

Algorithm for building financial convergence based on mobile internet and accounting information system

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ABSTRACT

The development of modern economy encourages the development of enterprises. As an economic accounting system, the financial integration system is not only an indicator to evaluate the income of enterprises, but also an indicator to evaluate the business status of enterprises. In the modern information environment, how to carry out the financial fusion system information of modern information environment is the focus of enterprises. The information contained in the financial integration system provides complete accounting information for the application of communication network and computer technology by combining modern technical means, and effectively analyze accounting and make reasonable economic plans. In the process of dynamic design of financial integration system, it can avoid accounting risks and significantly improve the economic benefits of the company. Firstly, the paper expounded the analysis of the influencing factors of mobile Internet on accounting information system, and briefly analyzed the relevant factors of financial integration construction. It considered the significance of financial integration construction and proposed effective ways to solve problems. After that, the dynamic planning algorithm was introduced into the financial integration construction design. Finally, the investigation and calculation were carried out. The new accounting information system designed by using dynamic programming algorithm and mobile Internet technology could improve the security and efficiency of enterprises by 38.6%.

Keywords: Accounting Information System, Financial Fusion Construction Algorithm, Mobile Internet, Human-computer Interaction, Computer Vision Multimodal Learning

1. Introduction

In the Internet information age, the rapid development of information technology and the wide application of the Internet have brought great changes to all industries. In particular, cloud computing, artificial intelligence, big data technology penetrates into all areas of society, and traditional management accounting can provide sufficient support for the strategic development planning, business development direction, and control of economic costs [1-3]. The construction of

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management accounting informatization system can make the management accounting work more effective, and the use of informatization technology can optimize the working methods and operating techniques of management accounting, so as to increase the economic efficiency of the enterprise and promote the economic transformation and upgrading of the enterprise [4-7].

The core element of financial integration is the use of Internet information technology to integrate the business work of enterprises with the work responsibilities of management accounting, forming the sharing of information and data such as funds, business processes, and enterprise resources [8-10]. So that the enterprise is in an optimized state when making strategic development decisions, business adjustments, and operational management, safeguarding the core competitive value of the enterprise, and maximizing the value and benefits [11-13]. Every enterprise is an urgent need to use management accounting information system to help enterprises to complete the strategy and enterprise performance improvement [14-15]. The information-based accounting management system is able to unify, analyze, and plan the data related to the entire operation of the enterprise, and realize the effective integration of business and finance [16-18]. The overall management of the first is the management of the tools used in accounting and the use of accounting and management methods software backwardness and shortages, the use of appropriate integration algorithms to improve the management of accounting information system software and system to meet the needs of enterprise management, to promote the relevant functions of the accounting play as well as the timely completion of the management decision-making [19-21].

With the development of modern science and technology, various information networks are widely used in commercial transactions, which to some extent encourages the development of companies and brings new challenges to the accounting treatment of traditional corporate account management. In order to achieve all-round development, the company should strengthen financial integration. On the one hand, the development of corporate financial accounting should take advantage of the opportunities brought by the development of network technology. On the other hand, it is necessary to constantly improve the accounting information system and accounting methods to improve the adaptability of accounting reform. Finally, the combination of traditional financial accounting methods and mobile Internet has laid a solid foundation for the realization and development of accounting information.

2. Evaluation of Influencing Factors of Mobile Internet on Accounting Information System

1) Analysis of the impact of mobile internet on accounting information system. The development and popularization of mobile Internet technology has enriched information systems and promoted the comprehensive development of information systems. Influenced by system integration technology, various functional systems have been reorganized to technically support data exchange between companies. In particular, in the Integrated Management Information System, each subsystem continues to operate in accordance with its business rules. While other systems complete tasks and meet requirements, economic and business data required for financial management shall be provided, so as to facilitate the interface between economic business and financial management and provide databases for financial forecasting, decision-making and monitoring. Financial management is a comprehensive management process of internal and external data, which requires historical data and latest data of enterprise financial system. At the same time, some data are obtained from market conditions and financial development. The development of mobile Internet makes the construction of accounting information system more timely. Data collection and transactions under the artificial information environment are inconsistent. The information processed by the company's accounting system reveals the company's cash flow in the form of virtual time series. However, the development of Internet technology has changed this phenomenon. The integration of accounting information

system and company information is realized through network. The collection of event information is essentially real information, which can be realized online through the synchronous development of record and fact information to promote the development of accounting information system.

