THE INFLUENCING FACTORS OF UNIVERSITY MANAGEMENT'S BIG DATA TECHNOLOGY ADOPTION

CHUNMEI SHAO

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF MANAGEMENT IN MANAGEMENT SCIENCE INSTITUTE OF SCIENCE INNOVATION AND CULTURE RAJAMANGALA UNIVERSITY OF TECHNOLOGY KRUNGTHEP ACADEMIC YEAR 2024

THE INFLUENCING FACTORS OF UNIVERSITY MANAGEMENT'S BIG DATA TECHNOLOGY ADOPTION

CHUNMEI SHAO

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF MANAGEMENT IN MANAGEMENT SCIENCE INSTITUTE OF SCIENCE INNOVATION AND CULTURE RAJAMANGALA UNIVERSITY OF TECHNOLOGY KRUNGTHEP ACADEMIC YEAR 2024

Thesis THE INFLUENCING FACTORS OF UNIVERSITY MANAGEMENT'S BIG DATA TECHNOLOGY ADOPTION
Author ChunMei SHAO
Major Master of Management (Management Science)
Advisor Dr.Surachai Traiwannakij

THESIS COMMITTEE

…… Chairperson
(Associate Professor Dr. Sureerut Inmor)

..…….. Advisor
(Dr. Surachai Traiwannakij)

……Committee
(Dr. Pharatt Run)

Approved by the Institute of Science Innovation and Culture
Rajamangala University of Technology Krungthep in Partial Fulfillment
of the Requirements for the Master's degree

……
(Assistant Professor Dr. Yaoping LIU)
Director of the Institute of Science Innovation and Culture
Date……Month……..Year…..…

Thesis THE INFLUENCING FACTORS OF UNIVERSITY MANAGEMENT'S BIG DATA TECHNOLOGY ADOPTION
Author ChunMei SHAO
Major Master of Management (Management Science)
Advisor Dr.Surachai Traiwannakij
Academic Year 2004

ABSTRACT

Big data is a widely used technology that can achieve apparent results in the digital era. In recent years, the scale of Chinese colleges and universities has gradually expanded, and the management difficulty has further increased. In the context of increasingly complex scenarios and rising business needs, it is imperative for university management to make reasonable use of big data technology. There are many factors affecting the use of big data technology in university management, which is the primary purpose of this paper. The quantitative method is applied in this study. Descriptive statistics such as frequency, percent frequency, mean, and standard deviation are introduced. Various inferential statistical methods are used to test the hypothesis, particularly the Independent Samples t-test, the One-way ANOVA, and the Multiple Linear Regression analysis. The results obtained from the study indicate that differences in Monthly Income, Working Position, and Working Experiences generate differences in Big Data Technology Adoption. The Multiple Linear Regression analysis found that the University Technical Level, University Organizational Level, and University Environmental Level positively impact Big Data Technology Adoption.

Keywords: Big Data Technology Adoption, University Technical Context, University Organizational Context, University Environmental Context

ACKNOWLEDGEMENTS

This dissertation was completed with the invaluable support and guidance of my advisor, Dr. Surachai Traiwannakij. His dedication to scientific rigor, academic excellence, and exemplary professional conduct have influenced and inspired me throughout this journey. From the initial stages of topic selection to the final steps of completion, he has provided insightful guidance and unwavering support. I express my deepest gratitude and highest respect to him.

I would also like to extend my heartfelt thanks to my fellow students and esteemed professors who have shared this journey with me, enriching my university experience. Their encouragement, collaboration, and camaraderie have been instrumental in helping me overcome various challenges throughout this research endeavor.

As this thesis writing ends, I am grateful for the many teachers, classmates, and friends who have provided invaluable support. To each of you, please accept my sincere appreciation for your contributions, encouragement, and understanding. Thank you all immensely.

ChunMei SHAO

CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I
INTRODUCTION

1.1 Background and Statement of the Problem

In the context of the rapid development of the Internet and information technology, big data plays an increasingly important role as a typical technology in people's daily lives. In the age of mass information, big data technology's emergence has profoundly changed how information is collected and processed. With the continuous maturity of its technology, it has been widely used in various fields, especially in education. Compared with other research on the application of big data, there is little research on the application of big data in education, especially in university management. The amount of data in the field of university management is relatively small, and the data noise is large. Because of its public welfare and non-profit characteristics, few people use information technology and big data to improve the efficiency of university management.

