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Application and Impact of Big Data Technology in the Assessment of University Management Personnel

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Abstract: **With the rapid development of information technology, big data technology has become a key driving force for social progress. The assessment of university management personnel is an important part of university management, directly affecting the development and construction of universities. With the development of big data technology, the assessment of university management personnel is gradually shifting towards digitization and intelligence. This article aims to explore the application of big data technology in the assessment of management personnel and its impact. The research reveals how big data technology optimizes the assessment process, improves assessment efficiency and fairness, and enhances the capabilities of management personnel. At the same time, this article also analyzes the potential issues that big data technology may trigger in the assessment of management personnel, such as data security, privacy protection, and technological dependence, and proposes corresponding countermeasures.**

***Keywords*: Big Data Technology; Management Personnel Assessment; Risk Challenges; Countermeasure Suggestions**

I. INTRODUCTION

The assessment of university management personnel is an important part of university human resource management, and it is a crucial basis for identifying, selecting, and appointing university management personnel. Traditional assessment of university management personnel mainly relies on subjective evaluation and qualitative analysis, which has certain limitations. With the development of big data technology, the assessment of university management personnel is gradually shifting towards digitization and intelligence, providing new ideas and methods for the assessment of university management personnel. At the same time, the application of big data technology in the assessment of university management personnel is a complex system engineering, which requires universities to take comprehensive measures in technology, management, ethics, and other aspects to address the challenges in the application of big data, leverage the advantages of big data technology, promote the scientific, refined, and intelligent development of the assessment of university management personnel, and provide strong support for the modernization of university governance.

II. CURRENT APPLICATION OF BIG DATA TECHNOLOGY IN THE ASSESSMENT OF UNIVERSITY MANAGEMENT PERSONNEL

The application of big data technology in the assessment of university management personnel is becoming increasingly widespread, covering aspects such as data collection and integration, analysis and mining, assessment applications, and intelligent decision-making, providing strong support for the scientific and precise level of the assessment of university management personnel. In the future, universities should further strengthen the research and application of big data technology in the assessment of management personnel.

(1) Data Collection and Integration

The assessment of university management personnel involves teaching, research, management, and other aspects, generating a large amount of structured and unstructured data. Through big data technology, data collection, cleaning, integration, and storage can be achieved, laying the foundation for subsequent analysis. For example, by developing the “Teacher Development Big Data Platform”, integrating teachers’ teaching, research, service, and other data to support teacher development and assessment. Similarly, by developing the “Smart Party Building Platform”, integrating basic information of party member management personnel, teaching and research data, ideological status, etc., achieving data interoperability and sharing[1]. Additionally, by building the “Management

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Personnel Comprehensive Evaluation System", connecting with various school business systems through data interfaces, automatically collecting work data of management personnel, and forming a comprehensive and multi-level data set.

(2) Data Analysis and Mining

Big data technology can conduct in-depth analysis and mining of massive data, discovering hidden patterns and rules, and providing the objective basis for the assessment of university management personnel. For example, by using big data technology to analyze teachers' teaching quality, research achievements, social services, etc., to form a "profile" of teachers, providing references for teacher assessment and title evaluation. Similarly, by applying big data technology to analyze the teaching quality, research achievements, and management efficiency of management personnel from multiple dimensions, forming a "profile" of management personnel, and providing data support for the assessment and development of management personnel. Furthermore, by establishing the "University Leadership Management Personnel Big Data Decision Support System", using machine learning, natural language processing, and other technologies to intelligently analyze the work performance of management personnel, providing references for leadership decision-making[2].