2) Analysis of the security impact of mobile internet on financial accounting information. As shown in Figure 1, mobile Internet technology makes enterprise operation more convenient and also affects enterprise information security, especially accounting information security. The first threat to information security is that information is attacked by hackers in the transmission process; even the actual information is manipulated, information is distorted; important information of the company is stolen; human factors may also lead to distortion or disclosure of accounting information. In addition, computer viruses that invade computers destroy accounting information, which leads to incomplete accounting information. The worst thing is that the whole network is paralyzed. The innovative measures for the reform of mobile Internet financial accounting are as follows:

(1) Modern financial accounting treatment is adopted. In the fierce market competition, only through scientific decision-making in a tense environment can competitive advantages be obtained, and accountants need more accurate financial information. Traditional accounting can no longer meet the requirements of modern accounting. In order to solve this problem, many companies choose computerized accounting. However, the function of financial software in the field of accounting computerization is defective. Therefore, it is necessary to reform accounting computerization and improve accounting software and procedures. In addition, in the process of computerization reform, the company's management should clarify its own business characteristics and formulate the overall guidelines for accounting computerization. The company is required to realize electronic accounting as soon as possible, and provide basic computer skills and general system training for financial and accounting personnel of the company. The function of financial software should be improved. When choosing financial software, traditional financial software should be removed, and more management financial software should be added and purchased. The development of modern market economy has put forward higher requirements for accounting software. In order to adapt to market requirements, accounting software should change from the original single form to multiple series.

(2) Diversified accounting information system is constructed. A diversified accounting information system can meet the needs of different information users. In mobile Internet, accounting information system urgently needs to be improved. First, the starting point of accounting data processing should be changed, and other accounting information should be added according to bookkeeping vouchers to improve accounting efficiency. Second, when building a diversified accounting information, the principles of integrity and systematicness should be adhered to provide timely and diversified accounting information for stakeholders. Finally, a complete accounting information system is established, which is composed of accounting event database, management system business database and information query. In the daily activities of the company, data is stored in the database in the form of original data, and corresponding information is generated according to different decision-making modes.

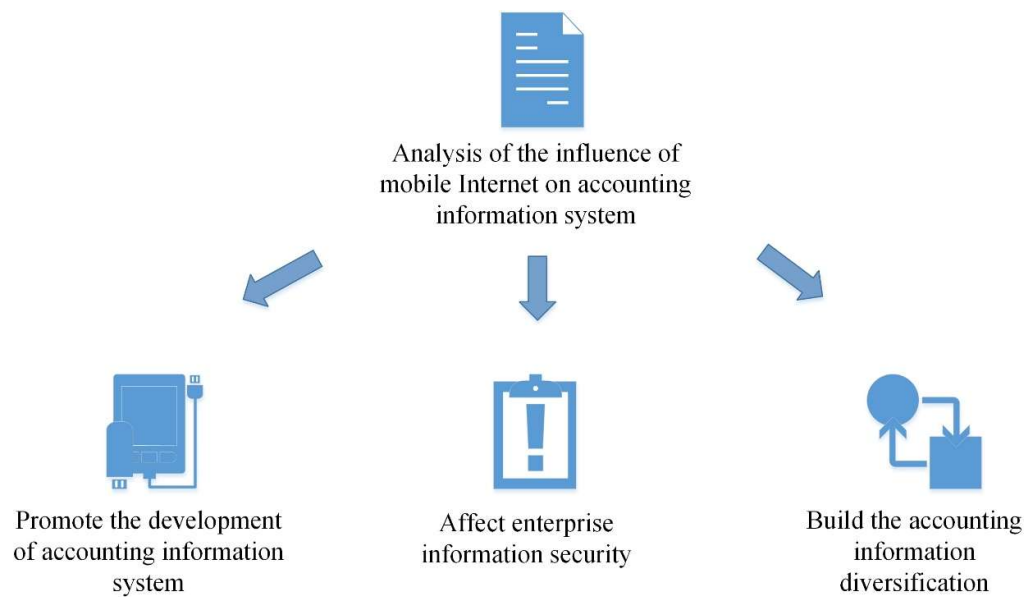


Fig. 1. Analysis of the impact of mobile Internet on the security of financial and accounting information

