



EMPIRICAL EVALUATION OF FINOPS FRAMEWORK FOR SUSTAINABLE CLOUD ENGINEERING

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INTRODUCTION:

- Most modern ICT solutions are shifting services, apps, and databases to the cloud to maximize profitability and minimize upfront expenditures.
- Cloud computing providers' "pay as you go" business model is pushing this movement.
- This method reduces infrastructure capital investment for enterprises.
- A firm would need a lot of resources and time to build services like public cloud providers if they maintained their own infrastructure.
- Since several cloud computing organizations introduced this payment mechanism, data has shown its benefits (Odun-Ayo et al., 2018).
- Finding the best cloud computing provider is difficult. Firms must consider both financial and time investments.

CONTD...

- Businesses, especially those with legacy systems, might struggle to choose the best cloud computing conversion approach. Businesses must assess cost, performance, and upkeep before choosing a vendor.
- "FinOps" was inspired by exorbitant costs in many enterprises. Monitoring cost services are being established to reduce cloud expenses and prove FinOps' feasibility.
- These tools provide a single management interface that facilitates cross-functional collaboration between departments like Engineering, Finance, and Delivery, improving financial control, predictability, and cost optimization.
- As a result, companies tend to improve their situations and problems.
- These solutions also enable a unified management interface for cross-functional collaboration between Engineering, Finance, and Delivery.

LITERATURE REVIEW:

- The objective of the research conducted by **Mei (2023)** was to investigate the ways in which cloud monitoring tools and Financial Operations (FinOps) might be combined to achieve cost optimisation in cloud systems. The purpose of this thesis is to investigate the methods and approaches utilised in FinOps, such as cost allocation, budgeting, and forecasting, as well as how these might be utilised in conjunction with cloud monitoring technologies to achieve the goal of reducing overall cloud expenses.
- Cloud computing, as a new format of the information industry, is the main technology and means to lead the innovation and development of the information industry in the future, according to **Li et al., (2022)**, who said such statement.
- The author **Theby (2022)** argued that cloud computing evolved into an essential instrument for crisis response for many public sector organisations (PSOs) during the COVID-19 pandemic. This helped to maintain public service delivery and public sector operations during times of unparalleled global turbulence.

LITERATURE REVIEW:

- **Chidambaram (2022)** conducted their research using a methodology known as multiple case study. In the course of the study, they decided to look into three different case projects. One of the considerations that went into selecting the case projects was whether or not the researcher who conducted the study had any involvement in the development or architectural aspects of any of the projects that were reviewed for the research.
- According to **Sannino (2022)**, an increasing number of businesses in today's modern day are starting out on a cloud transformation journey or consolidating their position on the cloud in order to take advantage of the scalability, flexibility, and efficiency benefits given by this technology paradigm for their businesses. The consequences that the variable pay-as-you-go cost model, which is commonly adopted by cloud service providers, has on traditional ICT Financial Management processes are frequently disregarded, despite the fact that this model typically has these repercussions.
- Cloud computing is a network-based technology that delivers compute, information, data, and storage services, as stated by **Zolkipli and Riduan (2021)**. The software business is increasingly placing a higher emphasis on Quality Assurance (QA) and Testing criteria in order to facilitate effective product expansion.

RESEARCH GAP:

- Since the public cloud became popular, the cloud computing sector has aggressively promoted hybrid cloud solutions to corporate customers, according to earlier literature.
- Hybrid clouds have various advantages over public clouds. Taking advantage of the fact that not all work will be relocated to the public cloud, some cloud providers and system integrators have promised to smoothly link this organization's data centre and the public cloud.
- However, integrating on-premises systems with cloud storage remains challenging and rewarding. Cost optimization and security are the biggest corporate challenges today.
- Cloud technology reduces operating costs and speeds time to market. Thus, this study examines one of the FinOps multi-cloud monitor technologies to determine if it benefits organizations.

