`

A Literature Review: Cloud Migration Model for Data Processing

Juan Carlos Flores Mendoza

1 National University of San Marcos, Lima, Peru

https://orcid.org/0009-0004-0860-7031

Juan.floresm@unmsm.edu.pe

Abstract

This article presents a literature review on cloud migration models applied to data processing in high-volume information environments. Cloud platforms are analyzed as strategic solutions to address the challenges of scalability, efficiency, and resilience required by modern processes such as monitoring, traceability, and advanced analytics. The study identifies technological models, cloud architectures, and relevant data analysis approaches aimed at improving operational performance. It concludes with practical recommendations for implementing digital solutions adapted to the specific needs of agricultural sectors, supporting a successful transition toward cloud-based infrastructures.

Keywords: Data processing, Cloud migration, Agricultural Big Data, Agriculture.

I. Introduction

In recent decades, multiple sectors have undergone significant transformation driven by advances in digital technologies. In this context, cloud computing has emerged as a strategic resource for addressing challenges related to managing large volumes of data, process traceability, and real-time decision-making. This trend has been further enhanced by the integration of complementary technologies such as the Internet of Things (IoT), Big Data, and artificial intelligence, thus consolidating a new paradigm of digitization in productive and organizational environments.

The growing need for agile, scalable, and resilient systems has led different industries to adopt cloud-based solutions to improve their operational performance, optimize resources, and respond more efficiently to changing conditions. However, the effective implementation of these solutions involves overcoming challenges associated with technological infrastructure, connectivity, system interoperability, and training of the personnel involved.

In this context, this study conducts a systematic review of the literature with the aim of identifying, analyzing, and classifying the models, benefits, and requirements associated with cloud migration in environments that depend on intensive data processing. To this end, 15 indexed scientific articles published between 2021 and 2024 are analyzed, addressing various technical, methodological, and applied perspectives on the use of cloud computing in digital transformation processes.

This review seeks to answer three fundamental questions:

(Q1) What are the main cloud migration models applicable to data processing?

(Q2) What benefits does cloud migration offer in contexts of high demand for information processing?

(Q3) What infrastructure and connectivity requirements are necessary for the effective adoption of cloud systems?

Based on these questions, the research offers a systematic analysis aimed at facilitating strategic decisions for technology adoption in different sectors, promoting the implementation of robust, efficient, and adaptable digital solutions.

II. Contex y motivation

Over the last decade, various productive sectors have undertaken digital transformation processes with the aim of improving resource efficiency, increasing competitiveness, and responding to challenges such as operational variability, changes in demand, and the effects of climate change. This transformation has been driven by the incorporation of emerging technologies that enable process automation, real-time data collection, and predictive analytics for strategic decision-making.

In this context, managing large volumes of information from devices such as sensors, monitoring systems, digital records, and control platforms has become a key necessity. However, many organizations still face difficulties related to storage capacity, efficient data processing, information traceability, and interoperability between heterogeneous systems.

Recent events that have tested the resilience of traditional systems have highlighted the urgent need for more robust, scalable, and adaptable solutions. Cloud computing has emerged as a technological alternative capable of responding to these demands, allowing for the centralization of data, the execution of complex analyses, and the implementation of digital services in a flexible and secure manner.

This study conducts a systematic review of the literature on cloud migration models focused on data processing, with the aim of identifying applicable technological approaches, the main implementation challenges, and the opportunities offered by these solutions to improve efficiency, sustainability, and adaptability in different production environments.