3. Evaluation of Factors Related to Financial Integration Construction

1) Development status of financial integration construction. In recent years, with the promotion of government departments and the introduction of corporate management practices, the informatization of financial integration has been rapidly improved. The government has also clearly stated that financial integration would be incorporated into the management information system as the construction and development goal. In addition, the enterprise has developed and applied independent accounting tools, information programs or management systems in practice. Combined with specific accounting tools and methods, it lays a foundation for financial integration components. However, the development of financial integration system is not perfect. On the one hand, financial information is relatively weak, which lacks the institutional basis for building a financial integration system. On the other hand, the development of management accounting tools and software can not meet the requirements of management statements for management decision-making information and control. The information level of management accounting tools used by companies is low, and let alone the financial integration system. The company management lacks a comprehensive management accounting team that meets the requirements of financial integration and management system construction, which is the construction and development status of the financial integration construction system, as shown in Figure 2.

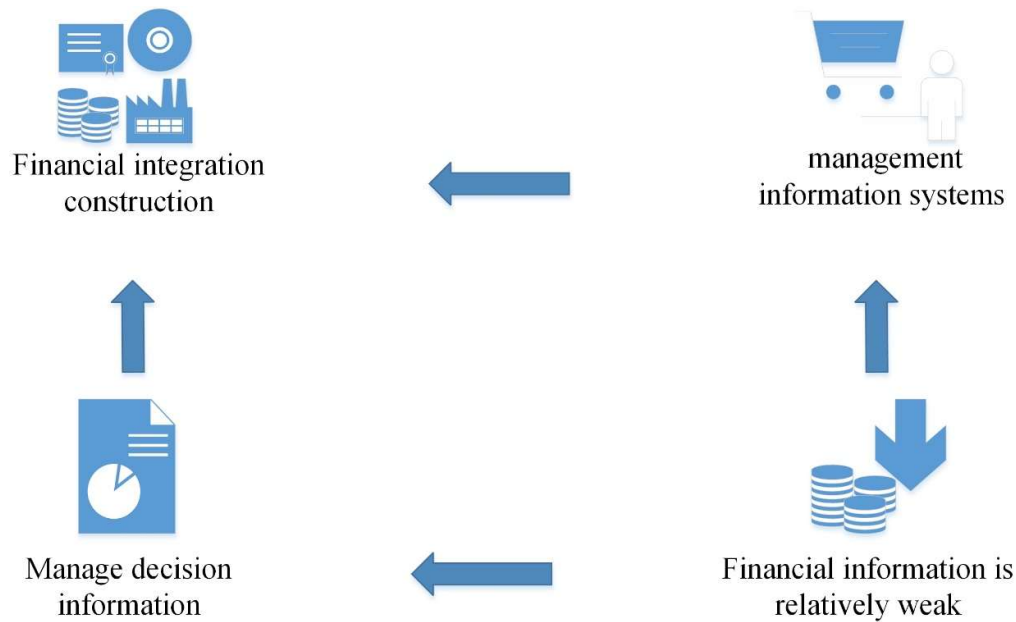


Fig. 2 Development status of financial integration construction

2) The significance of financial integration construction. In modern economic research, many theories are used as references. The importance of this framework lies not in the accurate description of reality but in the establishment of standards conducive to a better understanding of reality. In practice, the construction standard of financial integration plays a leading role. However, in practice, most critics ignored the role of standards, and many people believed that the assumptions behind financial integration were inconsistent with the facts. In fact, the theory of financial integration can neither be simply explained as the real financial world, nor can it be denied its correctness because it is far from the reality. At present, the empirical standard of financial integration theory cannot completely deny its accuracy. However, its role as the starting point of research is undeniable to a certain extent.

3) Problems in financial integration system. Some large enterprises with abundant funds are implementing the construction of financial integration system. However, due to financial, human, technical and other reasons, most enterprises have not yet completed financial integration and information integration. As shown in Figure 3, there is no real direct relationship between financial data and information data of the financial integration system. Financial data is not generated from business data, but the difference in data size between different information systems leads to insufficient reliability. Due to the integrity and timeliness of financial data and the lack of integration of financial information, the effective use of management accounting tools to assist senior management in decision-making is hindered. The basic requirements of enterprise financial report are rapidity, accuracy and integrity. Due to the defects of accounting information system, financial information is outdated, inaccurate and irrelevant. At the same time, due to the lack of a complete information system, in the process of financial information transmission, the information is not true or even not true, which would affect the decision-making of the management.

