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Retraction

Retracted: Application of Big Data and Internet of Things Technology in the Management of Financial Operating Income of Electric Power Enterprises

International Transactions on Electrical Energy Systems

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope
(2) Discrepancies in the description of the research reported
(3) Discrepancies between the availability of data and the research described
(4) Inappropriate citations
(5) Incoherent, meaningless and/or irrelevant content included in the article
(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

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[1] H. Su, "Application of Big Data and Internet of Things Technology in the Management of Financial Operating Income of Electric Power Enterprises," *International Transactions on Electrical Energy Systems*, vol. 2022, Article ID 6167479, 8 pages, 2022.

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Research Article

Application of Big Data and Internet of Things Technology in the Management of Financial Operating Income of Electric Power Enterprises

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Aim. In order to effectively integrate and rationally allocate the complex information flow of people, finance, and materials in the daily operation of the enterprise and improve the daily operation efficiency and management effect of the enterprise, the author proposes a method for the application of big data and Internet of Things technology in the management of financial operating income of electric power enterprises. The method specifically includes an overview of the relevant theories of financial management based on ERP and an analysis of the needs of a power company's financial management system based on ERP so as to construct an evaluation index system for the financial management system. The experimental results show that the return on assets of the experimental enterprises has increased from 27.48% in 2015 to 55.18% in 2019, an increase of 27.7%, and the profitability has been continuously enhanced. In 2019, the company achieved a net profit of 392 million yuan, an increase of about 4 times compared with the previous 77 million yuan in 2015. *Conclusion*. The application can further optimize the allocation of various resources of the enterprise and ensure the effective implementation of the long-term strategy and management goals of the enterprise on the basis of realizing the management needs of the enterprise.

1. Introduction

As an important economic lifeline of my country's national economy, the power industry is a reliable guarantee for healthy economic development, social harmony, and stability. Financial management has always been the main activity and basic content of the daily operation of an enterprise, and it is a strong guarantee for the long-term development and normal operation of an enterprise [1]. At present, the financial management informatization construction that is being widely implemented in electric power enterprises is to realize the integration strategy of financial management through informatization construction—by building a financial information management system that is harmonious and unified with business—implementing the "three-in-one" financial management goals of scientific management, orderly management, and fine management. This further improve the asset operation efficiency and asset disposal efficiency of electric power enterprises, ensure the safety of assets and reliable supply of funds for electric power enterprises, promote the sustainable and healthy development of the economic activities of power enterprises, and ultimately, it will improve the management support for the value enhancement of power enterprises and the realization of strategic goals [2]. Financial management is one of the core businesses of electric power enterprises, from this perspective, the financial informatization of electric power enterprises should be promoted as a whole. Only by realizing the integrated group finance and business can the group's financial resources be optimally allocated. Objectively speaking, this is an inevitable requirement for the financial informationization of group enterprises. ERP takes IT as the carrier to realize the revolutionary upgrade of the informationization, coordination, and intelligent management of the enterprise business activities [3]. In this way, with "financial management" as the link, the complex information flow of human, financial, and materials in the daily operation of the

enterprise can be effectively integrated and reasonably allocated, and the daily operational efficiency and management effectiveness of the enterprise can be improved. A computer management system with standardized operation methods and refined management objectives can also be improved. The core of the ERP system is the long-term strategy and management objectives of the enterprise. The development objectives are the management needs and business contents of the enterprise. The basis of implementation lies in the management level and resource status of the enterprise. Therefore, an ERP system from a strategic point of view through information management means it further optimizes the allocation of various resources of the enterprise on the basis of realizing the needs of enterprise management, in order to ensure the effective implementation of the long-term strategy and management objectives of the enterprise [4].