PROBLEM STATEMENT:

- Enterprise Cloud customers must evaluate lifetime expenses. These costs should encompass migration, operations, end-of-term, licensing, and operational risks.
- Financial management must handle multiple clouds. A firm FinOps competence will help manage these difficulties. Hosting across numerous clouds reduces cloud service costs, hence FinOps should be prioritized.
- This research develops algorithmic cost optimization models for efficient and reliable problem solving.
- A hypothetical review to promote financial management and cloud system energy efficiency has been suggested.
- FinOps can help solve cloud computing problems by including sustainability into cloud engineering's design, development, and operations.

RESEARCH QUESTIONS:

The research questions followed in this research are as follows:

- What are the benefits and impacts of multi-cloud monitors for enterprises, which assist them to plan and manage the resources they need in the cloud, in terms of efficiency and centralized resource management?
- Is the use of a multi-cloud monitoring tool going to become increasingly popular in the near future as well as essential for businesses?
- What are the advantages of incorporating the ideas of FinOps into the practices of the company?
- How should the capabilities of a company's FinOps be evaluated?

OBJECTIVES OF THE STUDY:

The objectives of the research are as follows:

- To create and analyse FinOps frameworks to achieve energy and cost efficiency for cloud computing systems.
- To perform a detailed review and concrete knowledge of the practical assessment of real-time FinOps systems.
- To embed sustainability into daily design, development and operational processes in cloud engineering.

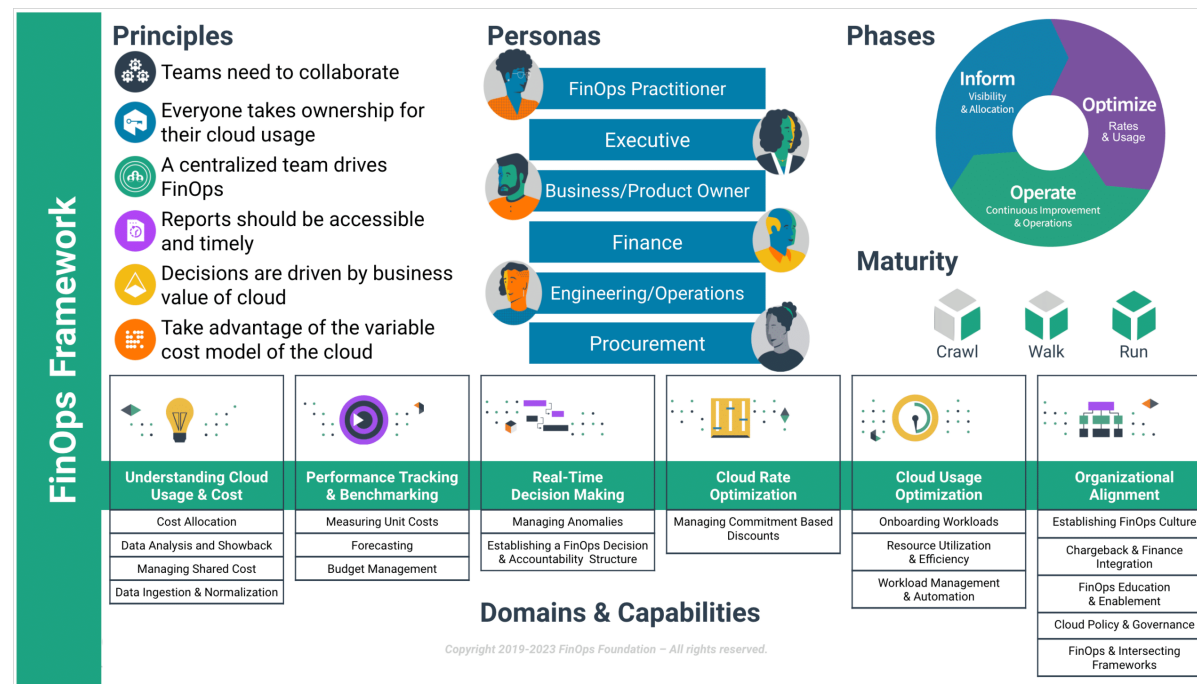
HYPOTHESIS OF THE STUDY:

The hypothesis followed in this research are as follows:

- **H01:** Financial operations (FinOps) will not allow remote teams to make decisions about speed, cost, quality and energy efficiency without being physically present in the data centre.
- **Ha1:** Financial operations (FinOps) allowed remote teams to make decisions about speed, cost, quality and energy efficiency without being physically present in the data centre.
- **H02:** FinOps will not helped to achieve financial stability and energy efficiency in cloud computing architecture.
- **Ha2:** FinOps will helped to achieve financial stability and energy efficiency in cloud computing architecture.