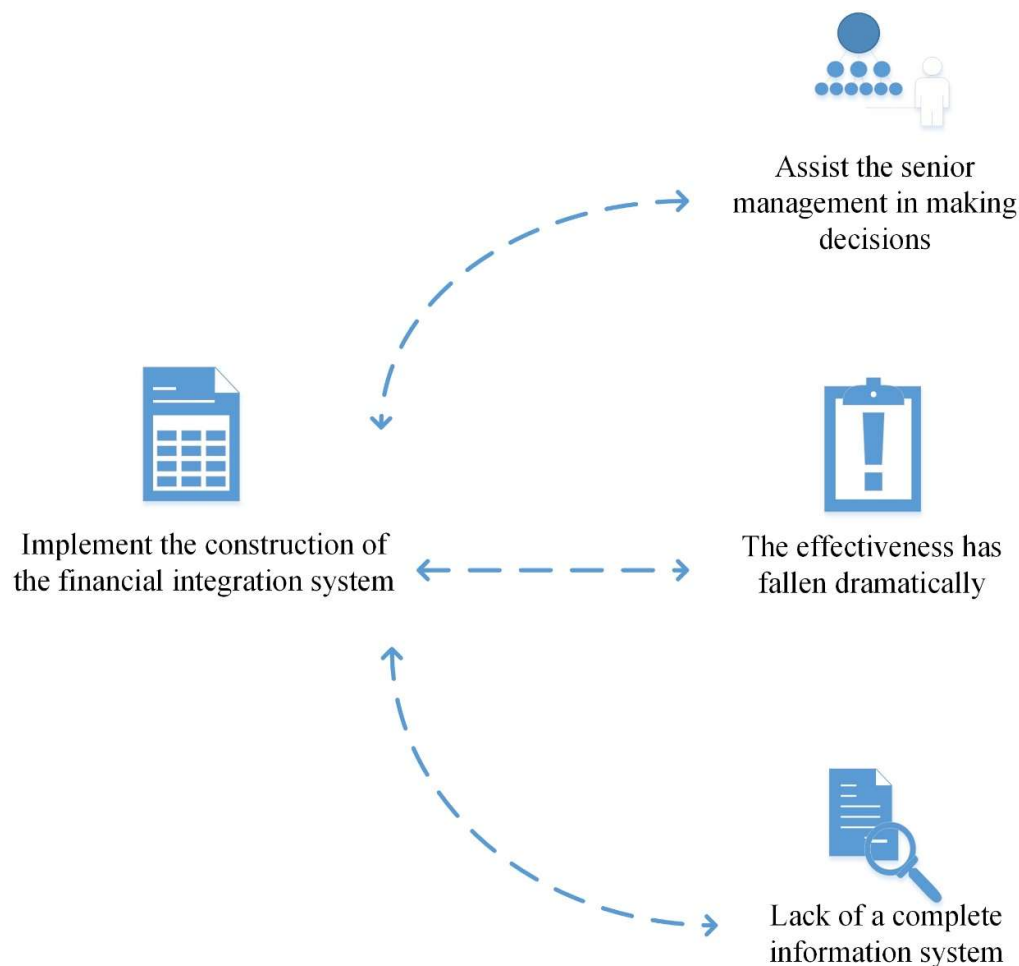


Fig. 3. Problems existing in the financial integration system

4. Construction Process of Financial Integration System Structure

1) Design of financial integration system structure. The construction of financial integration system should do a good job in personnel authentication, thereby improving user management and authority management and standardizing log management. The financial integration system combines user access and operation authority control on the system, which is mainly to ensure proper service management and system security. The financial fusion system should be incorporated into the subsequent accounting process and the company's production activity accounting. The financial fusion system can automatically generate accounting vouchers reflecting cost indicators and predict the status of the current effective business processes. The financial integration system can effectively control the fund and analyze the labor cost in combination with the cost accounting system.

2) Design of server in financial integration system. The financial integration system is not only an accounting system, but also an effective financial integration system. The development process of financial integration system combines authority management and industry management to complete the user management and authentication process. The system adopts a hierarchical structure, and the user management process needs to search, add and modify user data. In the authentication phase, user access rights would be set in combination with user authentication information. The user needs to confirm the login process, enter the user name on the login page, and then use the password to re-enter the authentication information. Authentication policies mainly include address access format and basic format, which directly reflect the query information specified by the system. It is

necessary to check the error information in a timely manner in combination with the login and access system information formats to ensure the normal operation of the system. The development process of financial integration system includes making original receipts, financial statements and payment receipts, and processing the data source format of accounting vouchers. First, the documents should be submitted and the account balance of the documents should be checked. The original documents should be completed in time and the documents should be reviewed. Financial management is realized through the effective cooperation between systems through account registration and settlement establishment, the implementation of automatic transfer system, purchase, sales and inventory management systems, and the effective connection between various systems, as shown in Figure 4.

