

Design of Accounting Information System Based on Computer Network

Baifang Liu^{1, a*} and Yingqi Jia^{2, b}

¹*School of Business, Beijing Language and Culture University, Beijing, China*

²*Beijing Branch, Agriculture Bank of China, Beijing, China*

^a*Liubaifang@blcu.edu.cn*, ^b*3302662907@qq.com*

**corresponding author*

Keywords: Accounting Information System, Computer Network, Linear Regression Model, Naive Bayes

Abstract: With the progress of information technology and the popularity of the Internet, the traditional Accounting information system (AIS) has been unable to meet the growing information processing needs of enterprises. The traditional AIS has problems such as inconvenient data storage and sharing, low efficiency of information transmission, etc. The AIS based on computer network can effectively solve these problems. This paper aimed to study the design of AIS based on computer network to improve the efficiency and accuracy of enterprise financial management. This paper first introduced the importance of computer network in enterprise management and the application of AIS in modern enterprises. Then, this paper put forward the demand of using computer network technology to design and establish AIS, and expounded the advantages of computer network in realizing real-time sharing and collaborative processing of financial data. This paper put forward indicators to evaluate different design schemes in terms of performance, security and reliability, and emphasized the importance of security in the design of enterprise AIS. This paper was committed to providing reference for enterprises to select appropriate AIS design scheme based on computer network through research and experiment.

1. Introduction

With the rapid development of information technology and the popularization of the Internet, computer networks are playing an increasingly important role in enterprise management. AIS, as the core tool of internal financial data processing and management, has also been widely used in this context. The traditional AIS is mainly based on a single server, which has data redundancy, low

security, low operating efficiency and other problems, and can not meet the needs of modern enterprises for accurate, efficient and safe financial management. Therefore, using computer network technology to design and establish AIS has become one of the current research hotspots. Using computer networks to connect various departments and branches within an enterprise to form a unified information platform can achieve real-time sharing and collaborative processing of financial data, improve the accuracy and timeliness of financial data, and increase the ability to control and supervise financial information. This paper aims to explore the design of AIS based on computer network to improve the efficiency and accuracy of enterprise financial management. Through in-depth analysis of the characteristics and development of the current computer network technology and AIS, combined with the needs and actual situation of the actual enterprise, a highly efficient, safe and reliable AIS suitable for enterprises is designed.

A financial information system is a comprehensive system that includes personnel, equipment, policies, processes, etc., all of which are aimed at transforming these materials into useful information. It is not only a collection of various devices and personnel that provide information support for management decision-making, but also an entity composed of many interdependent subsystems that collectively provide timely, reliable, and accurate information for decision-making. Beg Kashif studied the financial situation of the top 10 fastest consumer product companies in India. Using simple linear regression analysis, it was found that AISs have a significant impact on the financial performance of the surveyed enterprises. The purpose of Astuity Widia was to study the impact of system quality, information quality, service quality and training quality in the AIS on enterprise organizational efficiency through the successful model of DeLone and McLean information systems[1]. Al-Okaily Aws aimed to test the impact of enterprise resource planning on the quality of AIS, and discussed it from three dimensions of reliability, efficiency and flexibility [2]. However, these scholars did not combine the computer network with AIS.

In order to solve the problems of inconvenient data storage and sharing, low efficiency of information transmission and other problems in the traditional AIS, this paper designed a AIS based on computer network, and carried out experimental research on the common design scheme of AIS based on computer network. These schemes include client/server architecture, distributed system, cloud computing, and are intended to provide a reference for enterprises to select appropriate design schemes of AIS based on computer networks.

2. Computer Network and Accounting Information System

2.1. Accounting Information System

The AIS is an information system based on computer network, which manages and processes accounting data through computer and other information technology means [3]. In modern accounting work, the application of computer networks has become an indispensable part.