CONCEPTUAL FRAMEWORK:

- Public cloud architectures are market trends. Multiple cloud providers make cost management difficult. This makes agnostic billing and monitoring tools appealing. A firm should design a tool that all end users in all departments can use without technical understanding to make the most successful and profitable technological expenditures. Organizations learn about FinOps.



RESEARCH METHODOLOGY:

- The approach that has been suggested is to carry out a hypothetical evaluation with the purpose of presenting recommendations not only for the management of finances but also for the energy efficiency of several cloud systems.
- The qualitative analysis approach is going to be utilised as the study method. Researchers that use qualitative methods place an emphasis on the socially constructed nature of reality, the close link that exists between themselves and the subject of their study, and the situational restrictions that mould and direct inquiry.
- On the other hand, quantitative research places a greater emphasis not on processes but on the measurement and analysis of the causal links between variables.
- It is expected that inquiries will take place within a value-neutral framework. This research will concentrate on previous works on the subject that were published after 2015 and before 2023.
- Based on this study, this research will develop cost optimization algorithms that can be used as models to efficiently solve the issue and offer dependable results.

EXPECTED OUTCOME:

- It is expected that the outcome of this study would be cost management in the cloud, with the goal being to get the highest possible return on investment for cloud resources while ensuring that businesses are successful in accomplishing their business goals.
- Therefore, enterprises need to regularly assess and optimize how they use the cloud in order to effectively achieve these goals.
- This is true regardless of the approach that is selected. businesses are able to obtain better visibility and control over their cloud charges by implementing the appropriate combination of FinOps practices and multi-cloud billing monitoring technologies.
- This allows the businesses to optimize their cloud usage and increase the value of their cloud investments.

NEED AND SCOPE OF THE STUDY:

- A journey toward cloud transformation is typically started with the goal of realizing the benefits of increased business scalability and flexibility, which are made possible by eliminating the need to pay the upfront costs of purchasing and maintaining hardware and software.
- However, the utilization of the pay-as-you-go paradigm, which employs a variable cost model in place of the conventional CapEx expenses of on-premises computing, is fraught with potential hazards.
- This is primarily the case as a result of the higher spending delegations that are often granted to business users, who serve as the final consumers of cloud resources. Congenital difficulties in the cloud paradigm, such as the ease of resource provisioning from end users, billing methods based on continuous consumption, and the increase in Operation Expense, are compounded by critical issues related in one way or another to the offerings of cloud services and platforms by major providers.
- For example, exactly the ease of resource provisioning from end users; billing methods based on continuous consumption; and the increase in Operation Expense.
- The extreme granularity of billing, the constant updating of offerings and associated pricing models, the overload of alternative architectural configurations in service delivery, the lack of standardization across different provider platforms, and other factors actually make it more difficult for businesses to understand and control their cloud computing costs.

SIGNIFICANCE OF THE STUDY:

- Enterprise Cloud customers must evaluate lifetime expenses. These costs should encompass migration, operations, end-of-term, licensing, and operational risks.
- Financial management must handle multiple clouds. A firm FinOps competence will help manage these difficulties. Hosting across numerous clouds reduces cloud service costs, hence FinOps should be prioritized.
- This research develops algorithmic cost optimization models for efficient and reliable problem solving. A hypothetical review to promote financial management and cloud system energy efficiency has been suggested.
- FinOps can help solve cloud computing problems by including sustainability into cloud engineering's design, development, and operations.

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