Research on Performance Management in the Digital Management System of Commercial Assets of Tobacco Enterprises

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Abstract: This paper takes asset performance management in the digital management system of tobacco commercial assets as the research object, and analyzes the theoretical impact and application strategies of digital management on the asset performance management of tobacco enterprises from the concept, characteristics and core role of digital management. This paper argues that digital management can improve the asset performance of tobacco companies by improving the efficiency of asset management, promoting data-driven decision-making, and reducing risk management. This paper suggests that tobacco companies should pay more attention and resources to digital management, select appropriate technologies, train employees, and evaluate the effectiveness to optimize the level of asset performance management. Taking the electronic equipment assets of the information center of X Tobacco Company as an example, after the one-year application of "Digital Tobacco Business Asset Performance Management", the growth rate of the operating life of electronic equipment assets is 68.41%, which has far extended the operating life of the assets by more than 10%. This paper has made certain contributions to both theory and practice, and provides some references and enlightenment for the digital management of the tobacco industry.

Keywords: Digital management; Asset performance management; Tobacco industry; Apply policies.

1 Introduction

With the development and application of information technology, digital management has become an important means and goal for enterprises to enhance their competitiveness and sustainable development capabilities[1]. Digital management refers to the use of information technology and data analysis to effectively plan, organize, coordinate, control and optimize the resources and activities of enterprises. The core role of digital management in enterprise management is to improve efficiency, reduce costs, enhance innovation, and improve customer satisfaction[2].

The tobacco industry is an important pillar of the national economy, and it is also an industry facing great challenges and opportunities[6]. The tobacco industry involves a large number of assets, such as land, equipment, raw materials, products, etc., which are crucial to the survival and development of tobacco enterprises. Therefore, the tobacco industry needs to efficiently

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manage asset performance to ensure the safe, rational and effective use of assets. Asset performance management refers to the management of the whole life cycle of an enterprise's assets, from asset planning, procurement, use, maintenance, renewal to disposal, in order to achieve the maximum value and minimum risk of assets[4].

The goal of asset performance management is to improve the availability, reliability, efficiency and safety of assets, reduce the operating and risk costs of assets, extend the useful life of assets, and optimize the allocation and utilization of assets. This paper takes the asset performance management in the digital management system of tobacco business assets as the research object, and discusses the theoretical impact and application strategy of digital management on the asset performance management of tobacco enterprises. This paper mainly focuses on the following aspects: Literature review: Sort out and analyze the literature on digital management, asset performance management and tobacco industry at home and abroad to understand the relevant theories and practices.

Analysis of the theoretical impact of digital management on the performance management of tobacco commercial assets: The theoretical impact of digital management on the performance management of tobacco commercial assets is analyzed from three perspectives: efficiency improvement, data-driven decision-making and risk management.

Application Strategies of Digital Management in Tobacco Commercial Asset Performance Management: This paper introduces the application strategies of digital management in tobacco commercial asset performance management from two aspects: technology implementation and organizational culture.

Research Limitations and Future Prospects: Discuss the research limitations of this paper and propose future prospects. Conclusion: Summarize the main ideas and contributions of this paper. This paper hopes to provide some reference and enlightenment for the digital management of the tobacco industry through the above research content.

2 Research progress

This chapter mainly reviews and analyzes the literature on digital management, asset performance management and tobacco industry at home and abroad, understands the relevant theories and practices, and provides a theoretical basis and reference for subsequent research.

2.1 The concept and connotation of digital management

Digital management refers to the use of information technology and data analysis to effectively plan, organize, coordinate, control and optimize the resources and activities of enterprises to improve their competitiveness and sustainable development[1]. Digital management is an upgraded version of information management, which includes not only the basic functions of information management, such as information collection, transmission, storage, processing, and application, but also advanced functions such as data mining, intelligent analysis, predictive models, and decision support[2].

The core role of digital management in enterprise management is to improve efficiency, reduce costs, enhance innovation, and improve customer satisfaction. Digital management

involves multiple levels, such as strategic, business, and technical. At the strategic level, digital management requires enterprises to formulate a clear digital vision, goals and paths according to the external environment and internal resources, and achieve the consistency between enterprise strategy and digital strategy[9]. At the business level, digital management requires enterprises to digitally transform their core and auxiliary businesses, optimize business processes, improve business quality, and create new business models in a data-driven manner[10]. At the technical level, digital management requires enterprises to establish a unified data platform, integrate various data sources, realize the standardization, quality, security and sharing of data, and use advanced technology tools such as artificial intelligence, cloud computing, and the Internet of Things to realize data analysis, mining, application, and value transformation[11].