III. Methodology

A systematic search method was applied to identify articles that could answer our research questions. To broaden the results, both automated and manual searches were used. In the automated searches, we selected digital databases that publish high-quality articles, such as:

Table 1:
Search string for the different databases

Name of the search database	Search string
Scopus	("IT architecture" OR "cloud architecture" OR "cloud computing") AND ("data analytics" OR "data analysis" OR "big data")
IEEE Xplore	("cloud computing") AND ("Data Analytics")
ScienceDirect	"IT architecture" AND "cloud architecture" AND "cloud computing" AND "data analytics" AND "data analysis"
Web of Science	("cloud architecture" OR "cloud computing") AND ("data analytics")
Google Scholar	"IT architecture" AND "cloud architecture" AND "cloud computing" AND "data analytics" AND "data analysis"

3.1. Planning

3.1.1 Research Questions

At this stage, the research is structured around the purpose of the articles analyzed, taking into account the research questions and establishing the review protocol. The questions formulated to guide the search for information are presented in Table 1. These questions act as a guide for the research process, as they directly reflect the objectives of the study.

Table 2:
Research questions

ID	Research questions
P1	What are the main cloud migration models applicable to data processing?
P2	What benefits does cloud migration offer in contexts of high demand for information processing?
P3	What infrastructure and connectivity requirements are necessary for the effective adoption of cloud systems?

3.1.2. Period

Academic articles were considered based on their inclusion and exclusion criteria.

3.1.2.1.Inclusion criteria

- Articles written in English and published between 2020 and 2024
- Articles published in Q1-Q4 journals
- Studies focusing on cloud computing and data analysis
- Studies presenting quantitative and qualitative results on improvements in blueberry productivity.

3.1.2.2.Exclusion criteria

- Articles published in sources that are not scientifically rigorous.
- Publications that do not provide complete access to the data or methods used.
- Publications that focus on technical aspects without methods of application in blueberries.
- Secondary articles (systematic review).

3.2. Development

We assessed the quality of the articles based on the quartile of the journal to which they belong, according to the Scimago Ranking Journal (SJR).

Likewise, to assess the quality and accuracy of each study, two authors independently applied a tool based on four factors: type of study, sampling method, details of the data collection method, and analysis.

3.2.2. Description of the steps and results of the execution

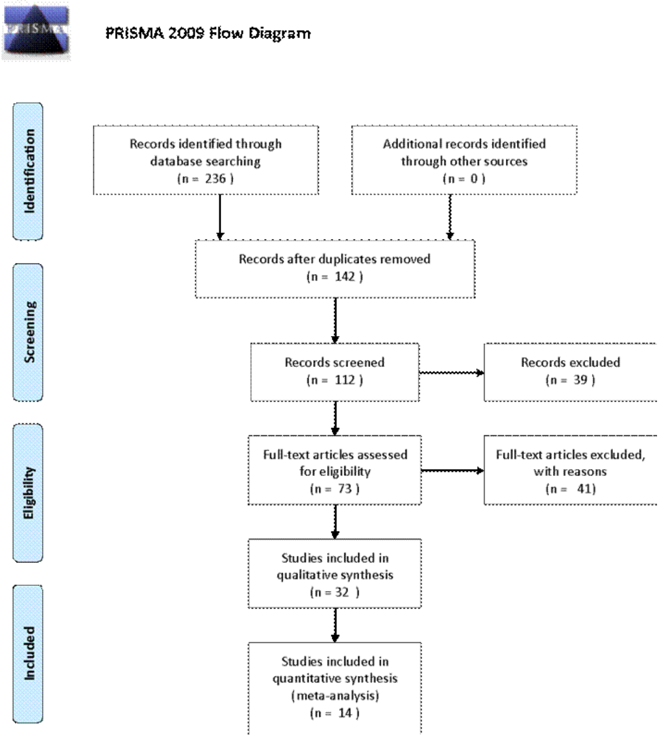
During the systematic review process, 236 records were identified through database searches. No additional records were found through other sources. After removing duplicates, 142 unique records remained.

Subsequently, the screening phase was carried out, in which 112 records were evaluated by reading titles and abstracts, excluding 39 for not meeting the established criteria.

Seventy-three full-text articles were evaluated to determine their eligibility. Of these, 41 studies were excluded with specific justification, either because they did not directly address the research questions or because they were not primary studies.

