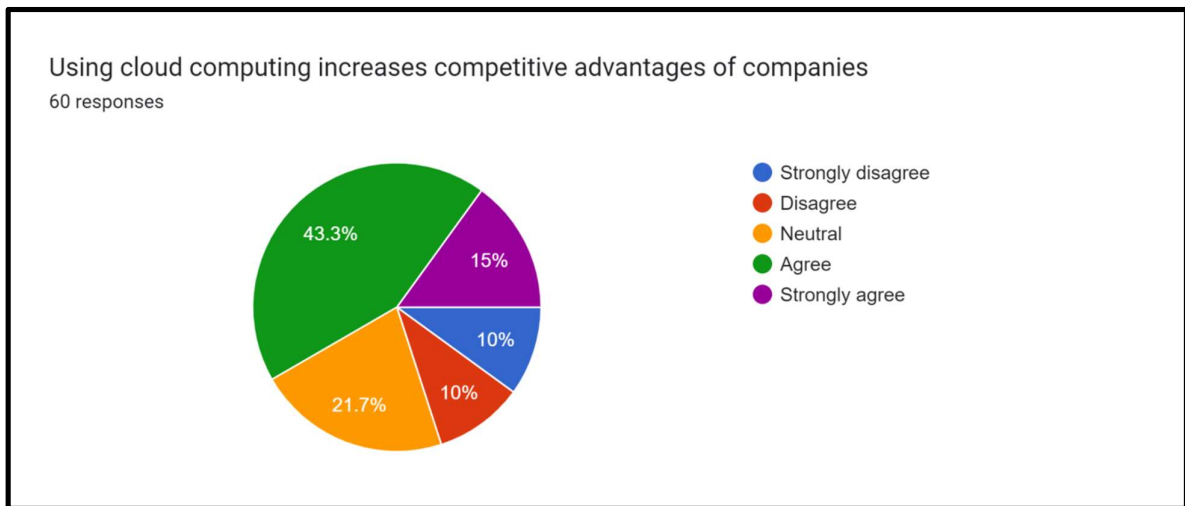


Figure 7: Increasing competitive advantages through cloud computing

The use of cloud computing has helped in managing the competitive advantages of the companies (Duc et al. 2019). In the survey, the statement was agreed by 43.3% of people and disagreed by 10%. Also, 15% and 10% strongly agreed and strongly disagreed with the fact respectively.

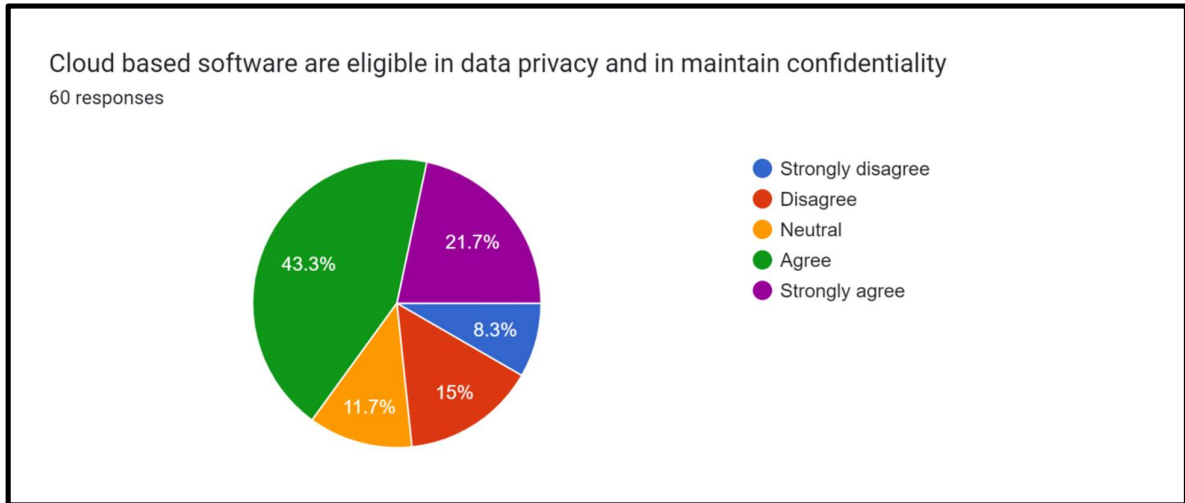


Figure 8: Data privacy through CC

Using CC can increase the safety of company information and individual confidentiality can be maintained (Stergiou et al. 2020). The statement was agreed by 43.3% of the participants and 21.7% strongly agreed with it. However, 15% disagreed and 8.3% strongly disagreed to the fact discussed here.