2.2 The concept and connotation of asset performance management

Asset performance management refers to the management of the whole life cycle of an enterprise's assets, from asset planning, procurement, use, maintenance, renewal to disposal, in order to achieve the maximum value and minimum risk of assets[4]. Asset performance management is a value-driven approach to asset management that aims to improve the contribution of assets to corporate goals by optimizing the relationship between asset inputs and outputs[5].

The goal of asset performance management is to improve the availability, reliability, efficiency and safety of assets, reduce the operating and risk costs of assets, extend the useful life of assets, and optimize the allocation and utilization of assets. Asset performance management involves multiple aspects, such as strategy, process, and technology. In terms of strategy, asset performance management requires enterprises to formulate a clear asset strategy, clarify the vision, goals and indicators of asset management, and connect asset strategy with enterprise strategy to achieve the consistency of asset management and enterprise value[6]. In terms of process, asset performance management requires enterprises to establish a sound asset management system, including asset planning, asset procurement, asset use, asset maintenance, asset renewal and asset disposal, etc., to achieve standardization, standardization and systematization of asset management[7]. In terms of technology, asset performance management requires enterprises to use digital technologies, such as the Internet of Things, big data, and artificial intelligence, to realize real-time monitoring, intelligent analysis, predictive maintenance, and optimized decision-making of assets, and realize the automation and intelligence of asset management[8].

2.3 Characteristics and challenges of the tobacco industry

The tobacco industry is an important pillar of the national economy, and it is also an industry facing great challenges and opportunities[6]. The tobacco industry involves a large number of assets, such as land, equipment, raw materials, products, etc., which are crucial to the survival and development of tobacco enterprises. Therefore, the tobacco industry needs to efficiently manage asset performance to ensure the safe, rational and effective use of assets. The tobacco industry faces the following characteristics and challenges when managing asset performance: First, the tobacco industry is a highly monopolistic industry, which is strictly regulated and controlled by the state, and its asset management also needs to follow the relevant national policies and regulations, and at the same time meet the national social responsibility and

public welfare requirements for the tobacco industry[14]. Second, the tobacco industry is a highly competitive industry, facing the diversification and personalization of consumer needs, as well as the impact and challenges of other alternatives, and its asset management also needs to be continuously innovated and optimized to improve product quality and brand image, and enhance market competitiveness[11]. Third, the tobacco industry is a highly complex industry, involving multiple links and multiple entities, such as planting, acquisition, manufacturing, commerce, etc., and its asset management also needs to be coordinated and integrated to achieve resource sharing and utilization and improve resource utilization efficiency[19]. Fourth, the tobacco industry is a highly risky industry, facing a variety of risks such as market risks, quality risks, and safety risks, and its asset management also needs to be prevented and responded to to ensure the safety and reliability of assets[9].

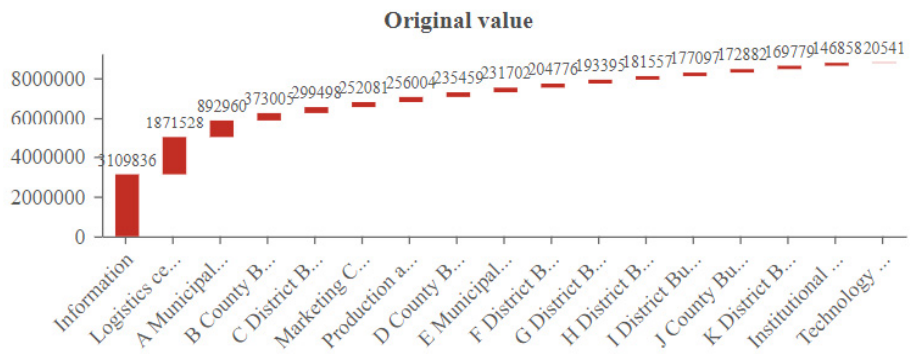
3 Analysis of the impact of digital management on the performance management of tobacco commercial assets

This chapter analyzes the theoretical impact of digital management on the performance management of tobacco commercial assets from three perspectives: efficiency improvement, data-driven decision-making and risk management.

