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AI-BASED COST OPTIMIZATION AND FINOPS GOVERNANCE FOR CLOUD-NATIVE BANKING PLATFORMS

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***Abstract*: The AI-based FinOps governance in the matter of cost-efficient use of clouds in the cloud-based bank platform. The issues that have been determined in the literature are the lack of visibility of costs, the governance immaturity, and a surge in cloud expenditures. The AI-based predictions, optimisation, and anomaly observation turn out to be valuable enablers to the realisation of improved financial accountability and decision-making. The data is complemented by the graphs, which point to the increased use of FinOps, yet there was a lack of maturity, as well as a rising relationship to the sustainability objectives. The study emphasises the need to have formal AI-enhanced governance systems unique to banking environments to enhance transparency, conformity and effectiveness. Overall, AI-based FinOps can offer the proactive, sustainable and strategically managed cloud cost to a great extent.**

Keywords: FinOps, AI-Based Cost Optimisation, AI, FinOps-governance, Autonomous Cloud Management

I. INTRODUCTION

A. Background to the Study

Concepts of cloud-native banking have transformed the delivery of financial services offered by them in that they are scalable, agile, and innovative [1]. However, such a step has significantly increased the expenditures around clouds and resource complexity, as well as financial uncertainty. The traditional cost management systems will not be able to handle the unstable consumption patterns and regulatory requirements in the banking arrangements. Bankers increase the use of AI and automation, and thus an increasing pressure is exerted on intelligent structures, which will be able to optimise their expenses, keep their banking systems transparent and accountable, and at the same time be one of the most regulated institutions in the world.

B. Overview

This study addresses the contribution of Artificial Intelligence to the governance of the FinOps and cost-saving of cloud-native banks. It investigates functionalities supported by artificial intelligence, such as predictive analytics, to distribute their resources intelligently and detect cost abnormalities to maintain economic accountability in the cloud environments [2]. The study also looks at the governance structure, decision-making, and monitoring systems, which are essential in sound cloud financial management. Based on the knowledge and the analysis, the studies provide a suggestion of an AI-based FinOps governance system to fit the banking sector.

C. Problem Statement

The cloud cost in banks is growing and becoming more unpredictable due to intricacy in the consumption models, distributed jobs, and a lack of real-time financial administrative oversight. The existing FinOps is reactive and disjointed, with an ineffective use of resources and increased costs [3]. In addition, regulatory compliance and accountability requirements are a contributing factor to financial risk. There is a dire need to have an AI-powered FinOps governance that is proactive in its cost prognostication, anomaly detections, and automation to optimize its automation and governance regulations within the cloud-based banking landscape.

D. Aim and Objectives

The aim of the study is to develop an AI-based FinOps governance framework to optimise cost efficiencies, financial accountability, and operational performance on cloud-based banking systems escalation. The objectives are: 1. To investigate the problem of cloud cost management issues within the banking environment. 2. To determine the utility of AI in predicting, optimising, and managing cloud spending. 3. To develop a FinOps-governance framework of banking sites by using AI.

E. Scope and Significance

The solutions of the public and hybrid cloud infrastructures will be targeted in this study as a cloud-native banking solution. It examines the application of artificial intelligence in cost forecasting, anomaly detection, optimisation, and governance with regard to the required regulatory provisions. The results will allow banks, FinOps practitioners, cloud architects, and policymakers to acquire a systematised model of governance that will provide them with the right to regulate spending in a way that would not disrupt performance or compliance [4]. It is one step ahead in the scholarly field concerning FinOps and implements AI-based intelligence into the fiscal governance of regulated examples of digital banking systems.