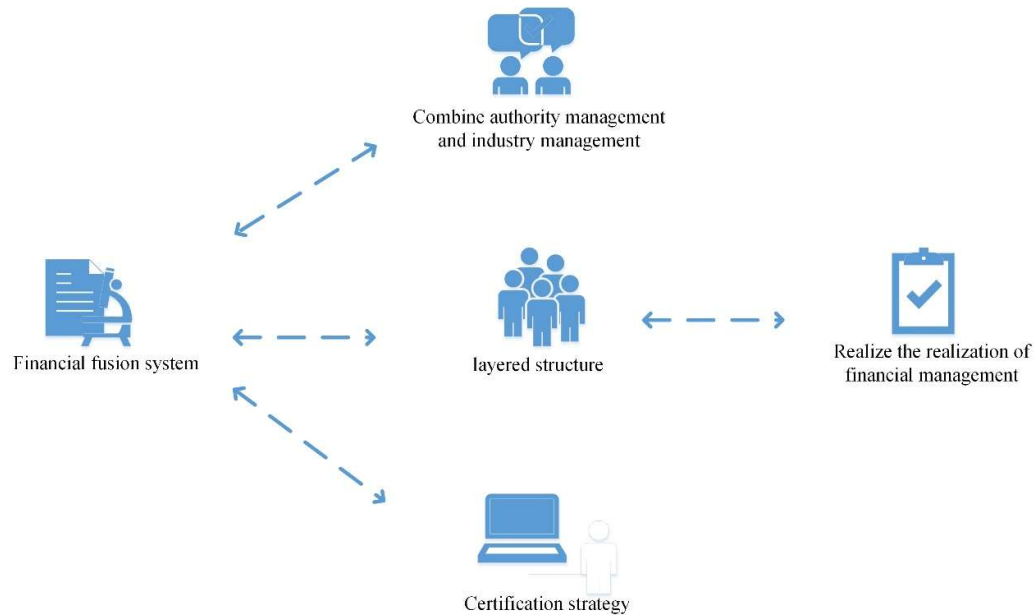


Fig. 4. Server-side design in the financial fusion system

5. Application of Dynamic Programming Algorithm in Financial Integration Construction

In order to construct financial integration, it is necessary to divide resource planning and financial problems. It is necessary to study how to divide responsibilities while each unit conducts financial planning, so as to maximize the overall benefits. The cumulative allocation amount from the score allocation in the first stage to the n th stage is taken as the status variable, and the total financial allocation amount in the n th stage is u_n . If y_p is the financial responsibility distribution of unit H , there would be $0 \leq u_n \leq y_p$. Under certain financial responsibility, the n th unit is considered as v_n , so the objective function v is the maximum. The formula is as follows:

$$V = \max \sum_{n=1}^i v_n \quad (1)$$

It is assumed that $f_n(x_n)$ is the optimal value of n , the formulas are as follows:

$$f_n(x_n) = \max \{V_n(x_n, u_n) + f_{n+1}(x_{n+1})\} \quad (2)$$

$$u_n(x_n) \in U_n(x_n), x_{n+1} = T(x_n, u_n) \quad (3)$$

$$\sum_{n=1}^i un = c \quad (4)$$

The transfer state formula is determined as follows:

$$x_{n+1} = x_n + u_n \quad (5)$$

The allocation of financial responsibilities at each stage is defined as V_n , and the formulas are as follows:

$$V_n(x_n, u_n) = 0.2(5 + \frac{1}{2}un) = 1 + 0.1u_n, n = 1 \quad (6)$$

$$V_n(x_n, u_n) = 0.2(2 + \frac{2}{3}un) = 0.4 + 0.13u_n, n = 2 \quad (7)$$

$$V_n(x_n, u_n) = 0.2(10 + un) = 2 + 0.2u_n, n = 3 \quad (8)$$

The optimal function is the maximum value of the sum of financial responsibilities at each stage:

$$V = \max \sum_{n=1}^3 V_k \quad (9)$$

6. Evaluation of Dynamic Programming Algorithm and Investigation Results

In order to further study the problems in the application of the current accounting information system, the use of accounting information systems in four enterprises is investigated. The problems of information leakage, tedious data collection, low accounting efficiency and low security performance occurred in the use of accounting information systems by enterprises are investigated separately. 200 financial department personnel in four enterprises conduct a questionnaire survey. The companies are set as A, B, C, D. The specific survey results are the problems existing in the current application of the accounting information system in enterprises. The survey results are shown in Figure 5.