In the information age, the information technology represented by big data has a very significant impact on the management of colleges and universities, and the management of colleges and universities is facing unprecedented opportunities and challenges. If colleges and universities still adopt the traditional management mode, it will be challenging to meet the teaching requirements. Only scientific and efficient use of information technology can improve management efficiency. Therefore, it is necessary to analyze the application of information technology in university management in the era of big data in detail.

The application of big data technology in university management has become an inevitable choice, but the application of big data technology in university management will be affected by many factors. Clarifying these influencing factors is

significant for the rational application of big data and improving university management efficiency. Guided by the TAM model, this paper summarizes the key factors affecting the application of big data technology in universities from the three dimensions of technology, organization, and environment. Then, effective measures are taken to improve the application level of big data based on these key factors. In the specific study, this paper collected samples by sending questionnaires. The subjects of this study are university administrators. Demographic characteristics and demographic factors will have a very important impact on the willingness of managers to adopt big data technology. This paper also uses empirical analysis to explore further the impact of demographic characteristics and demographic factors on universities' adoption of big data technology.

1.2 Research Questions

This paper mainly studies the following issues:

(1). How do demographic characteristics influence managers' willingness to adopt big data technologies

(2). How do demographic factors influence managers' willingness to adopt big data technologies

(3). How do the characteristics, organizational level, and environment of university big data technology affect the willingness of university administrators to adopt big data technology?

1.3 Research Objectives

(1). Based on the demographic characteristics of managers, an in-depth analysis is made of the influence of factors such as gender and age of managers on their willingness to adopt big data technology.

(2). Based on managers' demographic factors such as professional experience, management skills, and knowledge reserve, analyze the impact of managers' demographic factors on their willingness to adopt big data technology.

(3). Based on the characteristics of big data technology, the organizational level of colleges and universities, and the environment of colleges and universities, this paper studies the willingness of university administrators to adopt big data technology.

1.4 Research Framework

The independent variables applied in this paper are Demographic Factors, University Technical Level, University Organizational Level, and University Environmental Level, while the dependent variable is the Willingness to Adopt Big Data Technology. The conceptual model is shown in Figure 1.1:

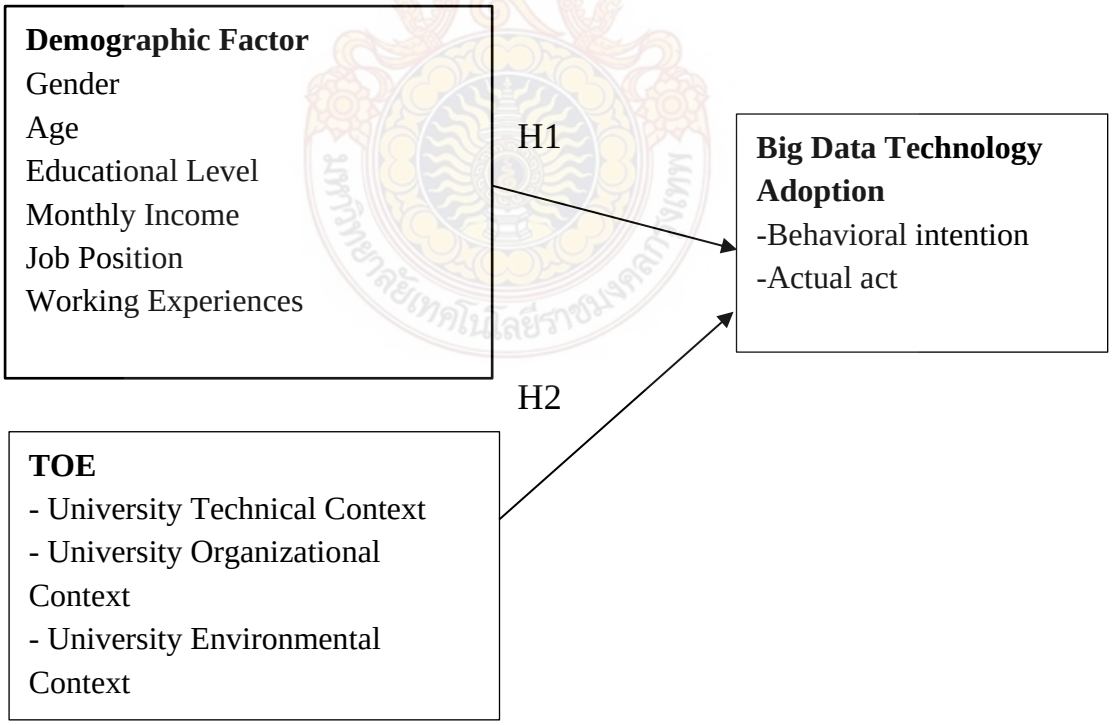

Figure 1.1 Conceptual Model 4.4

1.5 Research Hypotheses

This paper proposes the following hypotheses:

H_1: Differences in Demographic Factors Generate Differences in Big Data Technology Adoption

H_2: TOE (Technology-Organization-Environment Contexts) influence Big Data Technology Adoption

1.6 Scope of the Research Study

This study examines the challenges and opportunities in implementing information technology, particularly big data, within university management. Despite the progress made, several obstacles hinder the effective use of these technologies in higher education. Using the Technology-Organization-Environment (TOE) framework, this research analyzes the factors influencing university administrators' intentions to adopt and effectively utilize big data technology. By identifying these factors, the study aims to provide critical insights and recommendations to enhance the application and integration of big data technology in university management, ultimately supporting more informed decision-making, operational efficiency, and strategic planning.

1.7 Definition of Key Terms

Big Data： Big data contains at least two meanings: on the one hand, the amount of data is enormous, and the scale of the data is far more extensive than the previous data collection. On the other hand, using traditional tools for processing is impossible. Big data emphasizes the scale of data and pays more attention to the ability to obtain oil value information and knowledge from massive data quickly.

University Administrators: University administrators refer to a group of professional administrators responsible for university administration, management

education, teaching and research, class management, logistics management, financial management, campus security management, and other aspects of work. They have considerable experience and knowledge in organizing, coordinating, and guiding university affairs. University administrators' responsibilities involve managing all aspects of the school, including leadership decision-making, financial management, office administration, enrollment, student management, and teaching management. University management personnel include the president, vice president, department head, middle cadres, and other personnel at different levels. Their work must follow the University's goals and vision and promote its overall development while providing an excellent campus culture and living environment for faculty and students.

Technical Context: The factors that influence big data technology adoption are the relative advantages, compatibility, complexity, and perceived cost of big data technology.

Organizational Context: From the organizational level, the support of college administrators, the financial ability of colleges and universities, the management level of colleges and universities, and the teaching ability of colleges and universities will have a significant impact on the adoption of big data technology.

Environmental Context: Environmental factors mainly refer to government support and competitive pressure. Whether the government supports universities in adopting big data will have a pronounced impact on adopting big data technology, especially for public universities. The attitude of the government is very crucial.

1.8 Benefits of the Research

First, improving colleges' and universities' management efficiency and decision-making level is helpful. The rational application of information technology

represented by big data will enable the education management of colleges and universities to allocate resources better, thus improving the utilization efficiency of resources and achieving the goal of saving, efficient, and scientific management. In addition, applying big data technology can also help improve the management and decision-making levels of colleges and universities. In the past, the decision-making level of college and university management mostly relied on experience, which resulted in the lack of democracy due to incomplete information, and it was easy to produce the problem of overgeneralization. This will help to realize the scientific decision-making of university management.

Second, it is helpful to the scientific and modernization of university management. From the perspective of data use, university management has experienced three eras: the era of no data, the era of sample data, and the era of big data. In the era of no data, efficient management can only discover the rules of unknown fields by relying solely on experience. In the era of sample data, people consciously collect data to support the performance of relevant management functions. After entering the era of big data, university management begins to use massive information evidence to support the exploration of the rules of the real world. At this time, the efficient decision-making level will have advantages and opportunities that people did not have in the past. Scientific collection and use of various data will further realize the scientific management of colleges and universities.

Third, it can promote the transformation of colleges and universities from the previous incremental development to quality development. In the past, colleges and universities met people's requirements for the quality of higher education by expanding the scale of high-quality education resources. This incremental development idea has been developed to its limit due to the limitation of educational resources, and the application of information technology represented by big data in university management will further accelerate the informatization of higher education, promote

the modernization of higher education, and thus promote the high-quality development of higher education.

CHAPTER II
LITERATURE REVIEW

2.1 Related Theories

2.1.1 Demographic Characteristics

According to a new analysis of survey data collected by the Pew Research Center in November 2021, American women are more skeptical than men about some uses of big data. The analysis also found gender differences in the overall impact of technology on society, some of the security issues associated with big data applications, and the importance of including diverse group opinions in the big data design process. American women are less likely to view technology's impact on society as mostly positive (42%vs. 54%) and more likely to view technology as having a mixed positive and negative impact (45%vs.37%). In addition, women are less likely to say they are excited than concerned about the increased use of big data computer programs in their daily lives (13%vs.22%).