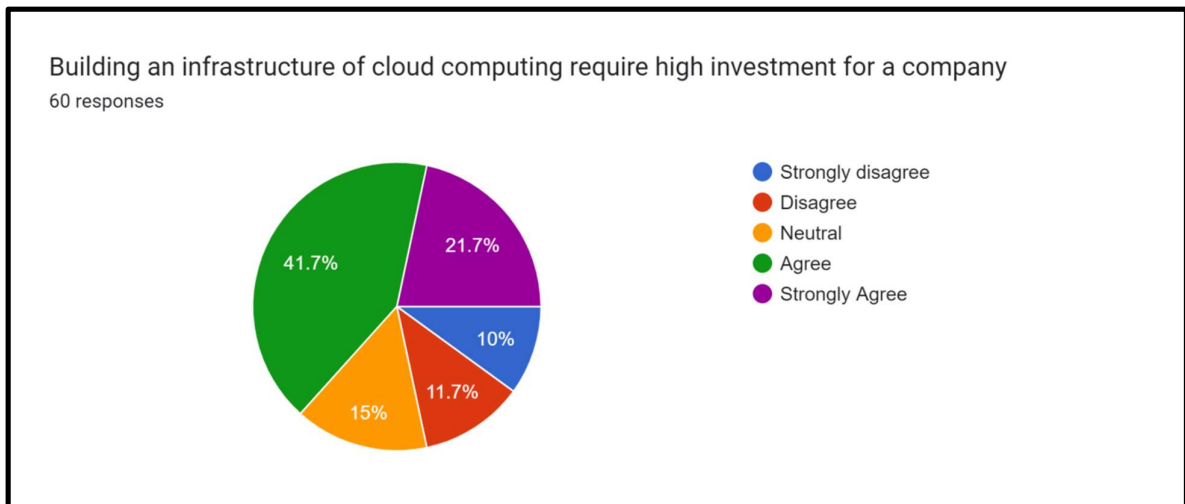


Figure 9: High investment in CC

CC is highly eligible to provide safety to the data; however, companies face challenges in collecting funds to incorporate it into business. In the survey, the statement was agreed by 41.3% of people and disagreed by 11.7%. Also, 21.7% and 10% strongly agreed and strongly disagreed with the fact respectively.

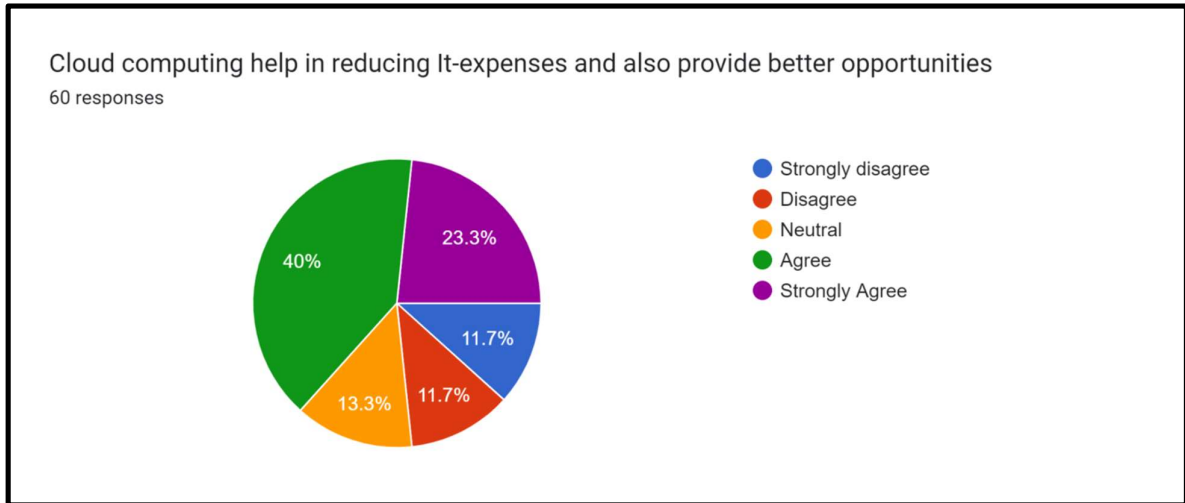


Figure 10: Better opportunities through CC

Saving up functional information and reducing the load of work in self-devices through CC can help companies to manage IT-expenses and bring opportunities (Sagan et al. 2020). 40% and 23.3% of the total population in the survey agreed and strongly agreed with the statement. However, 13.3% have neutral prospects for the statement.