Fig. 5. Problems existing in applying the current accounting information system in enterprises

It can be seen from Figure 5 that 200 employees of the four companies surveyed expressed high dissatisfaction with the problems existing in the current accounting information system. Among them, 61% of the employees of company A had the risk of information disclosure; 54% agreed with the cumbersome data collection; 71% of the employees recognized low accounting efficiency; 43% agreed with the low safety performance. In company B, 55% of employees were at risk of information disclosure; 59% agreed with the cumbersome data collection; 63% of the employees recognized low accounting efficiency; 54% agreed with the low safety performance. In company C, 49% of employees were at risk of information disclosure; 52% agreed with the cumbersome data collection; 47% of the employees recognized low accounting efficiency; 61% agreed with the low safety performance. In company D, 63% of employees were at risk of information disclosure; 52% agreed with the cumbersome data collection; 56% of the employees recognized low accounting efficiency; 64% agreed with the low safety performance.

To further study the satisfaction of enterprises with the current accounting information system, a survey is conducted on four companies to investigate their satisfaction with the accounting information system. The four companies are set as A, B, C, D. In the form of questionnaire, the satisfaction is satisfied, average, and dissatisfied. The number of samples is 400 and the survey is shown in Table 1.

Table 1. The company's satisfaction evaluation on the accounting information system

	A	B	C	D
satisfied	36%	41%	32%	44%
commonly	29%	31%	36%	28%
discontent	35%	28%	32%	28%

It can be seen from Table 1 that the company has a low satisfaction with the existing accounting information system. Among them, company A's satisfaction accounted for 36%; the general proportion was 29%; the proportion of dissatisfaction was 35%. The satisfaction rate of company B was 41%; the general proportion was 31%; the dissatisfaction accounted for 28%. The satisfaction rate of company C was 32%; the general proportion was 36%; the proportion of dissatisfaction was 32%. The satisfaction rate of company D is 44%; the general proportion was 28%; the proportion of dissatisfaction was 28%.

In order to improve the current accounting information system, the dynamic programming algorithm is introduced into the existing accounting information system. By using dynamic programming algorithm and mobile Internet technology, a more perfect system is designed for the existing accounting information. With the help of dynamic programming algorithm and mobile Internet technology, a new type of accounting information system is designed. The new accounting information system in this paper is introduced to the four companies mentioned above for evaluation and testing. The number of samples is 400 and the evaluation of the four companies on information leakage, cumbersome data collection, low accounting efficiency and low security performance in the new accounting information system is investigated. The specific results are shown in Figure 6.