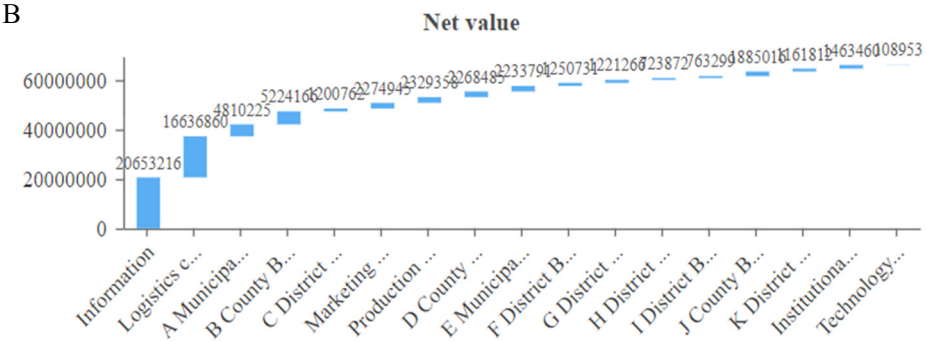
Taking the electronic equipment of X Tobacco Company as an example, analyzing the original value and net value (Formula 1) of its assets, it can be seen from Figure 1-A/B/C/D/E that the net value and original value of the total electronic equipment of the information center are the highest, followed by the logistics center, the third original value is the county bureau B, the third is the city bureau of A, and the original value and the net value of the technology center are the lowest. As can be seen from Figure 1-A/B, there are differences between the original value and the net value among different departments, and the net value of City A and District C has increased significantly. From the area chart (see Fig. 1-C), it can be seen that the depreciation of electronic equipment assets in different departments is obvious.

$$\text{Original value} = \text{Net value} + \text{Accumulated depreciation} \tag{1}$$

A



B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20000000
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Information
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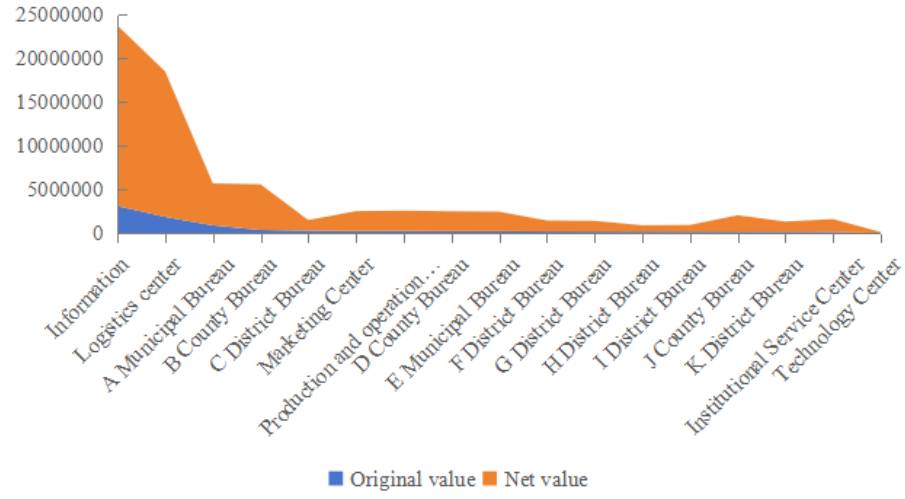
C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Information
Logistics center
A Municipal Bureau
B County Bureau
C District Bureau
Marketing Center
Production and operation...
D County Bureau
E Municipal Bureau
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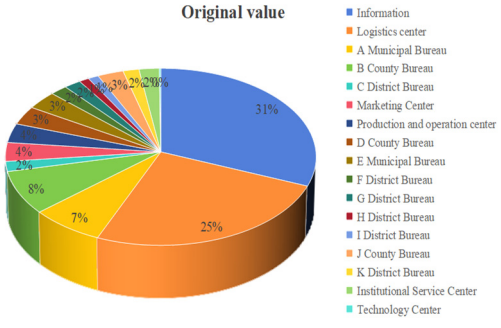
K District Bureau
Institutional Service Center
Technology Center
Original value
Net value