Finally, 32 studies were included in the qualitative synthesis, and of these, 14 were also considered in the quantitative synthesis (meta-analysis). The entire selection process is represented in Figure 2.

Figure 1:
Prism diagram



IV. Resultados

Table 3:
List of selected studies

Reference	Topic
[1]	Accounting analysis with Big Data in the cloud
[2]	Algorithm for reliable data regulation in hierarchical private clouds
[3]	Integration of AI and Big Data in different sectors
[4]	Use of edge computing connected to the cloud in agriculture
[5]	Hybrid optimization of the ETL process in cloud architecture
[6]	Cloud computing trends in smart health

[7]	Bibliometric analysis of the use of cloud computing in agriculture
[8]	Blueberry yield prediction with ML and simulation
[9]	IoT-cloud model for safe and smart agriculture
[10]	Use of cloud platforms in industrial data processing
[11]	Data visualization and analysis for smart agriculture
[12]	Cloud architecture with explainable analytics (XAI) for Big Data
[13]	IIoT data analysis in Edge-Fog-Cloud architectures
[14]	Smart Farming platform based on Lambda architecture

A total of 236 studies were identified through searches in six academic databases. Of these, 68 primary studies were selected, representing 28.8% of the total identified. The distribution by source reveals that the IEEE Xplore database had the highest number of records (94 studies; 39.8% of the total), followed by ScienceDirect with 63 studies (26.7%), Web of Science with 52 (22%), Google Scholar with 15 (6.4%), and Scopus with 12 studies (5.1%). This information is detailed in Table 4.

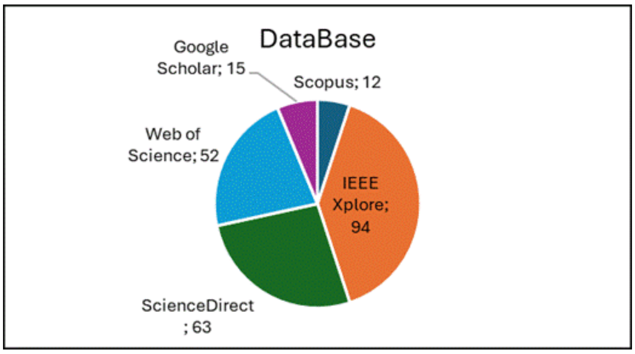
Table 4:
Total of studies searched

Name of the search database	**Total**	**Porcentaje**
Scopus	12	5.1 %
IEEE Xplore	94	39.8 %
ScienceDirect	63	26.7%
Web of Science	52	22%
Google Scholar	15	6.4 %
Total	**236**	**100**

4.1. Quality of the ítems included

Most of the relevant studies come from databases specializing in technology and engineering (IEEE Xplore, ScienceDirect), which is consistent with the focus on advanced technologies such as cloud computing and data analysis applied to agriculture. The other databases (Scopus, Web of Science, Google Scholar) contain fewer studies, possibly due to their more generalist or less specialized focus on these topics.

Figure 2:
Graph showing the distribution of select studies



The pie chart reflects the distribution of studies selected for the research, obtained from different databases. Below is a detailed description of how these databases were used and the specific search strings employed in each one to obtain relevant results in accordance with the defined inclusion and exclusion criteria.

4.2. Distribution of articles selected by database

IEEE Xplore (94 articles): This database was the most productive, with a search string focused on the intersection between cloud computing, data analysis, and agriculture. Given its focus on technology, it is natural that it generated the largest number of relevant studies.

ScienceDirect (63 articles): With a more detailed search that included specific terms related to IT architecture and data analysis, it also yielded a significant number of useful studies.

Web of Science (52 articles): This database, known for its scientific rigor, provided a considerable number of studies, with a search string that focused on cloud architecture, cloud computing, and data analysis in agriculture.