The AIS is a system that combines the principles of Accounting with computer technology to improve the efficiency and accuracy of accounting information processing [4]. It provides various financial statements and decision support information by collecting, recording, processing, storing, and transmitting accounting data, providing information support and decision-making basis for the economic activities of enterprises.

The functions of the AIS mainly include data acquisition, data processing, data storage and data output [5][6]. Data collection refers to the collection of data related to economic activities of enterprises through various channels and methods, including original vouchers, bills, and other relevant information. Data processing refers to the operation of classifying, analyzing, summarizing, and calculating collected data to generate corresponding accounting information. Data storage refers to storing processed data in a computer database according to certain rules and formats for future

queries and use. Data output refers to the output of data stored in the system in reports, graphics, and other forms according to different needs, providing information support for users. The AIS interface is shown in Figure 1.



Figure 1. AIS Interface

The AIS is characterized by accuracy, timeliness, reliability and security [7][8]. Accuracy refers to the ability of a system to accurately process and output accounting information, ensuring the accuracy and authenticity of data. Timeliness refers to the system's ability to process and output accounting information in a timely manner, meeting users' real-time needs for information. Reliability refers to the stable operation of a system, ensuring the integrity and reliability of data, and preventing data loss and damage. Security refers to the ability of a system to protect the confidentiality and integrity of accounting data, preventing illegal access and tampering [9][10].

Linear regression model and Naive Bayes classifier algorithm are also applied in the AIS [11]. Linear regression model is a machine learning algorithm used to establish linear relationships between variables. The formula is as follows:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n + \epsilon \quad (1)$$

Among them, y is the dependent variable. x_1, x_2, \dots, x_n is the independent variable. $\beta_0, \beta_1, \beta_2, \dots, \beta_n$ is the regression coefficient, and ϵ is the error term. In the AIS, the linear regression model can be used to analyze the linear relationship between financial data, such as the relationship between predicted sales and advertising expenditures, human resource costs and other indicators.

Naive Bayes classifier is a new classification method based on Bayesian principle and the assumption that feature conditions are independent of each other. The formula is as follows:

$$P(C_k|X) = \frac{P(X|C_k)P(C_k)}{P(X)} \quad (2)$$

Among them, $P(C_k|X)$ is the Posterior probability of category C_k in the case of given feature X . $P(X|C_k)$ is the Conditional probability of feature X in the case of category C_k . In the AIS, Naive Bayes classifier can be used to classify financial data, such as judging the profit status of an enterprise (such as profit, loss, flat) according to financial indicators.

To sum up, the AIS is an information system based on computer network. It provides various financial statements and decision support information by collecting, recording, processing, storing

and transmitting accounting data, and has the characteristics of accuracy, timeliness, reliability and security [12][13]. The next section further discusses the network architecture and key technologies of AIS.

2.2. Application of Computer Network in Accounting Information System

The application of computer network in AIS mainly involves the following aspects:

Data transmission and sharing: The computer network provides an efficient data transmission and sharing platform for the AIS [14][15]. Through network technology, accounting departments can transmit and receive financial data in real-time, thereby improving the accuracy and timeliness of data. In addition, the network can also achieve data sharing, allowing different departments to share data resources and improve collaboration efficiency.

System integration: Computer network can realize system integration and integration between different AIS [16]. Through the network, different AIS can exchange and share data, avoiding data redundancy and repeated entry, and improving data consistency. At the same time, the network can also achieve business process integration between different systems, making the AIS more efficient and convenient.

Security and confidentiality: The application of computer network in AIS also needs to pay attention to information security and confidentiality. Financial data transmitted through the network requires encryption and security authentication to prevent data from being tampered with and leaked. In addition, it is necessary to establish a comprehensive permission management mechanism to control permissions for different users and roles on the network, and to protect the security of financial data.

Remote access and mobile application: The computer network enables the AIS to realize remote access and mobile application. Through the network, accounting personnel can log on to the AIS remotely, query and process data anytime and anywhere, which improves the flexibility and efficiency of work. At the same time, the network can also support the application of mobile devices, allowing accounting personnel to conduct financial management through mobile devices such as smartphones or tablets.