II. LITERATURE REVIEW

A. Cloud cost challenges in banking

Cloud computing has transformed banking activities by making them scalable, agile, and constantly innovating as well as posing serious financial management issues. The growing cloud adoption is likely to predetermine uncertainty in expenses and wastage of resources and budget overruns owing to the complex pricing frameworks and dynamic workloads. As indicators, in there is a visibility and transparency problem on cloud spending in banks, where most institutions lack real-time monitoring and cost accountability tools and are therefore ineffective [5]. Nevertheless, on the contrary, it is not being visible, but rather it is the problem of poor governance maturity in which the decision-making remains a prerogative of silos, and FinOps remains reactive rather than strategic [6]. The former is the complexity and uncertainty of cost in technology, but the latter is the limitation of the operations in the organisation and the government, and there is a difference in the focus of the limitation of operational inefficiency and the limitation of financial governance structure.

However, the existing practices of cost management cannot be effective in banks where the measure is strict. Notwithstanding, the literature concerning AI-based proactive cost governance,

particularly that which demands a blend of predictive analytics, anomaly detection, and automated optimisation, particularly in cloud-native banking settings, is a void.

B. AI-driven cloud cost optimisation

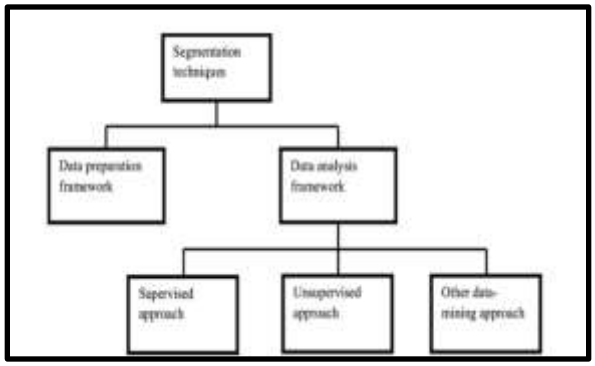

Figure 1: AI-driven techniques for Autonomous Cloud Management

(Source: [8])

AI has been significant in supporting proactive management of the cloud cost by improving the quality of forecasting, generating optimisation choices, and instant detection of anomalies. A closer look at AI value in the context of AWS reveals that predictive models will forecast how the load of work can be changed, how resources can be allocated in the most efficient way, and how needless spending can be minimised with the help of improved performance management [7]. Somewhat more concerned with the idea of autonomous cloud management and say how the methods of AI, such as supervised learning, unsupervised learning, and learning, enable the system to be self-healing, optimised, and detect anomalies to continuously stay stable and efficient [8]. Even though the former study posits the argument of performance-driven optimisation within a certain cloud ecosystem, the latter is widely concerned with automated and adaptive management in many different environments, which implies that they will have different perceptions of AI in cloud management ***[Refer to Figure 1]***.

Despite all these, there is still a literature gap in the subject of integrating AI-wise forecasting, optimisation, and anomaly detection within the formal FinOps governance framework in the most regulated industries. Minimal research was conducted on an experiment where AI-based intelligence would correlate directly with financial accountability, financial transparency, compliance congruence, and decision-making structures required in cloud-native banking systems.

C. AI-enabled FinOps governance

The greatest solution to render cloud-native banking systems more financially accountable, optimised, and risk-controlled lies in the AI-driven forms of governance. Risk intelligence, financial decision making, and operational resiliency processes in the banking ecosystem may be cemented by AI-driven analytics using data-first finance, which mostly concentrates on scalable architectures [9]. This perspective demonstrates that AI-driven data engineering pipelines offer more visibility, surveillance, and management of digital financial systems. All-inclusive computing architectures, which include intelligent robots, risk analytics, and secure online systems to support reliable and lucrative budgetary settings, are comparatively in place [10].

The importance of AI to improve the intelligence of processes in the financial systems and governance, in the literature, a specific, cloud-native banking platform-driven governance structure is not shown yet. There are also limited aspects of acculturation of AI-supported cost governance, predictive cost control, accountability models, and compliance-based financial management that are not completely incorporated into formal FinOps architectures specific to banking clouds, as far as cost management is concerned.