2. Literature Review

The power grid company announced the smart grid plan for the first time, that is, the comprehensive construction of a strong grid with a UHV grid as the backbone and coordinated development of power grids at all levels as the basis, and a strong smart grid characterized by informatization, automation, and interaction [5]. In the report on the development of modern power grids, the Energy Administration summarizes the seven characteristics of smart grids: it has the ability to self-repair, stimulate the initiative of users to participate in the operation of the power grid, the security ability to resist attacks, the high quality of electric power, accommodate various forms of power generation and storage, prosper the power market, optimize equipment operation, and reduce power grid operating costs [6]. Eladl and others believed that the effective combination of smart grid and Internet of Things technology can improve the stability of the power system and the efficiency of energy use and achieve sustainable energy development [7]. Rk et al. pointed out that the application requirements of the smart grid for the Internet of Things are very clear, for example, in the field of power generation, the Internet of Things can be used for unit monitoring, distributed power plant monitoring, plant area monitoring, pollutant and gas emission monitoring, and energy consumption monitoring, and pumped storage monitoring. It also has a wide range of application requirements in transmission line monitoring, tower protection, intelligent substation, state detection, and so on. [8]. Oikonomou and Parvania pointed out that all aspects of the smart grid need the technical support of the Internet of Things, and most of the business of the smart grid is related to the Internet of Things [9]. From the grid connection of renewable energy in the power generation link to the real-time monitoring of the operating status of the unit; from online monitoring of transmission lines to power production management, safety assessment, and supervision; from smart meters and electricity consumption information collection to three-meter reading and interactive marketing; and from the intelligent electricity consumption and intelligent community to multinetwork integration all need the support of Internet of Things technology [10]. Lorenzo et al. believed that the smart grid is actually loading sensors into the existing power network, through technical means such as RFID technology and local area network. The purpose of remote control of the power grid is achieved, and the structure optimization of the power grid is realized [11]. That is to say, the smart grid is actually the application of IoT technology on the grid. Selva et al. analyzed the application status of IoT in smart grids, the basic architecture of the Internet of Things for smart grid applications is introduced, and the application of the Internet of Things in smart grids is introduced in detail [12]. On the basis of this research, the author proposes a method to explore the application of big data and Internet of Things technology in the management of financial operating income of power enterprises. Based on the research on the application of ERP systems in the financial management of electric power enterprises, this paper introduces the background and significance of ERP financial management research, the core management ideas of ERP, and the core position of ERP financial management in enterprises [13]. Combined with the development stage of electric power enterprises, the development process of ERP financial management is summarized. The authors comprehensively analyze the characteristics of ERP financial management in electric power enterprises and its role in improving the level of financial management. At the same time, the present situation of the implementation of ERP financial management system in a certain electric power is studied and analyzed, and the more advanced domestic ERP financial management technology and methods are used for reference, in view of the current problems in business integration, budget management, and project whole-process management. The research is carried out, and the methods and countermeasures to solve the problems are explored, hoping to provide a certain reference for comprehensively improving the financial management level of power enterprises.

3. Methods

3.1. Overview of ERP Financial Management-Related Theories

3.1.1. Definition of ERP. The definition of ERP standard comes from its original English meaning, that is, enterprise resource planning [14]. It is a system for effectively sharing and utilizing enterprises resources, through the comprehensive and effective information transmission of the information system, the procurement, storage, production, and sales of resources in the enterprise, as well as human, financial, materials, and other aspects are reasonably allocated and utilized so as to achieve the improvement of enterprise business efficiency. Essentially, ERP is an information system and a tool. ERP integrates some advanced management ideas and contents in the system design, which can help enterprises to improve their management level. The development process is shown in Figure 1.

3.1.2. The Role of ERP in Enterprise Financial Management

(1) The ERP system makes the organizational structure of the enterprise flat and the information communication reasonable. The financial management