Performance optimization and system monitoring: The computer network can also optimize the performance of the AIS and monitor the system. Through the network, the running status of the AIS can be monitored to find and solve problems in time, ensuring the stability and reliability of the system. In addition, the network can also provide various performance optimization methods, such as load balancing, caching technology, etc., to improve the response speed and processing capacity of the system.

3. Experimental Results of Accounting Information System Based on Computer Network

3.1. Experimental Design

In modern enterprises, AIS plays a vital role, which can help enterprises to carry out financial management and decision-making. With the development of computer network technology, more and more enterprises begin to use computer network to realize the automation and integration of AIS. The main objective of this experiment is to evaluate the differences in performance, security and reliability of different AIS design schemes based on computer networks. By comparing and analyzing the experimental data of different schemes, it can provide reference for enterprises to select appropriate AIS design.

(1) Experimental subjects

In this experiment, several common design schemes of AIS based on computer network are

selected as experimental objects. These solutions include client/server architecture, distributed systems, cloud computing, etc. Each solution has its unique characteristics and advantages.

(2) Establishment of experimental environment

In order to carry out the experiment, it is necessary to build a simulated enterprise AIS experimental environment. This environment includes the following devices and software. Server: It is used to store and process accounting data of enterprises, and provides services to clients. Network equipment: It includes switches, routers, etc., used to achieve communication between clients and servers. Client device: It is used to access and operate AIS, such as personal computer, tablet computer, etc. Operating System: Both the server and client devices require the installation of corresponding operating systems, such as Windows Server, Windows, or Linux. Database management system: It is used to manage and query accounting data of enterprises, such as Oracle. Accounting software: It is used to process and manage accounting transactions, such as Oracle Financials.

When building an experimental environment, it is necessary to ensure the normal operation of equipment and software, and set up network connections and permission control to ensure the accuracy and reliability of the experiment.

(3) Performance evaluation indicators

In the experiment, this article uses the following performance evaluation indicators to compare the performance advantages and disadvantages of different design schemes. Response time: It refers to the time from the client sending the request to the server responding. The shorter the response time, the faster the system's response speed. Concurrent processing capability: It refers to the ability of the system to process multiple user requests simultaneously. The higher the concurrent processing capacity, the stronger the load capacity of the system. Data processing capability: It refers to the ability of the system to process a large amount of data. The stronger the data processing ability, the higher the efficiency of the system in handling complex accounting transactions.

By testing and analyzing these indicators, the performance advantages and disadvantages of different design schemes can be evaluated, and the design scheme that best suits the needs of the enterprise can be selected.

(4) Safety assessment indicators

Security is a very important aspect in the design of enterprise AIS. This article uses the following security evaluation indicators to compare the security of different design schemes. Data security: It refers to the ability to protect accounting data from unauthorized access, tampering, or deletion. Identity authentication: It is the process of confirming the user's identity. A good identity authentication system can prevent unauthorized users from accessing the AIS. Protection ability: It refers to the ability to prevent network attacks and malicious software intrusion.

By testing and analyzing these indicators, the advantages and disadvantages of different design schemes in terms of security can be evaluated, and the most suitable design scheme can be selected to protect the accounting information security of the enterprise.

(5) Reliability evaluation indicators

Reliability is another key aspect in the design of enterprise AIS. This article uses the following reliability evaluation indicators to compare the reliability of different design schemes. System stability: It refers to whether the system experiences faults or crashes during long-term operation. Disaster tolerance capability: It refers to whether the system can continue to operate normally in the event of hardware failures, natural disasters, etc. Data backup capability: It refers to the system regularly backing up accounting data to prevent data loss or damage.

By testing and analyzing these indicators, the reliability of different design schemes can be evaluated, and the most reliable design scheme is selected to ensure the normal operation of the enterprise's AIS.