III. METHODOLOGY

A. Research Design

The type of research design that the current study employs is the explanatory research design, and it will discuss how AI-based FinOps governance can optimise the cost of using clouds on platforms by banks. The design is oriented at establishing cause-and-effect relationships of AI implementation, the financial regulation frameworks, and the cost-efficiency outcomes. It talks about procedures, administrative set-ups, and decision-maker influences. The study of anatomy through literature analysis and presented evidence will serve the purpose of enlightening the activities of implementing AI-based forecasting, optimisation, and anomaly detection to improve the financial accountability and operational efficacy in services that are cloud-based.

B. Data Collection and Analysis

The study adopted secondary qualitative and quantitative data that are in the form of academic publications, industry reports, white papers, banking guidelines, FinOps documentation, and cloud governance publications. Relevant literature shall be reviewed and analysed constructively so as to observe the patterns, best practices, and gaps. AI use in cloud management models, governance, and regulatory models, as well as in financial accountability, will be examined. The obtained results will be scaled to the generalisation to present the insights and propose an AI-based model of FinOps governance employed in cloud banking platforms.

C. Case Studies/Examples

Case Study 1: AI-Based Cloud Optimisation in Capital One

Part of the FinOps governance, Capital One improved its ecosystem on cloud via the optimisation with the help of AI. Machine learning applications helped in cost prediction, intelligent auto scaling, and detection of anomalies in data to contain unexpected workloads. The automated governance policies reduced resource wastage, wasteful spending, and compliance with regulations [11]. The ensuing AI-driven FinOps solution enhanced cost visibility, responsibility, and optimisation of the utilisation of resources, and streamlined the effective and sustainable operation of the large-scale cloud services on an optimum level, leading to innovations and high-performance digital banking services.

Case Study 2: Predictive Cloud Cost Governance in HSBC

The HSBC embedded in the cloud costs that are supported by AI analytics implemented predictive governance over the layers of its multi-cloud infrastructure. AI models forecast spending patterns, the inefficiencies that exist, and how spending may be optimised. The centralised FinOps dashboard brought more transparency and accountability, and reduced financial risks and budget variances through automated detection of anomalies [12]. The efficiency of the operations, as well

as better control of finances and aided assurance of the compliance, has been facilitated by using AI to steer the operations of a cloud, which can show how cloud-cost management can help enable sustainable and well-managed cloud integration within the international banking environment.

Case Study 3: AI-Led Cloud Financial Intelligence in JPMorgan Chase

JPMorgan Chase applied financial intelligence based on AI to deal with cloud expenditure in a hybrid cloud setup. The machine learning systems were continuously surveilling expenditure behaviour, unexplained cost traits, and providing decisions that were optimised [13]. This enhanced openness, reduced wastage and ensured effective cost-effective decision making between the financial and technology departments. AI-based finops governance improved methodicality and adherence to the budgetary procedure, regulatory compliance, and responsibility in the financial dealings to regulate the complex cloud activity amid an orderly banking setup.

D. Metrics of Evaluation

Some of these measures will be the reduction of cloud spending, quality of AI cost forecasting, anomaly detection, cost visibility improvement, and efficiency related to the utilisation of the resource. The additional metrics include governance maturity, compatibility of compliance, financial intensity of budgeting and enhanced financial accountability to determine the performance of AI-based FinOps governance in banking destinations.

IV. RESULTS

A. Data Interpretation

Figure 2: The intersection of sustainability with FinOps

(Source: [14])

This graph shows that the overlap between the functions of FinOps and the sustainability team has been growing to an average of 50% projected to occur in the future, compared to the current 19%. With the case of cloud-native banking, it would entail that the governance models would not only be the more cost-effective deployments of the cloud, but also environmentally responsible, as they also involve AI-driven insights. It reflects the support of the increasing awareness that the priorities of financial accountability and sustainability undergo mutual collaboration at FinOps levels.