D


Original value
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Technology Center

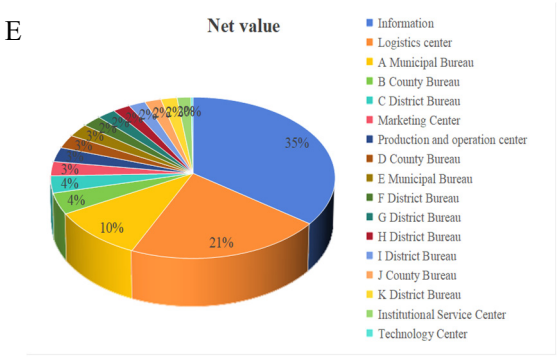

Fig. 1. Analysis chart of the original value and net value of the assets of the electronic equipment of X Tobacco Company

3.1 Efficiency improvement

Digital management refers to the use of information technology and data analysis to effectively plan, organize, coordinate, control and optimize the resources and activities of enterprises to improve their competitiveness and sustainable development[1]. Digital management is mainly reflected in the following aspects in improving the efficiency of performance management of tobacco commercial assets:

(1) Digital management optimizes the process of performance management of tobacco commercial assets. Through the establishment of a unified data platform, the informatization, standardization, normalization and systematization of tobacco commercial asset performance management have been realized, the quality, completeness and availability of asset information have been improved, and the time cost and error rate of information transmission and processing have been reduced[2]. Through the introduction of intelligent technology, the automation, intelligence and collaboration of tobacco commercial asset performance management have been realized, and the execution efficiency and coordination ability of asset planning, procurement, use, maintenance, renewal and disposal have been improved[3].

(2) Digital management improves the quality of performance management of tobacco commercial assets. Through the use of big data analysis, artificial intelligence and other technical tools, real-time monitoring, intelligent analysis, predictive maintenance and optimal decision-making of tobacco commercial assets have been realized, which has improved the availability, reliability, efficiency and safety of assets, reduced the operating costs and risk costs of assets, extended the service life of assets, and optimized the allocation and utilization of assets[7,8]。

(3) Digital management innovates the mode of performance management of tobacco commercial assets. By building a data-driven integrated platform, the whole life cycle management from seed to soot has been realized, the data flow barriers of "agriculture, industry, commerce, zero and consumption" have been broken, the sharing and utilization of resources have been realized, and the efficiency of resource utilization has been improved[15]. By building a socialized collaborative operation system, it has achieved deep integration with external partners such as suppliers and customers, and improved market competitiveness and customer satisfaction[16].

3.2 Data-driven decision-making

Data-driven decision-making for digital management promotes performance management of tobacco commercial assets Data-driven decision-making refers to decision-making based on data analysis and mining to form data insights and intelligence to support the strategic planning, business operation and management optimization of enterprises[12]. Data-driven decision-making is mainly reflected in the following aspects to promote the performance management of tobacco commercial assets:

(1) Data-driven decision-making improves the scientific performance management of tobacco commercial assets. Through the use of data analysis and mining tools, such as statistical analysis, association analysis, cluster analysis, classification analysis, etc., the multi-dimensional, multi-angle and multi-level analysis of tobacco commercial assets is realized, which reveals the essential characteristics, internal laws and external influencing factors of assets, and provides objective, accurate and comprehensive data support for the performance management of tobacco commercial assets[3,13].

(2) Data-driven decision-making improves the flexibility of performance management of tobacco commercial assets. Through the use of technical tools such as artificial intelligence and machine learning, real-time monitoring, dynamic prediction, intelligent recommendation and adaptive adjustment of tobacco commercial assets are realized, which provides timely, effective and personalized data services for the performance management of tobacco commercial assets[17].

(3) Data-driven decision-making improves the innovation of tobacco commercial asset performance management. Through the use of data visualization and interactive tools, the intuitive display, in-depth exploration and diversified expression of tobacco commercial assets are realized, which provides a vivid, interesting and diversified data experience for the performance management of tobacco commercial assets[13]. Through the use of technical tools such as data mining and knowledge discovery, the implicit patterns, potential values and novel knowledge of tobacco commercial assets are discovered, which provides novel, useful and meaningful data insights for the performance management of tobacco commercial assets[9].