3.2. Experimental Results

The performance evaluation index analysis is shown in Figure 2. Response time: Cloud computing solutions perform best with the shortest response time of 0.2 seconds. The client/server architecture solution has the longest response time of 0.5 seconds. Concurrent processing capability: Cloud computing solutions have the highest concurrent processing capability at 300, followed by distributed system solutions at 200, and client/server architecture solutions have the lowest at 100. Data processing capability: Cloud computing solutions have the highest data processing capability, capable of processing 1000 pieces of data per minute, followed by distributed system solutions with 800 pieces of data, and client/server architecture solutions with the lowest of 500 pieces of data.

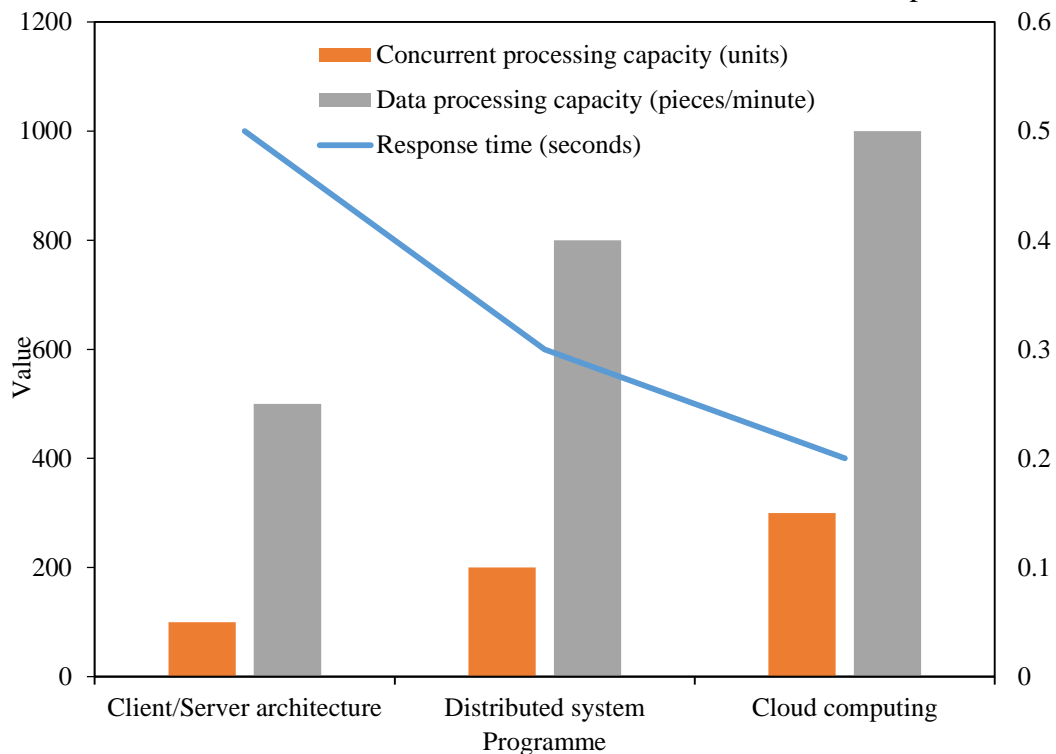


Figure 2. Analysis of performance evaluation indicators

The analysis of safety assessment indicators is shown in Figure 3. Data security: The client/server architecture and cloud computing solutions score high on data security, both at 9 points, while the distributed system solution scores 8 points. Identity authentication: Distributed systems and cloud computing solutions score higher in identity authentication, both at 9 points, while client/server architecture solutions score 8 points. Protection capability: The three schemes have similar scores in terms of protection capability, with distributed systems and cloud computing schemes scoring 8 points and client/server architecture schemes scoring 7 points.