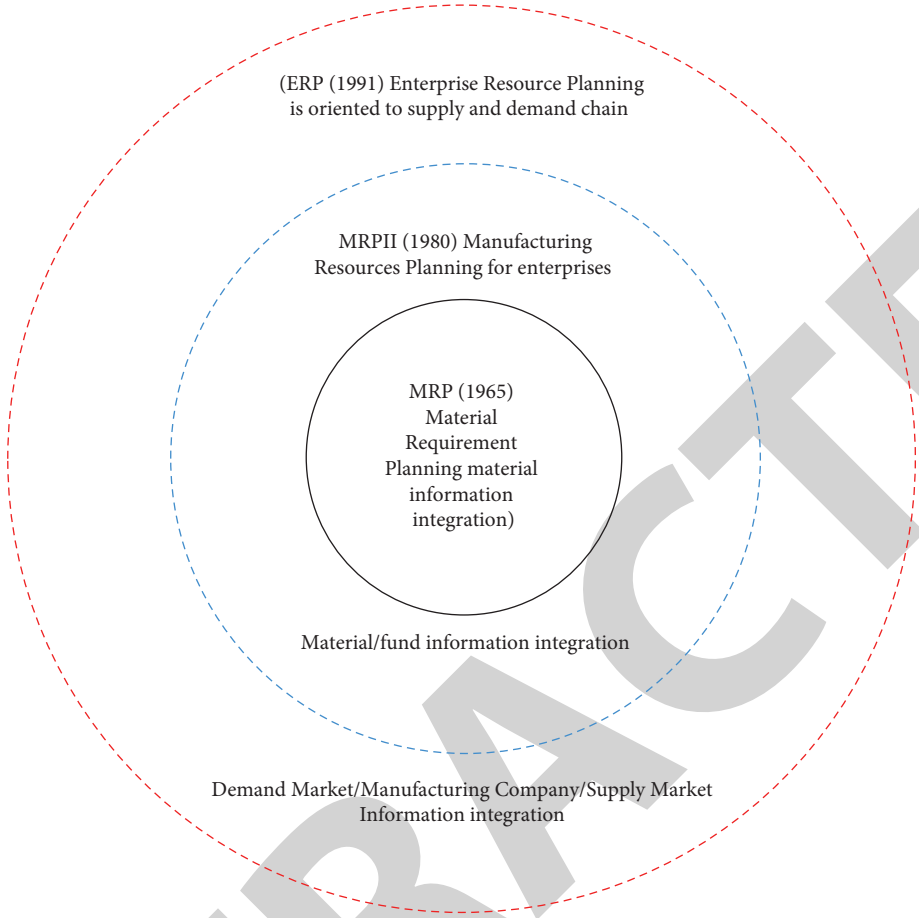

Figure 1: The development process of ERP.

personnel of the enterprise can support the intelligent system through the decision-making in the ERP system, fully understand and master the operating conditions of the enterprise, accurately analyze and formulate the development direction of the enterprise, and effectively control and reduce the operating costs of the enterprise. At the same time, the middle managers of the enterprise can arrange the corresponding purchase plan, production plan, sales plan, and capital plan through the ERP system. The grassroots managers of the enterprise can issue daily work orders through the operation of the ERP system. Enterprises successfully implementing ERP can also manage the supply chain well, cooperate with suppliers and distributors, improve work efficiency, and greatly enhance the competitive advantage of the entire supply chain.

(2) The effect of the ERP project after the implementation is not only reflected in the improvement of work efficiency but also in the awareness and concept of employees to keep up with the management model of modern enterprises and to be able to look at work and solve problems from different perspectives in the past. The upgrade and development of enterprises have laid a solid foundation. The main factor affecting the accuracy of the basic data of the company's manufacturing system is the awareness of cost management of all employees, which is caused by extensive management. In the future, it is necessary to further cultivate the awareness of refined management, at the same time, it is necessary to improve the means of measurement. With the expansion of enterprise scale, manual data collection cannot be accurate, and manual statistics often make mistakes in the case of large output [15]. The biggest advantage of ERP is to establish an integrated and transparent enterprise management system to ensure the accuracy of the original data and to control the real situation of the enterprise so as to optimize resources, respond quickly, and flexibly produce.

3.2. Demand Analysis of a Power Company's Financial Management System Based on ERP

3.2.1. The Overall Plan of a Company's ERP Implementation. The power company's ERP implementation goal is to complete the implementation of the ERP system for project management, material management, and financial management and ultimately achieve 100% coverage of the ERP system in the company's projects, materials, finance, and