Google Scholar (15 articles): Although this database is broader and less restrictive, the search string included a variety of relevant terms. However, the smaller number of articles reflects the rigorous application of the exclusion criteria.

Scopus (12 articles): Although the Scopus database provided the fewest articles, its search string was aligned with the criteria, covering IT architecture, cloud computing, and data analysis in agriculture.

V. Analysis

A detailed analysis of the articles selected in the systematic review was carried out, with the aim of identifying their methodological approaches, proposed technological models, reported benefits, and technical requirements related to cloud migration in the agricultural context.

The study in [1] proposes an accounting information analysis platform based on Big Data and cloud computing. The proposal aims to optimize the processing of large volumes of financial data, improve accounting traceability, and reduce operating costs, contributing to more agile decision-making in organizations that handle critical information.

The research in [2] presents a balance regulation algorithm for distributed data in private hierarchical cloud architectures. This approach improves data integrity and availability in critical environments, which is especially useful for sensitive applications such as precision agriculture or connected industrial systems.

The article in [3] provides a comprehensive review of the integration of artificial intelligence and Big Data in various sectors, highlighting its applicability in agricultural contexts to automate processes, optimize resources, and improve real-time responsiveness to production events.

The study in [4] develops an edge computing-based architecture connected to the cloud for application in smart agriculture. The system allows local sensor data to be processed with low latency, increasing operational autonomy in rural areas and facilitating practices such as automated irrigation or early anomaly detection.

The study by [5] proposes a hybrid optimization of the ETL process in cloud environments, combining the Grey Wolf Optimizer and Tabu Search algorithms. The results show significant improvements in the accuracy of data clustering, which is crucial in the consolidation of agroclimatic information.

[6] explores the evolution of cloud computing use in the smart healthcare field. Although focused on health, the proposed framework can be extrapolated to agricultural contexts by integrating IoT sensors, cloud platforms, and remote monitoring algorithms with a preventive and predictive approach.

The article by [7] performs a bibliometric analysis on cloud computing applied to agriculture, revealing publication patterns, key players, and emerging trends. This type of analysis helps identify research gaps and guide new proposals in digital agriculture.

[8] use ensemble machine learning techniques to predict wild blueberry crop yields, using data from agricultural simulations. The model demonstrated high accuracy in harvest planning, providing a clear example of the potential of ML in predictive agriculture.

The work of [9] proposes a cloud model enabled with IoT and edge computing, specially designed for smart agricultural environments. The model includes advanced security mechanisms such as AES encryption and digital certificates, highlighting its comprehensive approach that encompasses both productivity and cybersecurity in agriculture.

[10] examines the use of cloud platforms for industrial data processing. Although not focused on agriculture, its contribution is relevant to agro-industrial environments that require scalability, efficiency, and large-scale data management in real time.

The study by [11] integrates data visualization and analysis techniques into smart agriculture. It uses algorithms such as PCA and K-means to interpret data from the field in order to optimize crop yields through visual maps and interactive dashboards.

[12] propose an explainable analytics (XAI) architecture in the cloud that allows users to better understand the results of complex models. This proposal is key to increasing transparency and trust in AI-based agricultural decision support systems.

[13] introduce a framework for analyzing data generated by IIoT devices under Edge-Fog-Cloud architectures. Their model enables efficient and sustainable distributed processing, facilitating the migration of traditional agricultural systems to interoperable digital environments.

Finally, [14] develop a scalable platform for smart agriculture based on Lambda architecture, which enables both real-time and batch processing. This model promotes the adaptability and continuous analysis of agricultural data, integrating multiple sources of information into a single environment.

P1. ¿What are the main cloud migration models aplicable to data processing?