2.1.2 Technical Context

The technological context includes all of the technologies relevant to the firm, that is, technologies already in use and those available in the marketplace but not currently in use. A firm's existing technologies are essential in the adoption process because they limit the scope and pace of technological change a firm can undertake (Collins et al., 1988). Innovations that exist but are not yet in use at the firm also influence innovation by demarcating the limits of what is possible and showing firms ways technology can enable them to evolve and adapt. Within the group of innovations outside the firm are innovations of three types: those that create incremental, synthetic, or discontinuous changes (Tushman & Nadler, 1986). Innovations that produce incremental change introduce new features or versions of existing technologies. These

incremental innovations represent the least risk and change for the adopting organization.

According to the TAM model， from a technical point of view, the factors influencing big data technology adoption are the relative advantages, compatibility, complexity, and perceived cost of big data technology. The so-called comparative advantage refers to the advantages of big data in university management compared with the information technology adopted by the original university. After the use of big data technology in university management, the specific advantages are the improvement of work efficiency and the improvement of teaching management efficiency. At present, big data technology is an emerging representative of the technical level in the digital economy, which can provide users with a series of functions and services, from basic data resource acquisition to data analysis and decision-making.

From the perspective of compatibility, the compatibility of big data is mainly reflected in two aspects: on the one hand, it refers to whether big data technology is compatible with the culture and strategic positioning of colleges and universities; on the other hand, it is reflected in whether big data technology is compatible with the hardware and software facilities of colleges and universities and the strategic positioning of colleges and universities. This means that universities will likely adopt big data technology in their management.

Complexity refers to the perceived difficulty of big data technology when it is used. When big data technology is very complex, university administrators find it difficult to understand and use it in practical applications. They should make more efforts to learn and use. Generally, the more complex the new technology, the less willing universities are to adopt it.

The perceived cost refers to the human, material, and financial costs that must be paid to adopt new technologies. The greater the cost of adopting big data technology in university management, the willingness to adopt big data will be

significantly reduced.

2.1.3 Organizational Context

The organizational context refers to the characteristics and resources of the firm, including linking structures between employees, intra-firm communication processes, firm size, and the amount of slack resources. There are several ways in which this context affects adoption and implementation decisions. First, mechanisms that link internal subunits of the organization or span internal boundaries promote innovation (Galbraith, 1973). The presence of informal linking agents – such as product champions, boundary spanners, and gatekeepers – is associated with adoption. Cross-functional teams and employees with formal or informal links to other departments or value chain partners are additional examples of such mechanisms. More broadly, organizational structure has been studied to identify its relationship to the innovation adoption process. Communication processes within the organizational context can also promote or inhibit innovation. Top management can foster innovation by creating an organizational context that welcomes change and supports innovations that further the firm's core mission and vision (Tushman and Nadler, 1986).

TOE framework indicates three factors affecting big data technology adoption: technology, organization, and environment. University organization and management are essential factors affecting big data technology adoption. From the organizational level, the support of university administrators, the financial ability of universities, the management level of universities, and the teaching ability will significantly impact big data technology adoption. If college administrators can strongly support the application of big data technology, the willingness to adopt big data technology in school management will be significantly improved. Party secretaries and presidents have a greater say in college management for Chinese colleges and universities. If they can support the application of big data technology, the willingness to adopt it will be more vital. The financial ability of colleges and universities

determines the application intention and degree of application for big data technology. The application of big data technology usually requires financial cost. The willingness to adopt big data technology is stronger for those colleges and universities with solid financial ability. In contrast, colleges and universities with limited financial ability cannot adopt big data technology.

From the perspective of the management level of colleges and universities, if the management level of colleges and universities is high, the willingness of school administrators to use big data technology will be relatively low; on the contrary, when the management level of colleges and universities is poor, the willingness to adopt big data technology will become stronger, because they are eager to use new technologies to improve the management level of colleges and universities. From the perspective of the teaching ability of colleges and universities, only schools with low teaching ability will have a strong willingness to improve their teaching ability. In contrast, schools with strong teaching abilities likely think they do not need to adopt big data technology.