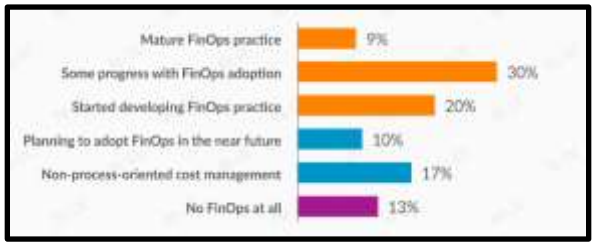

Figure 3: Level of FinOps adoption among companies

(Source: [15])

This graph shows that there are varying adoption speeds of FinOps by organisations. The percentage of businesses having full-fledged FinOps practices is quite low (9%), and most businesses are maturity-oriented (30%) or architecture building (20%). Meanwhile, some apply informal cost management (17%) or none at all (13%). Regarding cloud-native banking, it implies that the knowledge is increasing; however, the structured and AI-based FinOps governance is not developed yet, and it makes it necessary to enforce frameworks, automation, and cost accountability instruments.

B. Findings

FinOps has been found as an essential governance framework when it comes to handling the expenses, responsibility and viability of clouds in the new digital setting, as in cloud-native banking. The graphical findings show that the current collaboration between FinOps and sustainability teams is not over 19%, however, it is expected to multiply by much to 50% in the future, which can be attributed to the creation of more awareness of responsible, efficient, and environmentally oriented cloud spending. On the other hand, the proportion of organisations that have developed mature FinOps practices is low, and only 9% are in the practice (30%), and some are still developing (20%). Until then, 17% and 13% employ informal cost management, respectively, and not FinOps at all. Altogether, the statistics show that the strategic role and mutual dependence with sustainability become even more rapidly expanding with the rather infantile level of FinOps maturity.

C. Case Study Outcomes

Case Study	***Key Findings***	***Relevance***
Case Study 1: AI-Based Cloud Optimisation in Capital One	Improved cost visibility, reduced wastage, and enhanced financial control through AI optimisation [11].	Shows AI can effectively manage large-scale cloud costs.

Case Study 2: Predictive Cloud Cost Governance in HSBC	Strengthened governance, accurate forecasting, and reduced budget deviations using AI analytics [12].	Proves AI supports sustainable multi-cloud cost management.
Case Study 3: AI-Led Cloud Financial Intelligence in JPMorgan Chase	Proactive monitoring, anomaly detection, and compliance-aligned cost decisions [13].	Demonstrates AI's role in secure and accountable FinOps governance.

Table 1: Case Study Outcomes

(Source: Self-developed)

The key findings of major banking case studies are presented in the following table that offers the best use of AI-based cloud optimisation to improve financial control, governance, and accountability. It shows that AI assist in making costs more visible, accurate prediction, detection of anomalies, and consistency in compliance. The table demonstrates the general applicability of AI to help with a sustainable, secure, and efficient FinOps governance in the cloud-native banking scenarios.

D. Comparative Analysis

Author	***Focus Area***	***Key Findings***	***Limitations***
[5]	Cloud cost transparency in banking	Lack of real-time visibility and	No practical governance solution.

		inefficient cloud spending [5].	
[6]	FinOps governance maturity	Weak governance and reactive FinOps practices [6].	Limited technical optimisation focus.
[7]	AI-based cloud cost optimisation (AWS)	AI improves forecasting and resource allocation.	Restricted to AWS; limited governance link.
[8]	Autonomous AI-driven cloud management	AI enables anomaly detection and auto-optimisation [8].	No direct financial accountability focus.
[9]	AI data-first governance in banking	Enhances visibility and decision intelligence.	Weak FinOps-specific governance emphasis.
[10]	Intelligent automation and risk-aware frameworks	Supports secure and resilient financial systems [10].	Broad focus; limited cloud cost governance.