A review of the literature reveals that there are various cloud migration models designed to optimize agricultural data processing, combining technologies such as IoT, edge computing, machine learning, and cloud platforms. The most relevant contributions are detailed below:

Table 5:
Study regarding question N°1

Reference	Proposed Model	Application
[1]	Cloud platform for accounting analysis with Big Data	Business financial processing
[4]	Edge-cloud architecture for agricultural data	Real-time processing in rural areas
[5]	Hybrid optimization of ETL processes in the cloud (GWO + Tabu)	Grouping and cleaning of large datasets
[9]	Secure IoT + Cloud + Edge model	Monitoring and protection in smart agriculture
[12]	XAI cloud architecture for explainable analytics	Decision support in critical systems
[13]	Edge–Fog–Cloud framework for distributed analysis	Migration of IIoT devices to scalable environments

[14]	Lambda platform for batch and real-time processing	Smart Farming with multi-source integration

The models analyzed share the tendency to distribute the processing load between the edge and the cloud, incorporate security elements, and use predictive algorithms to facilitate strategic agricultural decisions. The diversity of approaches reflects the need for hybrid solutions adapted to the technical and productive context of the agro-industrial sector.

P2. ¿ What benefits does cloud migration offer in contexts of high demand for information processing?

Migration to the cloud in the agricultural sector offers multiple benefits derived from efficient data processing, remote access to smart services, and improved productive decision-making.

According to the literature, the following applications are detailed.

Table 6:
Estudy regarding question n°2

Reference	Identified Benefits	Specific Application
[1]	Efficiency in accounting data processing; reduction of operating costs	Business financial processing
[4]	Real-time processing with low latency; greater operational autonomy	Precision agriculture
[10]	Scalability and operational efficiency in large volumes of data	Processing in agribusiness and manufacturing
[14]	Real-time and batch analysis capabilities; integration of multiple sources	Intensive smart farming
[12]	Interpretability of complex models; support for critical decisions	Explainable analytics in agriculture

P3. ¿ What infrastructure and connectivity requirements are necessary for the effective adoption of cloud systems?

For the adoption of cloud systems to be effective, it is necessary to have physical and digital infrastructure that guarantees the continuous and secure operation of these technological environments.

Table 7:
Estudy referring to question n°3

Reference	Identified Requirements	Justification
[2]	Fault-tolerant hierarchical architecture; data flow control	Ensures reliability in distributed private clouds
[9]	IoT + Cloud + Edge with advanced security (AES, digital certificates)	Protection and authentication in smart agricultural networks
[13]	Distributed processing via Edge, Fog, and Cloud; low latency	Interoperability in agricultural IIoT devices
[6]	Integration of IoT sensors and cloud platforms	Adoption in remote monitoring and smart health/agriculture environments

V. Discussion

P1. ¿ What are the main cloud migration models applicable to data processing?

The literature analyzed proposes various technological models applicable to contexts with high data loads, such as agriculture, which combine cloud computing, edge computing, artificial intelligence, and hybrid architectures to ensure efficiency, scalability, and adaptability.

One of the most relevant approaches is the cloud-connected edge computing model proposed by [4], which enables decentralized real-time processing of agricultural data from local sensors. This model is particularly useful in rural areas where connectivity is limited, as it reduces latency and improves the operational autonomy of smart irrigation and monitoring systems.

On the other hand, the study by [14] introduces a scalable platform based on Lambda architecture, which integrates batch and real-time processing, facilitating the continuous collection, analysis, and visualization of data in Smart Farming systems. This model allows for the management of large volumes of data generated by multiple heterogeneous sources, such as sensors, drones, or weather stations.

From a security and scalability perspective, [9] presents a hybrid model that integrates IoT, cloud computing, and edge computing with authentication, encryption (AES), and digital certificate capabilities. Its application in smart agricultural environments demonstrates how it is possible to simultaneously achieve operational efficiency and critical data protection in distributed environments.

In the field of data processing and cleaning, [5] propose a hybrid optimization of the ETL process in the cloud, using algorithms such as Grey Wolf Optimizer (GWO) and Tabu Search. This architecture allows for efficient data migration to cloud environments, improving data quality and transformation speed.