2.1.4 Environmental Context

The environmental context includes the industry's structure, the presence or absence of technology service providers, and the regulatory environment. Industry structure has been investigated in several ways. For instance, intense competition stimulates innovation adoption (Mansfield, 1968; Mansfield et al., 1977). Concerning the industry life cycle, it is argued that firms in rapidly growing industries tend to innovate more rapidly. In mature or declining industries, however, innovation practices are not clear-cut (Tornatzky & Fleischer, 1990). Some firms use the decline of an industry to innovate through efficiency initiatives or by expanding into new lines of business. Other firms may avoid investment in innovation to minimize costs. Empirical work validating these assertions about the relationship between the industry life cycle and innovation adoption remains to be carried out. The support infrastructure for technology also impacts innovation. Firms that must pay high wages for skilled labor are often compelled to innovate through labor-saving innovations (Levin et al., 1987). Finally, government regulation can have either a beneficial or a detrimental effect on

innovation. When governments impose new constraints on industry, such as requiring pollution-control devices for energy firms, innovation is essentially mandated for those firms. Similarly, stringent safety and testing requirements can retard innovation in numerous industries.

Decision theory is a relatively complete theoretical system of decision-making processes, criteria, types, and methods formed by integrating system theory, operations research, and computer science developed after the Second World War into management decision-making problems. The theory holds that the surrounding environment will have an important impact on individual decision-making. Environmental factors mainly refer to government support and competitive pressure. Whether the government supports universities in adopting big data will have a very obvious impact on adopting big data technology, especially for public universities, and the government's attitude is crucial. In the era of the digital economy, the government will promote the development of a certain technology through financial subsidies and other means. When the application of big data technology in colleges and universities can obtain government support, the willingness of colleges and universities to adopt big data will be significantly improved. In terms of competitive pressure, although colleges and universities differ from enterprises, with the continuous expansion of college enrollment and the emergence of new schools, colleges and universities will face intense competition. In order to obtain more high-quality students, colleges and universities must improve their management level. When colleges and universities face increasing competitive pressure, their willingness to apply big data technology will become stronger and stronger.

2.1.5 Big Data Technology Adoption

According to the theory of planned behavior, behavior intention is influenced by behavior attitude and subjective norms and is the direct factor that determines actual behavior. This paper holds that it can be measured from behavioral

intention and actual behavior. Behavioral intention represents the subjective will of university administrators, and the actual behavior can measure how much they have paid for this will.

Behavioral intention refers to the tendency of a person to subjectively judge that he may take a specific behavior in the future. Intention is an aspect of feelings, emotions, and intentions with a coordinated and consistent attitude, and it belongs to the volition-oriented process of behavior. The will orientation of behavior includes internal intention and external consciousness. The difference between internal intention and external consciousness is that intention pays attention to the goal of behavior, while consciousness pays attention to the behavior process.

Actual behavior refers to the individual's actions in a specific time and space, resulting from human interaction with the surrounding environment. Actual behavior can be either active or passive. Actual behavior has observability, objectivity, and purpose. Observability means that actual behavior can be perceived through perception or observation. In contrast, objectivity means that actual behavior exists objectively in the objective world and is not affected by individual subjective consciousness. Purposiveness means people's behavior is purposeful, which is individuals' actions to achieve a certain goal.

2.2 Related Studies

After an in-depth review of relevant literature on university information management and big data, it is found that the current research achievements of scholars mainly focus on the following three aspects:

2.2.1 Demographic

Zhao (2019) states that building high-level digital campuses is an inevitable requirement for information management, and in order to achieve this goal, information

technology should be emphasized. All university departments should participate in the construction of information technology, and managers and functional departments should scientifically and effectively utilize information technology and bring it into the construction of organizational structures. China will be able to optimize its organizational structure. Shu (2020) states that universities have accumulated rich experience and significant achievements in information construction and management. From the perspective of future development trends, it is necessary to integrate existing resources further, achieve resource sharing, and gradually improve management services to meet the teaching needs of universities. Cai (2020) thinks university information management should focus on applying information technology and paying attention to management. Information technology is only a technical method, and a matching management mechanism should be established to achieve high-level management.