(3) Intelligent Decision-making and Prediction

Based on the results of big data analysis, an intelligent decision-making model for the assessment of university management personnel can be established, achieving automation and intelligence in the assessment of management personnel. For example, by developing the "Teacher Intelligent Evaluation System", using machine learning algorithms to comprehensively evaluate teachers' teaching, research, and service performance, and provide personalized development suggestions[3]. Again such as, by developing the "Management Personnel Assessment Big Data Platform, constructing a multidimensional and dynamic assessment index system for management personnel, achieving precise and personalized assessment. Also such as, by exploring the "6+1" management personnel assessment model, including dimensions such as morality, ability, diligence, performance, integrity, and public satisfaction, combined with comprehensive big data analysis to form a comprehensive and objective assessment result.

III. THE ADVANTAGES OF BIG DATA TECHNOLOGY IN THE ASSESSMENT OF UNIVERSITY MANAGEMENT PERSONNEL

Big data technology has significant advantages in the assessment of university management personnel, which can improve the objectivity, accuracy, efficiency, dynamism, and scientific nature of the assessment, providing new ideas and methods for the management of university management personnel. Universities should actively explore the application of big data technology in the assessment of management personnel, establish a scientific and perfect assessment system and management mechanism, give full play to the advantages of big data technology, and promote the modernization and intelligence development of the team of university management personnel.

(1) Enhancing the objectivity and fairness of the assessment

Traditional assessment of university management personnel is easily influenced by subjective factors, while big data technology can provide objective and comprehensive data support, reduce human interference, and enhance the objectivity and fairness of the assessment. For example, establishing a quantitative index system for the assessment of management personnel through big data technology, including teaching quality, research results, and management performance, reduces subjective evaluation during the assessment process and enhances the objectivity of the assessment results. Similarly, uses big data technology to statistically analyze the work data of management personnel, generate objective and fair assessment reports, and provide references for the evaluation and promotion of management personnel.

(2) Achieving precision and personalization in assessment

Big data technology can analyze multidimensional data of university management personnel, accurately depict the ability characteristics, and development potential of management personnel, achieve precision and personalization in assessment, and provide references for the training and appointment of management personnel. For instance, the "Management Personnel Portrait System", utilizes big data technology to analyze the performance of management personnel in teaching, research, management, and service dimensions, forming a personalized "portrait" of management personnel, and providing targeted suggestions for the training and utilization of management personnel. Moreover, the "Management

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Personnel Capability Model", uses big data technology to assess the leadership, execution, innovation, and other dimensions of management personnel, offering personalized guidance for the enhancement of management personnel's abilities and career development.

(3) Improving the efficiency and quality of the assessment

Big data technology can automatically collect, process, and analyze massive data, greatly improving the efficiency and quality of the assessment, reducing manpower and time costs, and providing strong support for the assessment of university management personnel. For example, the "Management Personnel Assessment Big Data Platform", automatically generates assessment reports through data collection, cleaning, and analysis, shortening the assessment cycle from traditional months to days, significantly enhancing the efficiency of the assessment. Similarly, the "Management Personnel Assessment Quality Monitoring System", uses big data technology to monitor the data quality, indicator settings, and results application in the assessment process in real-time, ensuring the standardization and effectiveness of the assessment work.

(4) Promoting the dynamism and regularity of the assessment

Big data technology can achieve real-time monitoring and dynamic evaluation of university management personnel, breaking the time constraints of traditional assessment, realizing the dynamism and regularity of the assessment, and providing comprehensive and all-around data support for the management of management personnel. For example, the "Management Personnel Real-time Monitoring Platform", collects and analyzes the work status and performance of management personnel in real-time through big data technology, forming a dynamic assessment mechanism for management personnel, promptly identifying and resolving issues in the work of management personnel. Additionally, the "Management Personnel Regular Assessment Mode", uses big data technology to continuously track and evaluate the daily work of management personnel, breaking the limitations of traditional assessment, achieving the all-process management and evaluation of management personnel.