3.3 Risk management

Risk management refers to identifying, assessing, controlling and responding to various uncertainties faced by enterprises to ensure the achievement of corporate goals and the growth of value[18]. Digital management can strengthen the risk management of tobacco commercial asset performance management in the following aspects:

(1) Use technical tools such as the Internet of Things and big data to achieve comprehensive coverage, full-time monitoring, and full-chain traceability of tobacco commercial assets, and timely discover and record the existing or possible risk events of assets, such as quality defects, safety accidents, wear and tear damage, etc.[3].

(2) Data analysis and mining tools, such as risk matrix, fault tree analysis, Monte Carlo simulation, etc., were used to realize the qualitative and quantitative risk assessment of tobacco commercial assets, and the risk level, impact degree and occurrence probability of the assets were determined[10].

(3) the use of intelligent technology and decision-making tools, such as expert systems, neural networks, fuzzy logic, etc., to realize the selection and implementation of control strategies such as risk avoidance, transfer, dispersion and assumption of tobacco commercial assets[9].

(4) Use information technology and communication tools, such as cloud platforms, mobile applications, social media, etc., to formulate and update risk emergency plans for tobacco commercial assets, as well as collect and analyze risk events, so as to provide timely, effective and continuous risk response means for the performance management of tobacco commercial assets[13,19].

4 Application strategy of digital management in the performance management of tobacco commercial assets

Based on the theoretical impact of digital management on the performance management of tobacco commercial assets, this chapter proposes the following three application strategies based on the actual situation of tobacco commercial enterprises(see Fig. 2):

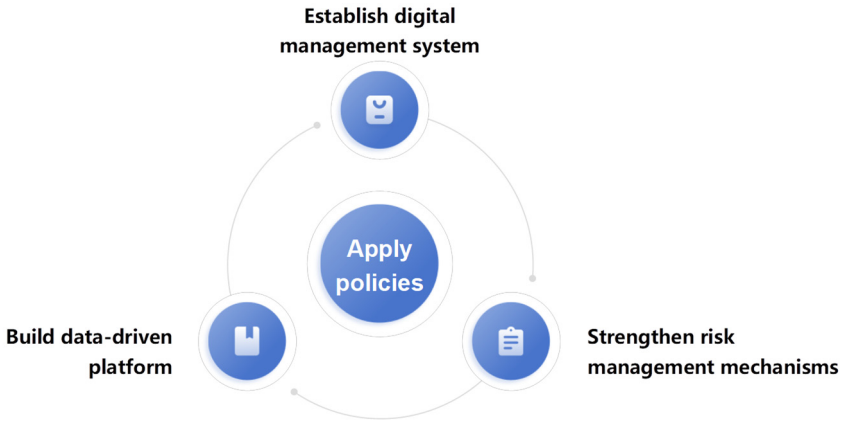

Fig. 2. Three application strategies

4.1 Establish a digital management system

The digital management system refers to a set of norms, processes and organizations within the tobacco business enterprise to achieve the effective implementation and operation of digital management. To establish a digital management system, it is necessary to formulate a digital management strategy and clarify the vision, goals and paths of digital management[9]. Establish a digital management organization and set up a department or team dedicated to digital management[2]; Improve the digital management system and formulate relevant rules, standards and guidelines[10].

4.2 Build a data-driven platform

A data-driven platform refers to a platform that integrates data collection, storage, processing, analysis, and application outside tobacco commercial enterprises to achieve data-driven decision-making[12]. To build a data-driven platform, it is necessary to integrate data sources

and connect various data inside and outside tobacco commercial enterprises to a unified data pool through technical means such as the Internet of Things and cloud computing[3]. Analyze the value of data, use big data analysis, artificial intelligence and other technical tools to analyze data in multiple dimensions, angles and levels, and form data insights and intelligence[3,13]; The application of data results and the use of visual, interactive and other technical means to provide effective, flexible and innovative decision support for the performance management of tobacco commercial assets[13].

4.3 Strengthen the risk management mechanism

A risk management mechanism refers to a set of norms, processes and organizations within and outside a tobacco business enterprise to achieve the effective implementation and operation of risk management. Strengthening the risk management mechanism requires the establishment of a risk management strategy that clarifies the vision, objectives and path of risk management[18]; Establish a risk management organization and set up a department or team dedicated to risk management[2]; Improve the risk management system and formulate relevant rules, standards and guidelines[10]; Implement risk management measures, adopt corresponding technologies, methods, tools and other means to form a systematic, scientific, effective and continuous risk treatment plan[9].