The reliability evaluation index analysis is shown in Figure 4. System stability: Cloud computing solutions have the highest system stability, with a continuous running time of up to 168 hours, followed by distributed systems at 120 hours, and client/server architecture solutions have the lowest running time of 96 hours. Disaster tolerance: Cloud computing solutions have the highest disaster tolerance, with 99.9% availability, followed by distributed system solutions at 98%, and client/server architecture solutions at 97%. Data backup capability: Cloud computing solutions have the longest data backup cycle of 30 days, followed by distributed system solutions of 14 days, and client/server architecture solutions have the lowest cycle of 7 days.

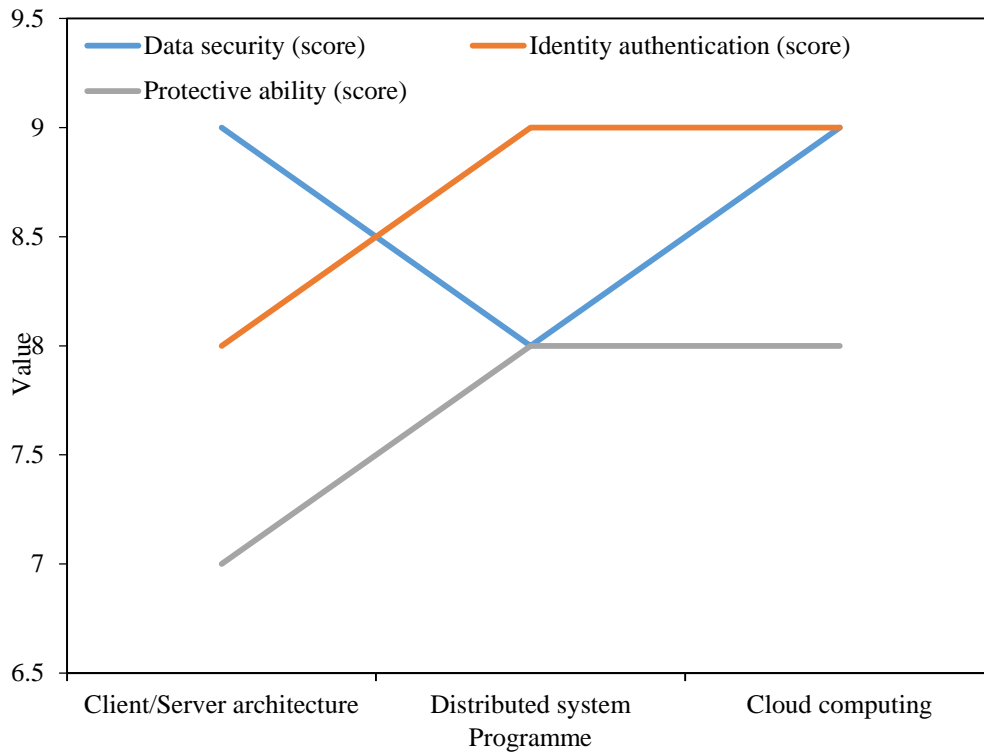


Figure 3. Analysis of safety assessment indicators

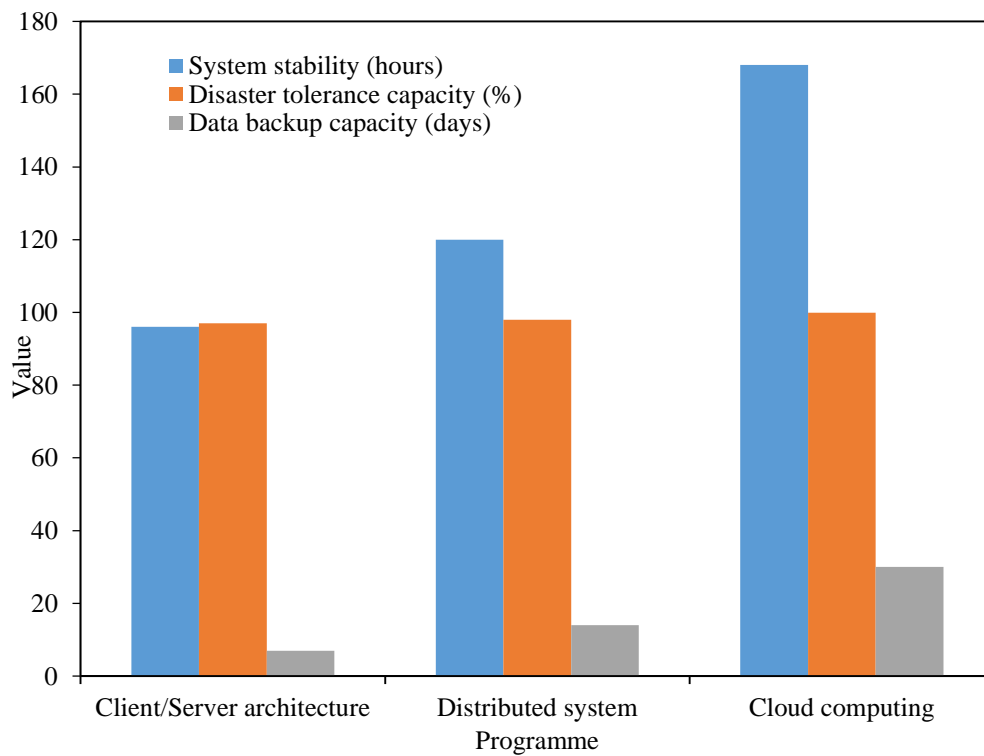


Figure 4. Analysis of reliability evaluation indicators

Based on a comprehensive analysis of the above data, the following conclusions can be drawn:

In terms of performance: Cloud computing solutions perform best in response time, concurrency processing ability, and data processing ability. In terms of security: Client/server architecture and cloud computing solutions score higher in terms of data security. In terms of reliability: Cloud computing solutions perform the best in system stability, disaster tolerance, and data backup capabilities.

According to the analysis results of experimental data, enterprises can choose the most suitable design scheme of AIS according to their own needs and priority indicators.

4. Conclusions