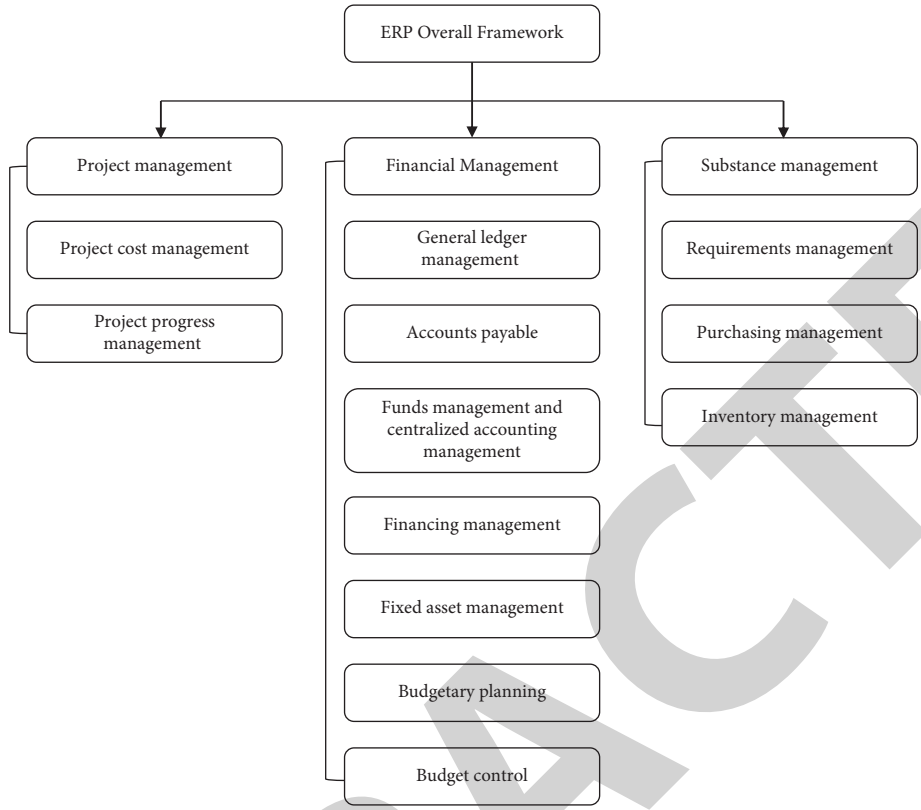

Figure 2: Overall framework of ERP.

human resources management; strengthen the intensive and refined management of people, finances, and materials; build a standardized and intensive management model for L Power company's projects, materials, and financial management; and provide a model for other enterprises' ERP promotion as a good reference. The overall framework of the company's ERP is shown in Figure 2.

3.2.2. Demand Analysis of the ERP Financial Management System for a Power Company. Fixed Asset Management is a comprehensive asset management system that maintains accurate asset information. Its main function is to carry out centralized value management of fixed assets and physical tracking management. In the fixed asset system, you can directly add assets manually, or you can add assets to the asset module through the project module transfer process. In the asset workbench, the staff can carry out corresponding business processing on the assets and maintain the financial information and physical management information of the assets [16]. At the same time, the system provides the standard reports for statistical analysis and tracks management of assets. The asset system is integrated with the general ledger system, and the financial information of the asset system can be transmitted to the general ledger system. The asset system is also integrated with the A/P management system. When adding assets in batches, the invoice information of the A/P system can be directly transferred to the asset module; when the project of the project module is capitalized, asset information can also be generated and transferred to the asset module, as shown in Figure 3.

The main business scope of fixed asset management includes ① asset card increase management: manually increase assets and increase assets in batches; ② asset card depreciation management; ③ asset card adjustment management: single asset adjustment and batch asset adjustment; ④ asset transfer management: internal transfer of assets and asset transfer across account books; ⑤ asset scrap and sale management; ⑥ intangible assets and long-term amortization management; ⑦ important low-value consumables management; ⑧ asset card query and report query management; and ⑨ asset management system closing management. The main management requirements of fixed asset management are shown in Table 1.

3.3. The Design of Financial Management System of a Power Company Based on ERP. Take key flexfields as an example: Oracle standard solutions group assets by nonfinancial information; asset key flexfields can be designed to record required information. Assets can be grouped by the asset key so that the asset can be looked up without the asset number. You can define an asset key flexfield structure that meets your organization's specific needs. You can select the number of segments, the length, name, and order of each segment in the asset key flexfield. Up to ten asset key fields can be defined. This key flexfields support only one structure. As shown in Table 2.

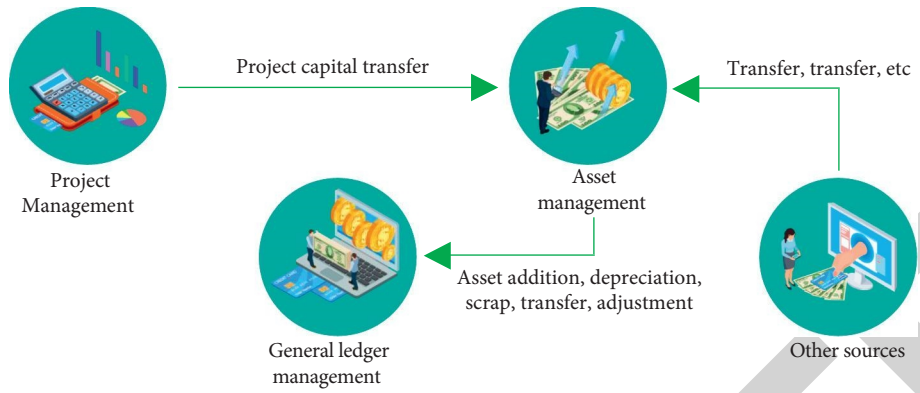

Figure 3: Information flow diagram of fixed asset management and other related modules.