Another key contribution is the model presented by [13], who develop an Edge, Fog, and Cloud framework to manage data generated by IIoT devices. Their proposal offers a highly scalable distributed architecture that allows agricultural monitoring systems to be migrated to interoperable and energy-efficient digital environments.

Finally, the approach of [12] stands out for combining explainable artificial intelligence (XAI) with cloud architecture. Their model facilitates the migration of analytical systems to the cloud without sacrificing the interpretability of results, which is essential in critical decisions related to agricultural or environmental management.

P2. ¿ What benefits does cloud migration offer in contexts of high demand for information processing?

The articles analyzed show that migration to the cloud allows for effectively addressing the challenges associated with massive information processing, particularly in productive environments such as agriculture, industry, and finance. Among the main benefits are: resource scalability, efficiency in real-time data analysis, reduced latency and operating costs, and the ability to integrate multiple heterogeneous sources of information.

The study in [1] demonstrates that a cloud platform can optimize the processing of large volumes of accounting data, reducing operating costs and improving the traceability of financial information. This benefit is essential for organizations that require agile, evidence-based decision-making systems.

[4] provides a model based on edge computing connected to the cloud that enables real-time processing of agricultural data, minimizing dependence on central bandwidth. This improves the operational autonomy of intelligent systems

installed in rural areas, ensuring immediate response to changing conditions in the field.

[10] highlights how cloud platforms enable the efficient management of large volumes of industrial data, facilitating traceability, security, and decision-making in manufacturing and agribusiness environments, where high availability and constant processing are required.

In the agricultural field, the proposal by [14] highlights the value of Lambda architectures, which enable the integration of real-time analysis with batch processing. This type of infrastructure benefits Smart Farming systems that need to act on constantly changing data, such as weather, soil moisture, or pest detection.

For its part, [12] presents a cloud architecture that incorporates explainable artificial intelligence (XAI), allowing users to understand the results of complex models. This benefit is crucial for maintaining trust in AI-based systems, especially when applied to agricultural, logistical, or sustainability decisions.

Taken together, these studies demonstrate that migration to the cloud not only increases technical processing capacity but also enables new operating models, predictive analytics, and efficient resource control in sectors with high information demand.

P3. ¿ What infrastructure and connectivity requirements are necessary for the effective adoption of cloud systems?

The successful implementation of cloud systems in data-intensive processing contexts, such as agriculture and industry, depends not only on the design of the computational model, but also on a robust infrastructure and adequate connectivity that guarantees availability, security, and real-time efficiency.

[2] highlight the need for fault-tolerant hierarchical architectures, which allow for controlled management of data flow in distributed environments. This type of infrastructure is key to maintaining data integrity and operational continuity in the event of network outages or processing overloads.

[9] emphasize the importance of incorporating advanced security technologies, such as AES encryption, IoT device authentication, and digital certificates, to protect data collected in smart agricultural systems. Their proposal integrates cloud computing with edge computing and IoT networks, and demonstrates that without these protection mechanisms, migration to the cloud could expose systems to critical vulnerabilities.

For their part, [13] point out that it is essential to have distributed processing based on Edge–Fog–Cloud architectures, which reduces latency, increases scalability, and minimizes data traffic to the cloud core. This strategy improves interoperability between devices and ensures efficient use of network resources in high-data-volume contexts, such as agricultural monitoring using IIoT.

From a more general perspective, [6] highlight the need to properly integrate IoT sensors with cloud platforms, which requires reliable physical infrastructure (sensors, gateways, transmission networks) and standardized protocols to ensure the quality and synchronization of the data collected. Although the case focuses on smart health, its principles are fully applicable to remote agricultural monitoring.

Taken together, the articles reviewed indicate that the main requirements for effective cloud migration are:

(1) stable, low-latency network connectivity, (2) distributed architectures with local processing (edge/fog), (3) robust security protocols, and (4) the ability to integrate with physical devices (IoT). The absence of these components compromises operability, data security, and the effectiveness of real-time applications.