Cloud computing solution is a design solution that performs well in terms of performance, security, and reliability. It has advantages such as fast response, high concurrency processing ability, powerful data processing ability, good data security and identity authentication, high system stability, excellent disaster recovery ability, and long-term data backup ability. It is a wise decision to choose cloud computing solution for enterprises to realize the automation and integration of AIS. However, it should be noted that the selection of an appropriate AIS design scheme should be based on the needs of the enterprise itself and the priority indicators to make trade-offs and decisions. Different enterprises may have differences in actual situations and needs. Therefore, when determining the most suitable design solution, factors such as the size, budget, technical level, and safety requirements of the enterprise should be comprehensively considered. In addition, with the continuous development of technology, new design schemes may appear. Therefore, enterprises need to pay close attention to the latest technological trends and industry development trends, and adjust and update the design scheme of the AIS in a timely manner. The analysis of the experimental results in this paper provides a reference for enterprises to choose a suitable AIS design scheme based on computer network. In practice, enterprises should comprehensively consider the needs of performance, safety, and reliability, and evaluate and make decisions based on actual situations to achieve efficient, safe, and reliable accounting information management and decision support.

Funding

This article is not supported by any foundation.

Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

References

- [1] Astuty Widia, et al. "Does enterprise resource planning lead to the quality of the management accounting information system?." *Polish Journal of Management Studies* 25.2 (2022): 93-107. <https://doi.org/10.17512/pjms.2022.25.2.06>