In the analysis of information management issues in universities, Wang & Xu (2020) indicate that the current efficient information management still lacks explicit mechanism guarantees, and the motivation for information work is insufficient. The management effect is not as expected due to the influence of different management cultures and concepts. To address these issues, scholars believe that a unified information management plan should be established, and talent team construction should be strengthened while gradually improving the quality of employees. Liu (2020) states that in the process of information management in universities, the long-standing problem of information silos in university management departments has seriously constrained information management. In order to achieve efficient education modernization, it is necessary to enhance information leadership capabilities and, at the same time, be guided by the needs of the school, continuously improve university information leadership under multi-level governance to achieve high-level management.

2.2.2 TOE (Technology-Organization-Environment)

TOE framework (Technology-Organization-Environment) was first proposed by Tornatzky and Fleisher (1990) when the theory developed rapidly. In the beginning, it mainly emphasized the influence of information technology on technology adoption, and later, it began to consider the influence brought by organizational factors and external environmental factors. Therefore, scholars are willing to apply this theory to explain organizations' technology integration and adoption behavior.

Baker (2011) believes the model's T, O, and E represent technical, organizational, and environmental factors. Technical factors refer to the existing technology of the organization and the technology that has not been introduced into the market by the enterprise. Organizational factors usually refer to the characteristics of an organization traditionally associated with resource utilization and adoption, such as organizational size and scope, characteristics of the management structure, and other relevant resources available within the organization. Gangwar (2018) believes environmental factors are the macro environment in which the organization conducts its business or activities, such as the macro industry in which it operates, competitive intensity and analysis, and the government environment.

2.2.2.1 Technical Context

In the context of the gradual popularity of big data technology, many scholars have conducted in-depth research on applying big data in university management. Picciano (2018) Thinks that applying big data technology in university education management is imperative. However, judging from the current situation, the application of big data technology is still in its initial stage and can only mature after a long period of accumulation and development. Although the application of big data technology in teaching management cannot solve all problems, the application of big data technology in teaching management cannot solve all problems. However, he can play an essential role in solving educational problems. Kim et al. (2018) analyzed in

detail the application of big data technology in the curriculum management of Korean universities. He believed that applying big data technology in curriculum management could play an important role and help improve the efficiency of curriculum teaching. However, he should also see that teachers' ability to apply big data is insufficient and cannot meet the practical needs. After structured interviews with experts in Indian universities, Chaurasia (2019) found that the application of big data in university management can improve management efficiency and the academic level, and the application of big data in university management has become an inevitable choice for future development. Alshqirate et al. (2020) state that the higher education sector's current environment is becoming increasingly complex, and the traditional management means can no longer adapt to the teaching situation. Applying new technologies represented by big data in higher education will play a key role, and establishing integrated learning analysis solutions can improve teaching management.

Ping (2020) thinks that the emergence and application of big data technology will help promote the development of intelligent teaching, and the complete reference and play to the advantages of big data will improve the education quality monitoring system, thus providing a more accurate and scientific basis for educational decision-making, which is of great significance for promoting the development of educational evaluation in a more objective and comprehensive direction. Sun and Zheng (2019) state that the application of big data in university teaching management is still in its infancy. In order to flexibly apply big data technology, it is necessary to strengthen further the research and application of big data in education and flexibly apply big data based on fully grasping the characteristics of the education field to improve. Ma (2020) states that big data brings opportunities and challenges to the development of higher education. In order to achieve high-level teaching management under the background of big data, student-centered teaching management should be taken as the value guidance, and data positioning should be taken as the technical

support. A multi-level and whole-process rating system should be built, significantly changing the application of big data in education. Zhao (2018) thinks that big data can play an essential role in data processing in colleges and universities, and its application in college teaching will promote rationalization and scientific decision-making in education.

2.2.2.2 Organizational Context

In big data teaching management, data governance is a top priority for colleges and universities. We can only meet the data governance requirements in colleges and universities by establishing a perfect mechanism and improving data governance ability. In the research on the concept and connotation of data governance, Prado et al. (2021) state that data governance has become essential for enterprise management to maintain stable operations. Data governance should ensure data integrity, improve data quality, and ensure easy-to-understand data operation while publicly collecting data. The ultimate goal of data governance is to improve the efficiency of operation management And ensure the security of data storage and that the data can be accessed and utilized by many people. Thabit et al. (2020) think that data governance focuses on content. In content governance, decision-making, responsibility allocation of governance subjects, and monitoring of governance processes should be further optimized, a sound management mechanism should be formed, and unified and efficient management of data assets and information should be realized through data governance. Marinos (2021) states that in the study of data governance elements, data governance includes data standard maker, data governance subject power and responsibility confirmation, data standard formulation basis, data governance effect measurement, data consciousness construction, and data operation training. Stockdale et al. (2021) state that data governance structure, roles and responsibilities of various entities in data governance, evaluation of data governance actions, and policies will directly impact the final effect of data governance. These

elements should be refined as much as possible.