VI. Results

Based on a systematic analysis of the literature, four key articles were selected that complementarily address the topics of data processing, cloud migration, and technical requirements for adoption. The results were organized into three thematic areas aligned with the research questions.

P1. Cloud migration models applicable to data processing

Studies reveal that the most applicable models for intensive data processing in productive contexts are those that combine distributed infrastructures (Edge/Fog/Cloud) with scalable architectures.

[14] propose a platform based on Lambda architecture, which allows real-time and batch processing, ideal for agricultural environments where continuous and heterogeneous data are generated. Their approach favors the integration of multiple sources such as sensors, drones, and weather stations.

[4] develop an edge-cloud architecture, optimized for local real-time processing of agricultural data, which reduces latency and allows for operational autonomy in rural areas.

P2. Benefits of cloud migration in contexts of high demand for information processing

Migration to the cloud brings key benefits such as scalability, efficiency, real-time analytics, and reduced operating costs.

The study by [1] shows that a cloud platform can optimize accounting analysis, improve the traceability of financial information, and significantly reduce the costs associated with local processing of large volumes of data.

[12] address the value of explainable analytics (XAI) in the cloud, offering benefits of transparency and interpretation that strengthen decision-making in complex agricultural and production systems.

P3. Infrastructure and connectivity requirements for effective adoption of cloud systems

The review highlights that migration to the cloud is only effective if certain technical and infrastructure requirements are met:

[2] propose a fault-tolerant hierarchical architecture that allows for the proper management of distributed data flows in complex environments and ensures system availability in the event of interruptions.

[9] They underscore the importance of incorporating robust security mechanisms, such as AES encryption, IoT device authentication, and digital certificates, which are necessary to protect the data collected in smart agricultural environments.

V. Conclusiones

1. The most effective migration models for cloud data processing are those that combine edge processing with cloud centralization, allowing for a balance between operational efficiency and local autonomy.

2. Migration to the cloud significantly improves the processing of large volumes of information by offering scalability, cost reduction, and support for advanced analytics, key factors in sectors such as agriculture, finance, and industry.

3. For migration to be effective, it is essential to have distributed infrastructure, data security, and reliable connectivity, as well as integration standards that ensure interoperability between physical devices and digital infrastructures.

VII. Future work

Based on the findings obtained, future research will focus on the design and validation of hybrid cloud-edge migration models that incorporate robust security protocols adaptable to contexts with infrastructure or connectivity limitations. These models should also consider the integration of intuitive and accessible interfaces that allow non-specialized users to interact with cloud solutions and evaluate both quantitative and qualitative benefits in real production or management environments.

Likewise, the exploration of explainable artificial intelligence (XAI) systems applied to data processing in information-intensive sectors is proposed as a research horizon. This line seeks to develop transparent and understandable analytical tools that support reliable data-driven decision-making, increasing the acceptance and understanding of results by end users.

VIII. References

[1] Y. Duan, «Design of Accounting Information Big Data Analysis Platform Based on Cloud Computing», *Procedia Comput. Sci.*, vol. 247, pp. 1128-1136, 2024, doi: 10.1016/j.procs.2024.10.136.

[2] C.-H. Hsieh y Z. Wang, «A Balance Regulation Algorithm for Reliable Data in Hierarchical Private Cloud Architecture», *IEEE Access*, vol. 9, pp. 104485-104500, 2021, doi: 10.1109/access.2021.3098849.

[3] S. Almanasra, «Applications of integrating artificial intelligence and big data: A comprehensive analysis», *J. Intell. Syst.*, vol. 33, n.º 1, nov. 2024, doi: 10.1515/jisys-2024-0237.

[4] M. A. Uddin, M. Ayaz, A. Mansour, el-H. M. Aggoune, Z. Sharif, y I. Razzak, «Cloud-connected flying edge computing for smart agriculture», *Peer--Peer Netw. Appl.*, vol. 14, n.º 6, pp. 3405-3415, nov. 2021, doi: 10.1007/s12083-021-01191-6.