5 Case Study

Taking the electronic equipment assets of the information center of X Tobacco Company as an example, this paper analyzes the application effect of digital management in the performance management of tobacco commercial assets.

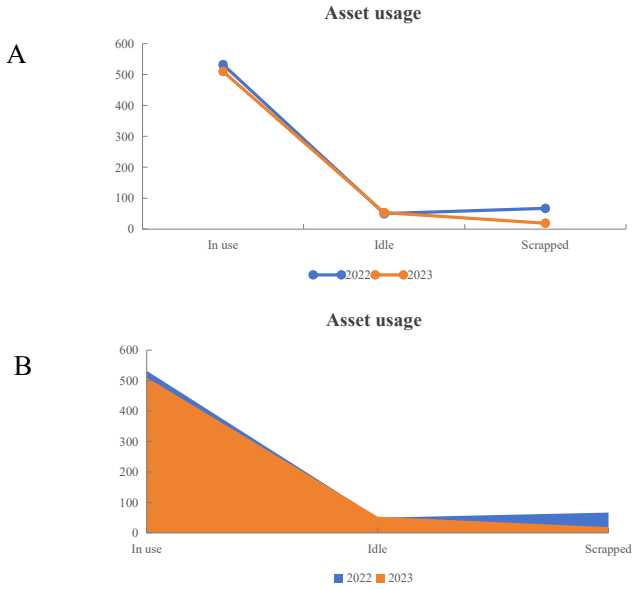

Fig. 3. The use of electronic equipment assets in the information center of the municipal bureau

It is clear from the line chart and area chart in Figure 3 (A/B) that the number of electronic equipment assets scrapped in the information center of the municipal bureau in 2023 has decreased significantly compared with 2022. After a one-year application of "Digital Tobacco Commercial Asset Performance Management" in the Information Center of the Municipal Bureau, the growth rate of the operating life of electronic equipment assets will be 68.41%, which has far extended the operating life of assets by more than 10%.

The annual scrap rate is calculated as follows (Formula 2-6):

$$ST = \frac{SN}{NU+NI+SN} \tag{2}$$

Note: *ST* represents the Scrap Rate, *SN* represents the scrapped number, *NU* represents the number in use, and *NI* represents the number in idle.

It is concluded that:

$$ST_{(2022)} = \frac{67}{532+50+67} = 10.32\% \tag{3}$$

$$ST_{(2023)} = \frac{19}{510+53+19} = 3.26\% \tag{4}$$

The asset life-of-life growth rate is calculated as follows:

$$GR_{OLA} = \frac{(i-1)ST-iST}{(i-1)ST}\, i = N \tag{5}$$

Note: GR_{OLA} represents the growth rate of the operating life of the asset.

$$GR_{OLA} = \frac{ST_{(2022)}-ST_{(2023)}}{ST_{(2022)}} = \frac{10.32\%-3.26\%}{10.32\%} = 68.41\% \tag{6}$$

6 Conclusion

This paper analyzes the theoretical impact and application strategies of digital management on the performance management of tobacco commercial assets, and argues that digital management can improve the asset performance of tobacco enterprises by improving the efficiency of asset management, promoting data-driven decision-making, and reducing risk management. This paper suggests that tobacco companies should pay more attention and resources to digital management, select appropriate technologies, train employees, and evaluate the effectiveness to optimize the level of asset performance management. This paper has made certain contributions to both theory and practice, and provides some references and enlightenment for the digital management of the tobacco industry. The main points and contributions of this paper are as follows:

This paper analyzes the theoretical impact of digital management on the performance management of tobacco commercial assets from the perspectives of efficiency improvement, data-driven decision-making and risk management, covering three important aspects of asset performance management, namely asset availability, reliability and safety.

This paper introduces the application strategy of digital management in the performance management of tobacco commercial assets from the aspects of technology implementation and organizational culture, involves two important aspects of digital management technology and humanities, and puts forward some specific suggestions and measures.

Combined with the literature on digital management, asset performance management and tobacco industry at home and abroad, this paper provides a comprehensive and in-depth review and analysis, which provides some ideas and directions for follow-up research.