In the research of university data governance, Chinese scholars have achieved a wealth of research results. Wu and Dong (2019) state that there are still many drawbacks to university data governance and many problems with university data. In order to achieve a high level of data governance, it is necessary to enrich the content of data governance, pay attention to data security data quality, improve the availability of data assets, and prevent technical and application risks while ensuring the uniformity of data standards. Yu and Li (2020) think that university data governance is a new organizational method that was formed after the full development of big data in education. The primary purpose of implementing university data governance is to integrate the scattered data of various departments to improve the whole school's work efficiency, eliminate data islands, improve data utilization rate, and deeply explore the value of data. Based on data management, data governance carries out macro-level management on many contents, such as data user behavior, data standards implemented by colleges and universities, and data security.

2.2.2.3 Environmental Context

The problem of data islanding has become the most critical problem in data governance. The high randomness of data access, weak awareness of data behavior norms, and serious privacy leakage seriously restrict the level of information management in universities. Therefore, it is necessary to improve the top-level design of university data governance and enhance the ability of data governance. Liang and Ji (2023) found that from the perspective of data governance, the data business in colleges and universities has a low degree of correlation, relatively dispersed data business, and fragmented data. Also, many colleges and universities have not realized the importance of data, and the diversity of data sources in various schools and departments makes data management challenging. In addition, data centers are not based on unified data standards when collecting data, which results in low data quality, data flow, and

complicated data volume in colleges and universities, which will inevitably increase the workload of data operation, thus bringing considerable obstacles to the construction of colleges and universities.

2.2.3 Review Conclusion

After an in-depth review of relevant literature, it can be seen that scholars' current research on university information management under the background of big data mainly focuses on three aspects: university information management, application of big data in university management, and university data governance. University information management is the focus of scholars. Under the background of rapid iteration and increasingly extensive application of information technology, scholars' research on university information management has reference significance for this paper. In the research on the application of big data in university management, it can be seen that more and more scholars have realized the necessity and value of applying big data technology in university information management. Applying big data can effectively improve management efficiency. Despite this, it is also essential to see that scholars put forward general measures and strategies from a macro perspective in studying big data application strategies, which rarely involve specific businesses, making it difficult to solve practical problems.

University data governance is the key to the application of big data. In the study of university data governance, scholars have recognized the differences between university data governance and enterprise data governance and put forward strategies to improve university data governance based on the characteristics of university data. Implementing these strategies is of great significance for improving big data management. Despite this, it is also necessary to see that scholars have analyzed the common problems in university data governance but have not put forward targeted suggestions based on actual cases. Therefore, this paper will take A university as a practical case, provide a detailed analysis of the school's information management

status, and discuss using big data technology to achieve high-level management.

CHAPTER III
RESEARCH METHODOLOGY

3.1 Research Design

The independent variables of this study are the factors at the technical level of big data, the organizational level of universities, and the environmental level of universities, and the dependent variable is the adoption of big data technology. This study adopts the questionnaire survey method in the area of Yunnan Economics Trade and Foreign Affairs College, and the survey objects are local university administrators.

3.2 Sample and Sample Size

3.2.1 Population

This study's population is the Yunnan Economics Trade and Foreign Affairs College administrators. This population includes people of different genders, ages, education levels, and monthly incomes—the willingness of managers of different grades to adopt big data technology. Yunnan economics trade and foreign affairs college administrators have accumulated rich experience in adopting and applying big data technology and have great influence in the local area. This development is of great significance.

3.2.2 Samples

The Yamane Sampling Sample Size Scale is a standard statistical method used to determine the sample size required in research (Rahi, 2017). According to the Taro Yamane Sample Size Table, the population is unlimited, the probability of error is 0.05 or 5 % (at a 95% confidence level), and the sample size is at least 400 units. However, the questionnaires must be evenly distributed among the administrators of different grades, with 135 questionnaires for each grade. Therefore, in this study, the

questionnaires are equal to 405 units.

3.2.3 Sampling Methods

The Multi-stage Sampling Method is applied in this study. The quota sampling method is adopted in the first stage to select three grades from Yunnan Economics Trade and Foreign Affairs College. In the second stage, a fixed sample size of 135 managers was used in each grade, and in the third stage, a convenient sampling method was used.