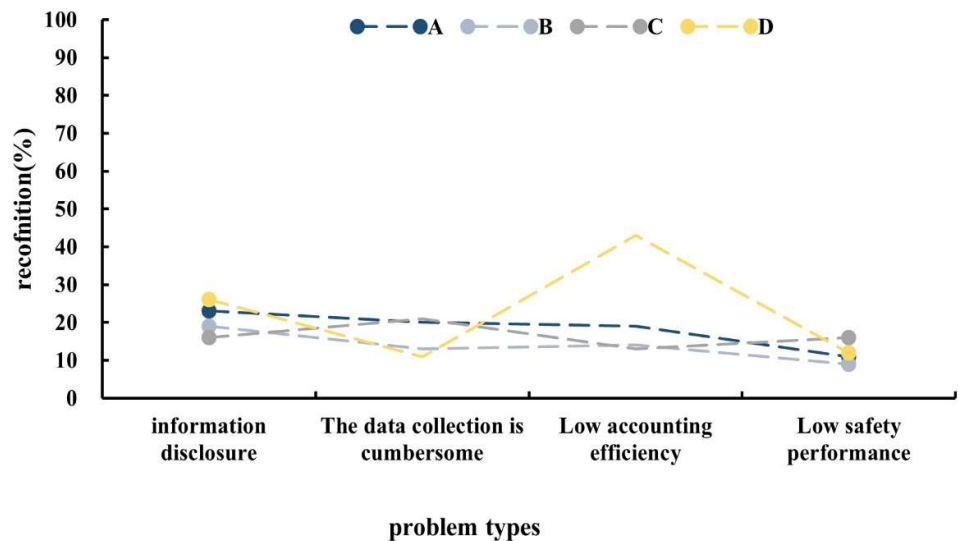


Fig. 6. Evaluation of the new accounting information system by enterprises

As shown in Figure 6, in the new accounting information system designed by using dynamic programming algorithm and mobile Internet technology, each sub index has dropped significantly. Compared with traditional accounting, there are many problems, and the new accounting information system has significantly improved its security and rapidity. This shows that the new accounting information system has greatly improved the efficiency and information security of the company, and has also provided help for the good development of the company. After investigation and calculation, the new accounting information system designed by using dynamic programming algorithm and mobile Internet technology can improve the security and efficiency of enterprises by 38.6%.

In order to test the satisfaction of enterprises with the new accounting information system, a survey is conducted on four companies to investigate their satisfaction evaluation of the accounting information system. The survey results are satisfactory, good, average and dissatisfied, as shown in Figure 7.

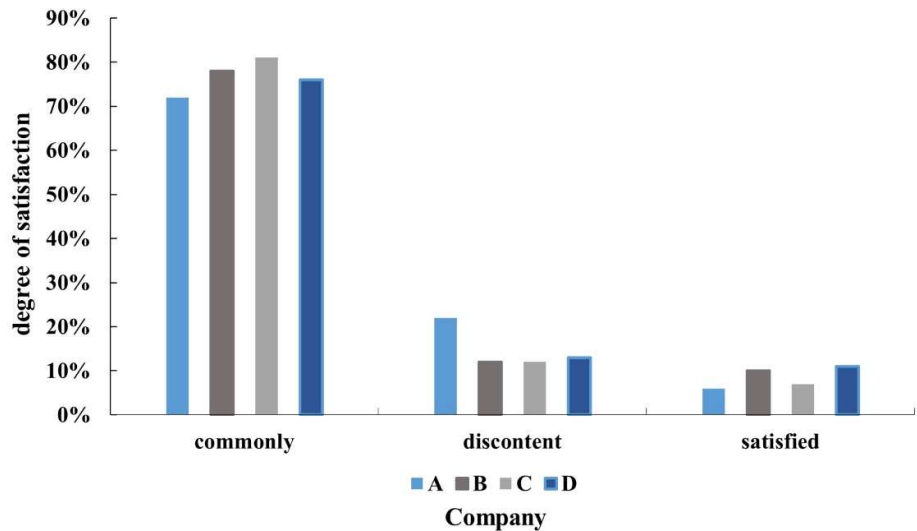


Fig. 7. Enterprise's satisfaction with the new accounting information system

As can be seen from the histogram in Figure 7, the company has significantly improved its satisfaction with the new accounting information system designed by using dynamic planning algorithm and mobile Internet technology. Among them, the satisfaction of company A accounted for 72%; the general proportion was 22%; the dissatisfaction accounted for 6%. The company B's satisfaction accounted for 78%; the general proportion was 12%; the dissatisfaction accounted for 10%. The satisfaction rate of company C was 81%; the general proportion was 12%; the dissatisfaction accounted for 7%. The satisfaction rate of company D was 76%; the general proportion was 13%; the dissatisfaction accounted for 11%. To sum up, the four enterprises have highly satisfied with the new accounting information system designed by using dynamic programming algorithm and mobile Internet technology.

7. Conclusions

With the development of mobile Internet in the field of computing, the design and application of the system should meet the basic needs of mobile users and provide a more convenient, efficient and good user experience. On the basis of fully considering the needs of mobile users, an accounting information system suitable for different enterprise needs and system functions is designed combined with mobile Internet technology. In order to ensure the security of the system, the access process of the system must be strictly controlled, and the data encryption mechanism should be gradually expanded. A perfect protection system should be established to ensure the safety of system data and avoid data damage. The integration architecture and development of the accounting information system combine the basic application of the user system, which has achieved good results in the process of building a highly available system and ensuring the user experience.