Table 2: Comparative Analysis
(Source: Self-developed)

This comparative analysis table gives significant research contributions to cloud-related problems, AI-enhanced optimisation and FinOps management within banking. This highlights the existence of perennial issues of low visibility, low-quality governance and low accountability, and the outlook of AI to predict and optimise. However, it reveals a gap in the models of AI governance peculiar to FinOps, too.

V. DISCUSSION

A. Interpretation of Results

The literature review indicates that cloud-native banking platforms are gradually being questioned on the aspects of cloud spending under the permanent control with low visibility, immorality in governance, and the reactive financial control mechanism. Despite the fact that AI has demonstrated a promising prospect with regard to its cost predictability, resource availability optimisation, and anomaly detection, its applicability in systematic FinOps governance remains low [5]. Literature sources suggest further attention should be paid to AI-based governance systems, but the usage in banking remains immature, and end-to-end FinOps structures are not numerous that may integrate regulatory and accountability demands [7]. The graphical findings also would support these insights. The adoption chart of FinOps shows the fact that comparatively few organisations have mature practices, but rather most organisations are developing or maturing and indeed represent maturing but developing governance practices. Meanwhile, the FinOps and sustainability collaboration graph shows that the number today, at 19% and, is expected to increase significantly to 50% in the future, which refers to the transition to integrated financial, operational and environmental governing [14]. This together suggests that FinOps is forming an enhanced and more intricate variant of financial monitoring into AI-managed, strategic, and sustainability-focused financial management.

B. Practical Implications

In terms of cloud-native banking platforms, the findings imply that the organisation of FinOps and AI-based analytics have to be codified. To manage the escalated cloud expenditures, the banks ought to increase the magnitude of cost visibility, predictability of cost, and responsibility for spending [16]. Their interrelatedness with the sustainability activities will also come in handy in offering energy-efficient utilisation of cloud and adherence to regulatory requirements. It will eventually result in more smart, compliant and sustainable digital banking operations by enhancing the performance of financial control, operational optimisation, and reducing the risks through the adoption of mature FinOps performance.

C. Challenges and Limitations

The study is primarily based on secondary data, which may not be realistic and applicable in a real-life situation. The range of sectors used in the FinOps data on applicable businesses in banking is lacking, and most information available is general opinion on the use of clouds, rather than AI-focused governance manifestation [17]. The differences in the organisation practices, the geographical regulations, and even more so, the maturity in technology may also affect applicability. Additionally, existing literature lacks a lot of empirical research on AI-based FinOps

in the banking sector, which restricts the potential to perform an in-depth analysis of performance and may require further primary data analysis or reports on real accomplishments.

D. Recommendations

The study recommends that additional research must incorporate primary information through the use of interviews or case-based evaluation in order to confirm the efficacy of AI-based enabled FinOps governance in banks. Further empirical research, which is sector-specific, is necessary to compute the actual performance, adherence, and the impacts of financial accountability [18]. Standardised AI-based governance structures and benchmarking frameworks reformulated to fit controlled financial settings are another potential path for researchers to look into. Further longitudinal research is also possible by concentrating on FinOps maturity processes, sustainability and cost optimisation performance via cloud banking platforms.

VI. CONCLUSION AND FUTURE WORK

This concludes that AI-based FinOps governance is on the frontline to manage skyrocketing cloud invoices, promote financial responsibility, and support efforts in cloud-based banking services. The evidence of literature and graphics indicates that the adoption of FinOps is on the rise, and there is low maturity, as well as a linkage with sustainability is in change. The AI-driven forecasting, optimisation and anomaly detection have great prospects of enhancing proactive governance that can ensure a more efficient, transparent and strategically aligned management of cloud costs in banks.

There is a need to improve AI-based FinOps models used in the banking sector, increase the governance designs, and align the financial, operations and sustainability objectives. Further studies regarding automation, integration of regulatory and regulatory standards, the long-term advantage of maturity and standardised maturity systems are required to support the stable and progressive development of FinOps within the cloud-native financial environment.

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