- [2] Al-Okaily Aws, et al. "Accounting information system effectiveness from an organizational perspective." *Management Science Letters* 10.16 (2020): 3991-4000. <https://doi.org/10.5267/j.msl.2020.7.010>
- [3] Kwarteng Amoako, and Felix Aveh. "Empirical examination of organizational culture on accounting information system and corporate performance: Evidence from a developing country perspective." *Meditari Accountancy Research* 26.4 (2018): 675-698. <https://doi.org/10.1108/MEDAR-01-2018-0264>
- [4] Ahmad Muhannad Akram, and Seif Obeid Al-Shbiel. "The effect of accounting information system on organizational performance in Jordanian industrial SMEs: The mediating role of knowledge management." *International Journal of Business and Social Science* 10.3 (2019): 99-104. <https://doi.org/10.30845/ijbss.v10n3p9>
- [5] Al-Attar Kayed. "The effect of accounting information system on corporate governance." *Accounting* 7.1 (2021): 99-110. <https://doi.org/10.5267/j.ac.2020.10.008>
- [6] Puspitawati Lilis, and Sri Dewi Anggadini. "The Influence of the Quality Accounting Information System to the Quality of Accounting Information-Evidence In Indonesia." *Majalah Ilmiah UNIKOM* 17.1 (2019): 3-12. <https://doi.org/10.34010/miu.v17i1.2228>
- [7] Dagiliene Lina, and Kristina Sutiene. "Corporate sustainability accounting information systems: a contingency-based approach." *Sustainability Accounting, Management and Policy Journal* 10.2 (2019): 260-289. <https://doi.org/10.1108/SAMPJ-07-2018-0200>
- [8] Kwarteng Amoako, and Felix Aveh. "Empirical examination of organizational culture on accounting information system and corporate performance: Evidence from a developing country perspective." *Meditari Accountancy Research* 26.4 (2018): 675-698. <https://doi.org/10.1108/MEDAR-01-2018-0264>
- [9] Ghorbel Jihene . "A Study of Contingency Factors of Accounting Information System Design in Tunisian SMIs." *Journal of the Knowledge Economy* 10.1(2019):74-103. <https://doi.org/10.1007/s13132-016-0439-8>
- [10] Taiwo J. N. , and E. Agwu . "Effect of ICT on Accounting Information System and Organizational Performance." *Social Science Electronic Publishing* 8.6(2018):01-01. <https://doi.org/10.21859/eulawrev-08061>
- [11] Abdalrahman Alameen . "A Cloud Database based on AES 256 GCM Encryption Through Devolving Web application of Accounting Information System." *International Journal of Recent Technology and Engineering* 9.5(2021):268-274. <https://doi.org/10.35940/ijrte.E5269.019521>
- [12] Dalle Juhriyansyah , et al. "The Influence of Accounting Information System and Energy Consumption on Carbon Emission in the Textile Industry of Indonesia: Mediating Role of the Supply Chain Process." *International Journal of Energy Economics and Policy* 11.1(2021):536-543. <https://doi.org/10.32479/ijeep.10693>
- [13] Natalia Ita , L. Lisnawanty , and A. Ardiyansyah . "Accounting Information System For Purchasing, Sales, And Service (Case Study Of Pt. Gm Motor Pontianak)." *Jurnal Riset Informatika* 3.1(2021):57-66. <https://doi.org/10.34288/jri.v3i1.190>
- [14] Onodi Benjamin Ezugwu , O. Ibiyam , and J. C. Akujor . "Management Accounting Information System and the Financial Performance of Consumer Goods Firms in Nigeria." *European Journal of Business Management and Research* 6.1(2021):112-120. <https://doi.org/10.24018/ejbmr.2021.6.1.684>
- [15] Almomani Salam Nawaf , A. Hosban , and M. Alebbini . "The Role of the Internal Auditor in Dealing with the Security and Confidentiality of Computerized Accounting Information Systems. A Proposed Framework." *International Journal Of Management* 12.2(2021):601-611. <https://doi.org/10.34218/IJM.12.2.2021.059>

- [16] *Fraij Jihad , H. Haddad , and N. A. Romman . "The Quality of Accounting Information System, Firm Size, Sector Type as a Case Study from Jordan." International Business Management 15.Issue 2, 2021(2021):30-38. <https://doi.org/10.36478/ibm.2021.30.38>*