(5) Supporting the scientific and intelligent assessment

Big data technology can provide the scientific theoretical basis and method support for the assessment of university management personnel, achieving intelligence and automation in assessment through techniques such as data mining and machine learning, enhancing the scientific and accuracy of the assessment. For instance, the "Management Personnel Assessment Intelligent Decision System", optimizes the indicator system and weight setting for the assessment of management personnel using data mining, knowledge graph, and other technologies, improving the scientific nature of the assessment scheme. Similarly, the "Management Personnel Assessment Artificial Intelligence Platform", automatically analyzes and evaluates the work data of management personnel using machine learning algorithms, generating intelligent assessment reports, reducing the subjectivity and differences in manual scoring.

IV. CHALLENGES OF BIG DATA TECHNOLOGY IN THE ASSESSMENT OF UNIVERSITY MANAGERS

The application of big data technology in the assessment of university managers, although having significant advantages, also faces many challenges such as data quality and security, algorithm fairness and transparency, human-machine collaboration and ethics, data isolation and sharing, and the lack of compound management personnel. These challenges involve multiple dimensions such as technology, management, and ethics, requiring universities to adopt systematic and comprehensive response strategies.

(1) Data Quality and Security Issues

The assessment of university managers involves a large amount of sensitive data, and ensuring the authenticity, integrity, and security of the data is a major challenge. Some universities have vulnerabilities in data collection, storage, transmission, etc., leading to risks such as data leakage and tampering. At the same time, the quality of the data for manager assessment is also uneven, with issues such as data "islands" and inconsistencies, affecting the accuracy of the assessment results. For example, a university found discrepancies in manager data provided by different departments, such as inconsistencies between research data and personnel data, leading to distorted assessment results. This problem reflects the inadequate data governance of universities, requiring the strengthening of data quality management, the establishment of data standards and norms, and the improvement of data accuracy and consistency.

(2) Algorithm Fairness and Transparency Issues

Algorithm models in big data technology may have biases and discrimination, affecting the fairness of assessments. Some universities lack review and testing of algorithm fairness when designing manager assessment algorithms, leading to biased

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assessment results. Furthermore, the operation process of algorithms lacks transparency, making it difficult for managers to understand how their assessment results are calculated, preventing them from appealing and providing feedback. For example, a university introduced an intelligent evaluation system in manager assessment, but some managers found that the evaluation results did not match their actual performance, suspecting algorithm biases. This example indicates that universities need to strengthen research on algorithm fairness when applying big data technology, establish mechanisms for detecting and correcting algorithm biases, and ensure the fairness and justice of assessment results.

(3) Human-Machine Collaboration and Ethics Issues

Big data technology cannot completely replace human judgment and decision-making, posing a challenge in achieving human-machine collaboration. Some universities overly rely on big data technology, neglecting human subjectivity, resulting in assessments becoming formalities. Additionally, the application of big data technology brings about ethical issues such as privacy protection and data ownership, requiring enhanced institutional development and ethical review. For example, a university excessively relied on big data scoring in manager assessment, leading to one-sided assessment results that overlooked the actual work performance and contributions of managers. This example highlights the need for universities to establish assessment mechanisms for human-machine collaboration, leverage human experience and wisdom to review and adjust the results of big data analysis and improve the comprehensiveness and accuracy of assessments.

(4) Data Isolation and Sharing Issues

The data barriers between different departments within universities make it difficult to effectively share and utilize manager assessment data. Some universities lack top-level design and overall planning, with departments independently building data systems, resulting in data “islands” that affect the correlation analysis and comprehensive utilization of assessment data. For instance, a university found that teaching data held by the academic affairs department could not be effectively integrated with title data held by the personnel department, affecting the setting and quantification of assessment indicators. This problem indicates the need for universities to break down data barriers, establish data-sharing mechanisms, achieve interoperability between different departmental data, and enhance the efficiency of data utilization.