[5] L. Dinesh y K. G. Devi, «An efficient hybrid optimization of ETL process in data warehouse of cloud architecture», *J. Cloud Comput.*, vol. 13, n.º 1, ene. 2024, doi: 10.1186/s13677-023-00571-y.

[6] M. Javaid, A. Haleem, R. P. Singh, S. Rab, R. Suman, y I. H. Khan, «Evolutionary trends in progressive cloud computing based healthcare: Ideas, enablers, and barriers», *Int. J. Cogn. Comput. Eng.*, vol. 3, pp. 124-135, jun. 2022, doi: 10.1016/j.ijcce.2022.06.001.

[7] S. Jombo y M. Abd Elbasit, «Bibliometric Analysis of Cloud Computing in Agriculture using Remote Sensing Data», en *2023 IST-Africa Conference (IST-Africa)*, Tshwane, South Africa: IEEE, may 2023, pp. 1-9. doi: 10.23919/IST-Africa60249.2023.10187834.

[8] H. R. Seireg, Y. M. K. Omar, F. E. A. El-Samie, A. S. El-Fishawy, y A. Elmahalawy, «Ensemble Machine Learning Techniques Using Computer Simulation Data for Wild Blueberry Yield Prediction», *IEEE Access*, vol. 10, pp. 64671-64687, 2022, doi: 10.1109/access.2022.3181970.

[9] M. Tawalbeh, M. Quwaider, y L. A. Tawalbeh, «IoT Cloud Enabeled Model for Safe and Smart Agriculture Environment», en *2021 12th International Conference on Information and Communication Systems (ICICS)*, Valencia, Spain: IEEE, may 2021, pp. 279-284. doi: 10.1109/ICICS52457.2021.9464567.

[10] Z. Yao, «Application of cloud computing platform in industrial big data processing», *Appl. Comput. Eng.*, vol. 54, n.º 1, pp. 234-240, mar. 2024, doi: 10.54254/2755-2721/54/20241602.

[11] M. Liu, «On the Application of Internet of Things in Smart Agriculture», en *2020 2nd International Conference on Artificial Intelligence and Advanced Manufacture (AIAM)*, Manchester, United Kingdom: IEEE, oct. 2020, pp. 113-116. doi: 10.1109/AIAM50918.2020.00028.

[12] N. Mills *et al.*, «A cloud-based architecture for explainable Big Data analytics using self-structuring Artificial Intelligence», *Discov. Artif. Intell.*, vol. 4, n.º 1, p. 33, may 2024, doi: 10.1007/s44163-024-00123-6.

[13] R. Kumar y N. Agrawal, «Analysis of multi-dimensional Industrial IoT (IIoT) data in Edge–Fog–Cloud based architectural frameworks : A survey on current state and research challenges», *J. Ind. Inf. Integr.*, vol. 35, p. 100504, oct. 2023, doi: 10.1016/j.jii.2023.100504.

[14] Mohamed El Mehdi El Aissi, Sarah Benjelloun, Younes Lakhrissi, y Safae El Haj Ben Ali, «A Scalable Smart Farming Big Data Platform for Real-Time and Batch Processing Based on Lambda Architecture», *J. Syst. Manag. Sci.*, vol. 13, n.º 2, abr. 2023, doi: 10.33168/JSMS.2023.0202.

Author contact information:

Juan Carlos Flores Mendoza

Lima

Peru

Juan.floresm@unmsm.edu.pe

https://www.linkedin.com/in/juan-carlos-flores-mendoza/

Juan Carlos Flores Mendoza

Systems Engineer from the National University Pedro Ruiz Gallo. Currently pursuing a Master's Degree in Systems Engineering and Computer Science at UNMSM, with a specialization in ICT Management. I specialize as a cloud architect.