In 2023, after selecting the electronic equipment asset management application "Digital Management of Tobacco Commercial Asset Performance" in the information center of X Tobacco Company, through the use of Internet technology, the real-time consistency between system information and asset change information will be realized, so that managers can understand the situation "all-weather", conveniently and quickly, realize "asset life cycle management" and "real-time automatic asset management", and realize the asset life cycle (warehousing, application, operation and maintenance, desensitization, The intelligent dynamic real-time tracking and centralized monitoring and management of the process of scrapping or recycling, prolongs the life cycle of asset use, provides accurate reference data for enterprise investment decision-making and reasonable asset allocation, effectively improves asset utilization, reduces unnecessary equipment investment, and prolongs the operation life of electronic equipment assets.

In short, this paper argues that digital management is an effective means and goal to improve the performance management level of tobacco commercial assets, and hopes that this paper can be helpful to the digital management of the tobacco industry.

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References

[1] Jiang Qiping, Wang Yu, & Li Xiao. (2019). Digital Management: Concept, Connotation and Practice. Management World, (8), 1-16.

[2] Li X, Wang Yu, & Jiang Qiping. (2020). Digital Management: Theory and Practice. Beijing: Chinese University Press.

[3] Zhang Ming, Zhang Hongwei, & Liu Xiaojuan. (2020). Construction and application of digital management system for tobacco commercial assets. Journal of Chinese Tobacco Society, 26(4), 1-10.

[4] Woodhouse, J. (2018). Asset management excellence: optimizing equipment life-cycle decisions. Boca Raton: CRC Press.

[5] ISO 55000. (2014). Asset management — Overview, principles and terminology. Geneva: International Organization for Standardization.

[6] Zhang, H., Li, X., Liu, X., & Chen, Y. (2020). Research on asset management of power grid equipment based on artificial intelligence. In Proceedings of the 5th International Conference on Electrical Engineering and Control Technologies (pp. 269-273). ACM.

[7] Li, X., Wang, S., Zhang, C., & Lin, Z. (2019). A survey on the application of artificial intelligence in transformers. IEEE Transactions on Power Delivery, 35(2), 870-882.

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[8] Khan, Z., Anjum, A., Soomro, K., & Tahir, M. A. (2020). Towards cloud based big data analytics for smart future cities. Journal of Cloud Computing, 9(1), 1-41.
[9] Zhang Guosheng. (2017). Digital Strategy and Enterprise Transformation and Upgrading. Management World, (11), 1-18.
[10] Wang Yichao. (2018). Digital Transformation: Concept, Connotation and Path Selection. Scientific and Technological Progress and Countermeasures, 35(23), 1-7.
[11] Wang Yu. (2020). Application status and prospect of digital technology in power asset management. Journal of Electric Power System and Automation, 32(2), 1-10.
[12] Russell, S. J., & Norvig, P. (2016). Artificial intelligence: a modern approach. Malaysia; Pearson Education Limited.
[13] Liu Xiaojuan, Zhang Ming, & Zhang Hongwei. (2017). Construction and application of power asset performance management system based on big data. Power System Technology, 41(12), 4033-4040.
[14] Fang Ying. (2020). Research on the Current Situation, Problems and Countermeasures of Social Responsibility in China's Tobacco Industry: An Analysis from the Perspective of the National Level. Exploration of Economic Issues, (3), 132-139.
[15] Zhao Yufang, Zhao Xiaofeng, & Ma Jianhua. (2019). Discussion and practice of the whole life cycle management model of tobacco industry based on Internet of Things. Computer and Digital Engineering, 47(9), 2017-2021.
[16] Zhang Min, Zhao X, & Ma Jianhua. (2018). Construction and practice of collaborative operation system in tobacco industry based on Internet of Things. Computer and Digital Engineering, 46(11), 2413-2417.
[17] Zhao Xiaofeng, Zhang Min, & Ma Jianhua. (2018). Construction and practice of intelligent decision support system in tobacco industry based on artificial intelligence. Computer and Digital Engineering, 46(12), 2635-2640.
[18] ISO 31000. (2018). Risk management — Guidelines. Geneva: International Organization for Standardization.
[19] Li Xuefeng. (2018). Design and implementation of power asset risk management system based on cloud platform. Computer Applications and Software, 35(9), 1-5.