Table 1: Analysis of fixed asset management needs.

Serial number	Demand category	Demand content
1	Asset book	Set up separate asset books
2	Asset base data management	Category flexfield, domain location flexfield, key flexfield, descriptive flexfield related account settings, and asset number
3	Asset business management	Asset increase, asset depreciation, asset adjustment, asset transfer, asset retirement and sale, asset inventory, asset impairment provision, important low-value consumables, intangible assets, and long-term amortization
4	Inquiries and reports	Online query and report query
5	Month-end closing and security	Run depreciation, generate documents, and close accounting periods
6	System integration	Realize the integration between different modules to ensure the flow and timely update of the information

Table 2: Settings of the location elastic domain of a power company.

Company	Primary location	Secondary location
A power supply company	0530L office	General manager's office
A power supply company	0530L safety inspection department	Test class
A power supply company	0530L enterprise service center	Cultural center

After the evaluation indicators are established, it is necessary to assign different weights to each indicator so that the different degrees of importance of each indicator can be clarified. The determination and distribution of weights can more objectively and truly evaluate the security benefits of enterprises. The following will use the improved analytic hierarchy process to determine the weight of each indicator. The general AHP needs to check the consistency of the judgment matrix, but when it is applied in practice, it is difficult to ensure the accuracy of this consistency check, and it needs to be adjusted many times to meet the requirements [17]. However, after improving the general AHP method by using the properties of the optimal transfer matrix, it can naturally meet the consistency requirements and directly calculate the relative weight. The steps are as follows:

3.3.1. Establishing a Judgment Matrix. Taking the element U_1 as the evaluation criterion, the same level elements below U_1 are compared in pairs, and the judgment matrix A is constructed. When making a pairwise comparison, the line-scalemethod can be used to express the relative importance.

3.3.2. Solution of the Antisymmetric Matrix. Perform $b_{ij} = \lg a_{ij}$, and transform A into an antisymmetric matrix and a transfer matrix B.

3.3.3. Solution of the Optimal Transfer Matrix. Find the optimal transitive matrix of an antisymmetric matrix.

$$c_{ij} = \frac{1}{n}\sum_{i=1}^{n}\left(b_{ik} - b_{jk}\right), \quad i = 1, 2, \ldots, n;\ j = 1, 2, \ldots, n. \tag{1}$$

It suffices to minimize $\sum_{i=1}^{n}\sum_{j=1}^{n}(c_{ij} - b_{ij})$.

Perform $W^* = 10^C$ transformation to find the Quasi-optimized consensus matrix of WW^* and the Quasi-optimized consensus matrix W^* of the judgment matrix, which

preserves the information in the judgment matrix to the greatest extent [18].

$$w_{ij}^{*} = 10^{c_{ij}}, \quad i = 1, 2, \ldots, n;\ j = 1, 2, \ldots, n. \tag{2}$$

3.4. Financial Risk Prevention Measures

3.4.1. Rational Formulation of Corporate Financing Strategies. The capital of a power company mainly comes from debt financing, which has led to the high asset-liability ratio of the company in recent years. A power company should formulate a reasonable financing strategy to broaden its own financing channels, thereby reducing the company's asset-liability ratio and optimizing its capital structure. First, companies can change their conservative financing strategies into moderate financing strategies and use short-term financing to raise funds. Secondly, the enterprise itself can issue additional stocks to raise funds, increase equity financing, reduce debt financing, or can use the form of a "debt-to-equity swap" for related optimization, at the same time, it can also delay the enterprise's expenditure on interest, form "natural financing" and increase the utilization of funds [19]. Finally, enterprises can further optimize the industrial structure through fixed increase fundraising, actively respond to the impact of the power system reform on the traditional power business, and improve the layout of the distribution network energy-saving service business.

3.4.2. Steady Promotion of the Corporate Investment Strategy

(1) Accelerate corporate investment and mergers and acquisitions to promote the development of power distribution and energy-saving business.

According to relevant information reports, in mid-August 2020, a power company on the listed platform of the State Grid disclosed that it planned to promote the distribution of power distribution and energy-saving business through a combination of capital raising and asset acquisition. A power company originally mainly engaged in the power supply business, since it entered the field of power distribution and energy saving, has entered the "fast lane" of business performance and growth. If this trend continues, the development of the enterprise will make great progress, the business can be further expanded, and the situation of investment losses can be reversed.