(5) Shortage of Compound Management Personnel

The application of big data technology in the assessment of university managers poses new requirements for the knowledge structure and competency of relevant personnel. The lack of compound management personnel who understand both management and technology in universities hinders the implementation and promotion of big data assessments. Some universities still have traditional personnel management personnel leading manager assessment work, lacking professional capabilities in data analysis and application, thus being unable to leverage the advantages of big data technology. For example, a university organized data analysis training for manager assessment, but most participants had backgrounds in personnel management and lacked foundations in data analysis, resulting in poor training effectiveness. This problem reflects the shortcomings in universities’ cultivation of management personnel and necessitates the design of differentiated training programs for managers with different backgrounds to enhance their data analysis and application capabilities, promoting the widespread application of big data assessments.

V. SUGGESTIONS AND STRATEGIES FOR THE APPLICATION OF BIG DATA TECHNOLOGY IN THE ASSESSMENT OF HIGHER EDUCATION MANAGERS

The application of big data technology in the assessment of higher education managers faces many challenges. Universities need to adopt systematic and comprehensive strategies to address these challenges. They should start from multiple dimensions such as top-level design, data governance, algorithm research, personnel training, and ethical regulation, and improve institutional construction, enhance data quality, ensure fair assessment, improve the quality of the team, guard against moral risks, comprehensively promote the innovative application of big data assessment, and enhance the scientific, refined, and intelligent level of the assessment of higher education managers, providing strong support for accelerating the modernization of higher education and building a high-quality professional management team.

(1) Strengthen top-level design and improve institutional construction

Facing the complexity and systematic nature of the application of big data technology in the assessment of higher education managers, universities need to strengthen top-level design and

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improve relevant institutional construction to provide institutional guarantees and normative guidelines for big data assessment. Firstly, it is necessary to formulate the overall planning and implementation plan for big data assessment. Universities should base themselves on the school's development strategy and the needs of personnel team construction, systematically plan the goals, content, and process of big data assessment, clarify task division and schedule arrangement, and ensure the orderly progress of big data assessment. Secondly, it is necessary to establish sound and relevant systems and standards for big data assessment. Universities should formulate regulations and standards for various aspects of data collection, management, analysis, and application, clarify standards and norms for data quality, security, sharing, and privacy protection, and provide institutional compliance for big data assessment[4].

(2) Strengthen data governance and improve data quality

Big data assessment puts high demands on data quality. Universities need to strengthen data governance, improve the accuracy, completeness, consistency, and timeliness of data, and lay a solid foundation for data analysis. Firstly, it is necessary to establish a responsibility system and accountability system for data management. Universities should clarify the responsibilities and powers of various departments in data management, establish a mechanism for assessing and holding accountable for data quality, supervise departments to strengthen data management, and improve data quality. Secondly, it is necessary to strengthen data standardization and normalization management. Universities should formulate unified data standards and coding specifications, regulate data collection, entry, storage, and other processes, strengthen data cleaning and auditing, and improve the standardization and normalization of data[5]. Thirdly, it is necessary to promote data-sharing and exchange. Universities should break down data barriers, establish internal data sharing platforms, promote data exchange and sharing between different departments and systems, and improve the level of data correlation analysis and comprehensive utilization.

(3) Strengthen algorithm research and ensure fair assessment

The algorithm models used in big data assessment may have biases and discrimination. Universities need to strengthen algorithm research, optimize algorithm design, and ensure the fairness and accuracy of assessment. Firstly, it is necessary to enhance research on algorithm fairness and transparency. Universities should conduct research on identifying and correcting algorithm biases, establish mechanisms for the interpretability of algorithm models, and improve the fairness and transparency of algorithms. Secondly, it is necessary to establish a monitoring and evaluation mechanism for algorithm models. Universities should regularly test and evaluate algorithm models, monitor the operation status and output results of algorithms, promptly discover and correct algorithm biases, and improve the credibility of assessment results[6].