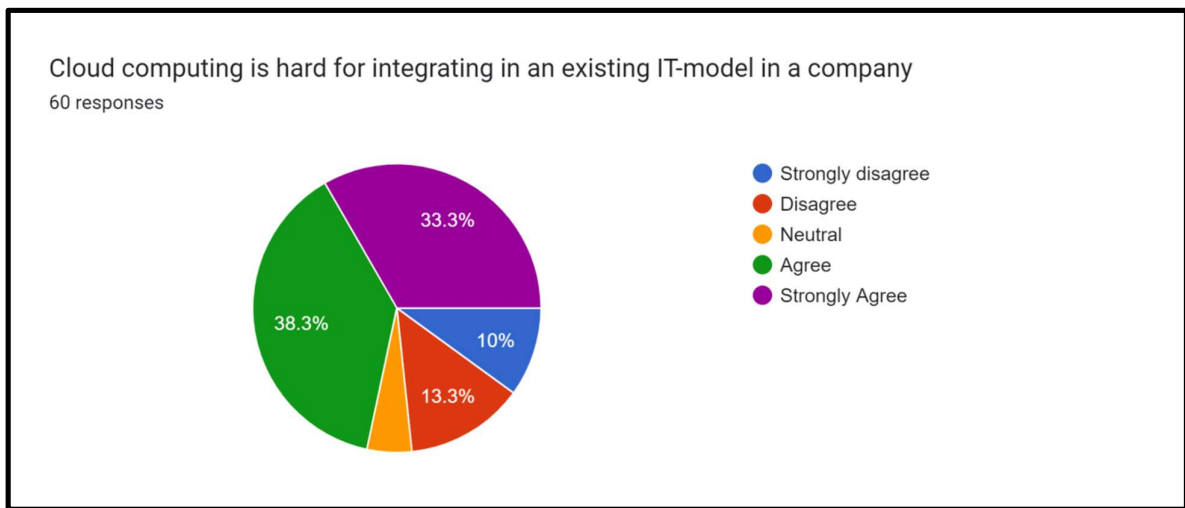


Figure 11: Difficulties in incorporating CC in existing IT- model

Easing the process of working through the access of all resources on the internet is the basic portfolio of CC, however, it can be challenging to include in existing IT work (Aceto et al. 2020). The statement was agreed by 48.3% of the participants and 33.3% strongly agreed with it. However, 13.3% disagreed and 10% strongly disagreed with the fact discussed here.

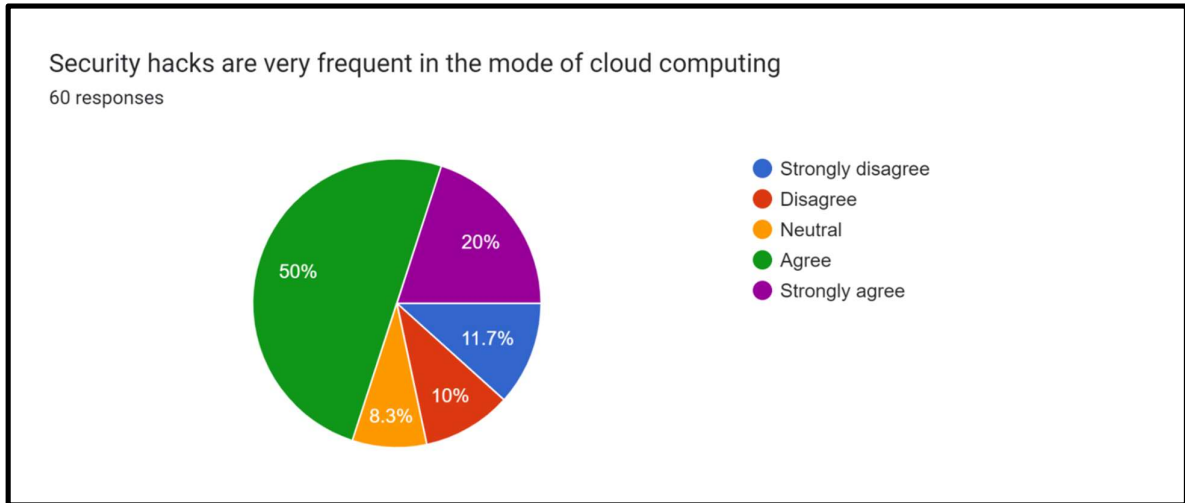


Figure 12: Frequency of security hackings in CC

Centralised data security is no doubt the best offering of CC operation, although sincere hackers can destroy the information of companies in many ways (Stergiou et al. 2020). In this statement, 50% responded with an agreed viewpoint and 20% strongly agreed with it. 10% and 11.7% population of the survey disagreed and strongly disagreed respectively.