(2) Increase investment in energy conservation of distribution network and promote the development of "dual main business" of enterprises.

After a power company participated in State Grid's distribution network energy-saving business in 2016, its performance has risen significantly, but it has also attracted the attention of provincial companies within the State Grid, and they all want to profit from it. This disrupts the energy-saving business of the State Grid that should have been developing continuously because the internal competition has become full of uncertainty [20]. Therefore, a power company must seize this opportunity, cooperate with the relevant policies of the State Grid, actively increase investment in the energy-saving business of the distribution network, and strive to achieve the goal of achieving a revenue of 80 billion yuan for the comprehensive energy service business of the State Grid in 2025.

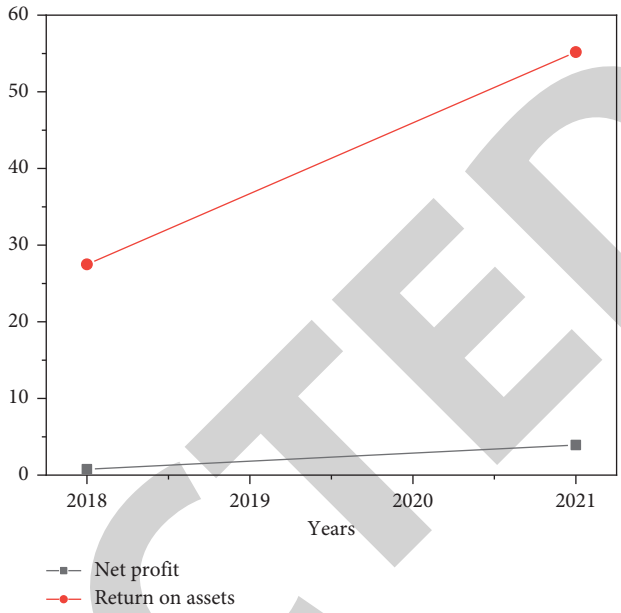

Figure 4: Comparison of operating performance.

(3) Improve the management of accounts receivable.

A power company's accounts receivable account for a large proportion of the company's current assets, at the same time, the company's accounts receivable turnover days continue to increase; the recovery period is longer, and the company's capital flow speed has become relatively slow. This poses a certain threat to the financial status of the company, hinders the development of a power company to a certain extent, and may cause the company to not have enough funds to repay current liabilities; therefore, enterprises should formulate scientific and effective policies to improve the management of their own accounts receivable. On the one hand, a power company should pay attention to the credit level of its associated customers and their business conditions. Enterprises should maintain long-term, stable contact, and cooperation with related party customers with better management level and reduce opportunities for economic cooperation with those enterprises with more debts and poor credit status. On the other hand, the power company itself should reduce bad debts by reasonably setting credit terms and other methods, and then gradually increase the company's accounts receivable turnover rate.

4. Results and Discussion

Judging from the operating performance of a power company after the development of "dual main business," the company will achieve a net profit of 392 million yuan in 2021, an increase of about 4 times compared with the previous 77 million yuan in 2018. The company's return on assets has risen from 27.48% in 2018 to 55.18% in 2021, an increase of 27.7%, and profitability has continued to increase. Therefore, in order to solve the problem of competition in the energy-saving industry in the distribution network within the State Grid, a power company must play the role of a "commander," increase investment and construction in related fields and continuously enhance the level of profitability, as shown in Figure 4.

5. Conclusion

The author proposes a method for the application of the big data and Internet of Things technology in the management of financial operating income of electric power enterprises, taking the financial management system of an electric power company based on ERP as the research object, on the basis of comprehensively considering the current situation of financial management of a power company, by focusing on analyzing the functional requirements of the three management modules of fixed asset management, financing management, and budget control management of the power company financial management system based on ERP, and taking the fixed asset management system as an example, the ERP-based financial management system of a power company is proposed a design. In order to prove that through informatization management methods, it is possible to further optimize the allocation of various resources of the enterprise, on the basis of realizing the management needs of the enterprise and ensuring the effective implementation of the long-term strategy and management objectives of the enterprise. The financial management system of L power company based on ERP is evaluated, and the evaluation results show that the financial management system of L power company based on ERP is at a good level.

Data Availability

The data used to support the findings of this study are available from the author upon request.

Conflicts of Interest

The author declares no conflicts of interest.

Acknowledgments

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