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References

- [1] Bai, L., Koveos, P., & Liu, M. (2018). Applying an ontology-augmenting XBRL model to accounting information system for business integration. *Asia-Pacific Journal of Accounting & Economics*, 25(1-2), 75-97.
- [2] Faccia, A., & Petratos, P. (2021). Blockchain, enterprise resource planning (ERP) and accounting information systems (AIS): Research on e-procurement and system integration. *Applied Sciences*, 11(15), 6792.
- [3] Gejing, X., & Yang, L. (2019, November). Research on the impact of Internet evolution on accounting information system based on data Mining. In *Journal of Physics: Conference Series* (Vol. 1345, No. 5, p. 052055). IOP Publishing.
- [4] Islam, K., Rehman, A. C., Bilal, A. R., & Ilyas, M. U. H. A. M. M. A. D. (2017). Accounting information systems: traditions and future directions (by using AIS in traditional organizations). *Journal of internet banking and commerce*, 22(2).
- [5] Van Niekerk, A., & Rudman, R. (2019). Risks, controls and governance associated with internet of things technologies on accounting information. *Southern African Journal of Accountability and Auditing Research*, 21(1), 15-30.

- [6] Jasim, Y. A., & Raewf, M. B. (2020). Impact of the information technology on the accounting system. *Cihan University-Erbil Journal of Humanities and Social Sciences*, 4(1), 50-57.
- [7] Wu, J., Xiong, F., & Li, C. (2019). Application of Internet of Things and blockchain technologies to improve accounting information quality. *Ieee Access*, 7, 100090-100098.
- [8] Wang, Y. (2016). Research on the accounting information construction path based on internet of things and data mining. *RISTI (Revista Iberica de Sistemas e Tecnologias de Informacao)*, (E6), 222-234.
- [9] Chyzhevska, L., Voloschuk, L., Shatskova, L., & Sokolenko, L. (2021). Digitalization as a vector of information systems development and accounting system modernization. *Studia Universitatis Vasile Goldiş Arad, Seria Ştiinţe Economice*, 31(4), 18-39.
- [10] Nazarova, I. (2024). Analysis of business digitization level and implementation of electronic accounting and information systems. *Ekonomichnyy analiz*, 34(2), 158-167.
- [11] Alam, M. S., & Hossain, D. M. (2021). Management accounting in the era of digitalization. *The Journal of Industrial Distribution & Business*, 12(11), 1-8.
- [12] Kucherenko, T., Anishchenko, H., Melnyk, L., & Glinkowska-Krauze, B. A. (2021). Accounting Information System under the Digital Transformation. *Oblik i finansi*, 94, 23-29.
- [13] Kartikasari, E. D., Zainuddin, S. A. B., & Jamil, A. B. (2024). Transformation of Accounting Information Systems in the Management of BUMDesa Financial Performance in the Digitalization Era. In *Board Diversity and Corporate Governance* (pp. 537-543). Cham: Springer Nature Switzerland.
- [14] Posadzińska, I., & Grzeszczak, M. (2022). Management accounting system in the management of an intelligent energy sector enterprise. *Energies*, 15(20), 7633.
- [15] Xiaoli, Y., & Abdullah, N. H. N. (2024). The Impact Of Digitalization On Management Accounting Practices Among Smes In China. *Educational Administration: Theory and Practice*, 30(4), 10140-10153.
- [16] Li, G. (2019, August). Research on innovation of enterprise management accounting informatization platform based on intelligent finance. In *1st International Symposium on Economic Development and Management Innovation (EDMI 2019)* (pp. 286-291). Atlantis Press.
- [17] S Supriyati, S. S., Sri Mulyani, S. M., Harry Suharman, H. S., & Taufiq Supriadi, T. S. (2022). The Influence of Business Models, Use of Information Technology on the Quality of Accounting Information Systems Digitizing MSMEs Post-COVID-19. *Jurnal Sistem Informasi (Journal of Information System)*, 18(2), 36-49.
- [18] Sapinah, S., Saragih, H., & Imaningati, S. (2024). The Effect of Accounting Digitalization on Operational Efficiency and Decision Making in Companies. *Nomico*, 1(9), 82-90.
- [19] Munfareedi, A., Sulaiman, N., AlKhatib, R., & Wadi, R. A. (2022). The impact of digitalization on managerial accounting roles. In *Artificial Intelligence for Sustainable Finance and Sustainable Technology: Proceedings of ICGER 2021 1* (pp. 502-511). Springer International Publishing.
- [20] Tuan, N. M., Hung, N. Q., & Hang, N. T. (2021). Digital transformation in the business: a solution for developing cash accounting information systems and digitizing documents. *Science and Technology Development Journal*, 24(2), 1975-1987.
- [21] Saed, K. A. M. (2020). Assessment of the impact made by the digital transformation of the accounting system on the decision-making system of the enterprise. *Management*, 5(6), 29-35.