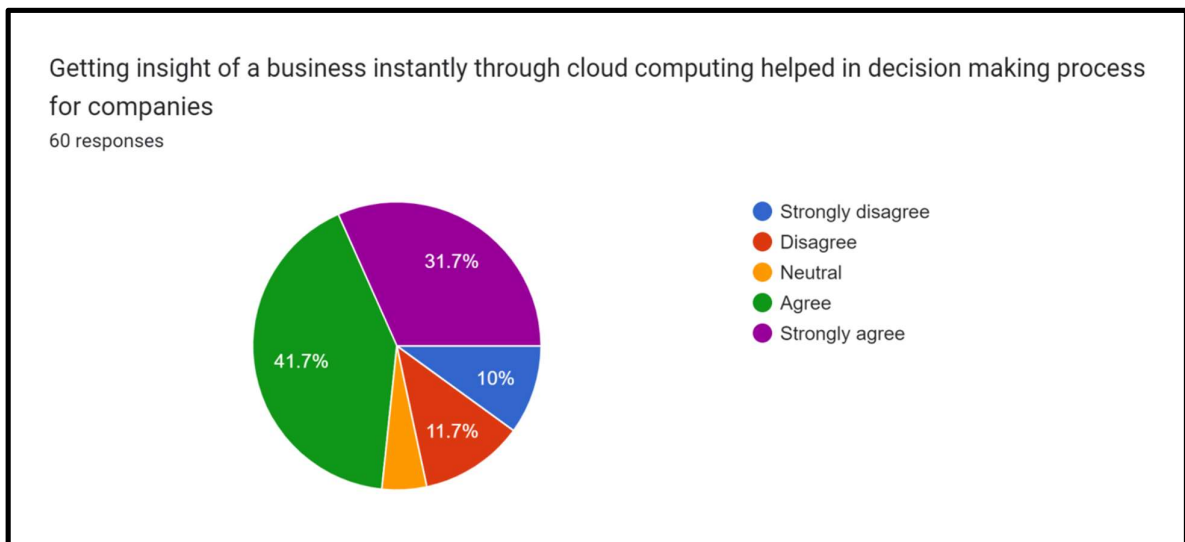


Figure 13: Easier way of making decision due to CC

Insight of business becomes easy to get through the use of CC and 41.7% of participants have agreed with it. However, 11.7% and 10% disagreed and strongly disagreed with the statement.

Discussion

Using cloud computing can increase the accessibility of resources effectively. It also increases data security and saves up money. The use of CC in companies can help in managing IT-expenses and bring opportunities (Sriram, 2022). However, challenges can occur in the

operation of the business. Misconfiguration, hacking and other challenges can damage the smooth work of individuals and companies effectively (Sun et al. 2019). Findings have revealed the real-time view of people who have participated in the survey. Maximum people are aware of the benefits and threats of CC and they responded accordingly.

Conclusion

This study has covered a detailed discussion of the benefit, opportunities and the threats of using the cloud computing process. A brief explanation helps in reaching the aim of the study and the survey has helped in gathering all relevant information. Graphical analysis has helped in gathering the perception of people in detail.

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Appendices

(Survey link:

https://docs.google.com/forms/d/1s3oFXQ7_om3T-EevyTkE5k3kjrB84PKILJ-Xn8_qHY/edit#responses)

Appendix 1: Survey questions

1. What is your age?
2. What is your gender?
3. What is your profession?
4. Using cloud computing increases competitive advantages of companies
5. Cloud based software is eligible in data privacy and in maintain confidentiality
6. Building an infrastructure of cloud computing require high investment for a company
7. Cloud computing help in reducing It-expenses and also provide better opportunities
8. Cloud computing is hard for integrating in an existing IT-model in a company
9. Security hacks are very frequent in the mode of clod computing
10. Getting insight of a business instantly through cloud computing helped in decision making process for companies