(4) Strengthen personnel training and improve the quality of the team

Big data assessment poses new requirements for the knowledge structure and professional abilities of higher education managers. Universities should increase the training of management personnel, and improve the data literacy and professional level of the management team. Firstly, it is necessary to strengthen the introduction and training of composite management personnel. Universities should introduce composite management personnel who are proficient in both management and technology from within and outside the school, strengthen professional training and capacity building, and create a high-level big data assessment team. Secondly, it is necessary to promote human-machine collaboration and cross-learning. Universities should explore assessment models that combine humans and machines, leverage the experience and wisdom of human beings and the computational advantages of machines, and improve the comprehensiveness and accuracy of assessment. At the same time, it is necessary to strengthen cross-learning among personnel with different professional backgrounds and promote knowledge integration and capacity building.

(5) Pay attention to ethical regulation and prevent moral risks

Big data assessment involves the personal privacy and sensitive information of managers, which can easily lead to ethical and moral issues. Universities should attach great importance to big data ethics, strengthen institutional regulation, and prevent moral risks. Firstly, it is necessary to formulate ethical norms and codes of conduct for big data. Universities should refer to relevant legislation and ethical guidelines at home and abroad, combine the school's actual situation, formulate ethical norms and codes of conduct for the application of big data, clarify the moral bottom line and responsibility boundaries for data collection, use, and sharing. Secondly, it is necessary to establish a mechanism for ethical review and supervision of big

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data. Universities should establish a big data ethics committee to conduct comprehensive ethical review and supervision of big data assessment projects, prevent illegal and irregular behavior and improper use, and protect the privacy and informed consent of managers. Thirdly, it is necessary to strengthen the protection of managers' privacy and provide data security education. Universities should strengthen the protection of managers' privacy and provide data security education, improve managers' ethical awareness and standardized operations, prevent data leaks, abuses, and other issues, and safeguard the legitimate rights and interests of managers[7].

VI. CONCLUSION

The application of big data technology in the assessment of higher education managers provides new possibilities for improving the objectivity, accuracy, and efficiency of assessment, but also faces challenges such as data quality, algorithm fairness, and ethical norms. Universities should strengthen theoretical research and practical exploration of big data assessment, deeply analyze the inherent laws and development trends of big data applications, summarize excellent experiences and typical cases, and form replicable and scalable application models. Universities should strengthen inter-school communication and cooperation, share big data resources and technological achievements, and promote collaborative innovation and integrated development of big data assessment. Universities should strengthen policy guidance and resource input, create a good institutional environment and development atmosphere, and continuously deepen the reform of human resources management, providing solid guarantees for building world-class universities and disciplines and injecting inexhaustible power into the high-quality development of higher education.

REFERENCES

[1] How does digitalization empower teachers' professional development? [EB/OL]. https://www.163.com/dy/article/I7706K3H05532PZ8.html.2023-06-14.

[2] How does artificial intelligence promote the digital transformation of university governance? [EB/OL]. https://baijiahao.baidu.com/s?id=1771024344601291996&wfr=spider&for=pc.2023-07-10.

[3] A model based on big data machine learning to improve teachers' teaching effectiveness [EB/OL]. https://max.book118.com/html/2020/1214/7023015061003031.shtm.2020-12-15.

[4] Zhang Hui, Li Jianming, Yang Qiang. Building a university data governance system to support the digital transformation of higher education [EB/OL]. http://www.jyb.cn/rmtzcg/xwy/wzxw/202209/t20220928_2110952372.html.2022-09-28.

[5] Handbook for the construction of smart campus in universities: Ideation on school data standards [EB/OL]. https://www.sohu.com/a/431666360_278960.2020-11-13.

[6] Su Yu. Technical due process in the digital era: Theoretical examination and institutional construction [EB/OL]. http://news.sohu.com/a/636761703_121123752.2023-02-03.

[7] Public opinion: Planning and strategies for data security protection in universities [EB/OL]. https://xxzx.tsnu.edu.cn/info/1067/1353.htm.2021-04-07.