First, the number of samples for each grade in the sample should be determined based on the size of the grade and the number of administrators. Since the number of administrators in each grade is relatively close, three grades are selected through quota sampling. Secondly, the appropriate sample size for each grade is determined by a fixed sample size, i.e., 135 administrators per grade. Finally, the data acquisition method for convenient sampling is introduced.

3.3 Data Collection

The QR code and questionnaire link were placed at the teaching office's front desk, and most faculty and staff can scan the QR code to complete the questionnaire online.

Data for this study were collected through an online survey. The questionnaire aims to collect information on the characteristics of big data technology, the organizational level of colleges and universities, the school environment, and the willingness to adopt big data technology. The questionnaire was distributed using the "Questionnaire Star" online survey platform. The survey was made available to potential participants via a web link or other convenient online means, allowing respondents to complete the questionnaire electronically.

3.4 Research Instrument

This paper used the Literature Research Method, Case Study Analysis, Questionnaire Survey Method, Interview Method, and Quantitative Analysis Method to conduct detailed research.

In analyzing the current situation of relevant literature research in recent years, this paper used the literature research method to conduct an in-depth analysis. After reviewing relevant literature in the past three years, this paper found that scholars' research focuses on three aspects: university information management, the application of big data in university management, and university data governance. The analysis of these three aspects of literature provided references for the writing of this paper. In addition, when introducing the concepts related to big data, this paper also used this method to understand the viewpoints and attitudes of various scholars, which is of great significance for scientifically defining and analyzing the concepts and advantages of big data.

Case Study Analysis: this paper took Yunnan Economics Trade and Foreign Affairs College in China as a practical case for in-depth analysis. This university is used as an example to carry out a detailed discussion because it is a relatively well-known and influential institution of higher learning in China, and its analysis in this paper is exemplary. In recent years, A university has attached great importance to the application of information technology in daily management and actively responds to the call of the Party and the government, vigorously applying big data to achieve management. Although it has made some achievements, it also faces many universal problems. In order to help more universities solve these problems, this paper will take Yunnan Economics Trade and Foreign Affairs College as a practical case to carry out targeted research.

In order to understand the application of information technology in the daily management of Yunnan Economics Trade and Foreign Affairs College, this paper also

conducted a questionnaire survey on the majority of teachers and students in the school.

Interview method: In order to find out the key problems restricting the application of information technology in Yunnan Economics Trade and Foreign Affairs College, this paper used the interview method to interview management cadres, grass-roots employees, and relevant teachers engaged in information construction and management in Yunnan economics trade and foreign affairs college. Through interviews, I can understand the real feelings of front-line personnel and deeply understand the existing problems. In the specific research, this paper took L, the supervisor in charge of the school information management, Z, the leader of the information department, and S, the front-line manager, as the interview objects.

Quantitative Analysis: This paper used quantitative analysis through the construction of various data charts to show the research results and gain a deep understanding of the application of information technology in university management. Professional statistical analysis tools were used to obtain accurate results and support research conclusions.

The application of information technology in university management involves many disciplines, such as big data, information technology, and management. In order to propose a scientific and reasonable application strategy, this paper used the interdisciplinary research method. It comprehensively utilized the knowledge of information technology, management, and other disciplines to carry out interdisciplinary research, which will further enhance the depth of this paper's research.

The main purpose of this questionnaire is to understand the impact of specific factors in three dimensions: Technical context, organizational context, and environmental context on the adoption of big data technology in university management. This questionnaire survey was designed to include several items according to the factors proposed in the hypothesis section. In order to measure the results of these items, the Likert scale was adopted in this paper, and the score was set

at 1-5 points, in which 1 point represented strongly disagree, 2 points represented disagree, 3 points represented uncertain, 4 points represented agree, and 5 points represented strongly agree. In order to ensure the validity and reliability of the data in the specific research, the measurement items are repeatedly considered and tested in this paper and were compiled based on referring to relevant literature and discussing with senior leaders of relevant majors and schools many times. Each item of the scale is shown in Table 3.1.

Table 3.1 TOE Measurement Scale

Dimension	**Factor**	**Item**
Technical Context	Comparative Advantage	Big data technology helps to improve the efficiency of university management.
		Big data technology contributes to scientific decision-making in universities.
	Compatibility	Big data technology is compatible with existing hardware and software equipment in universities.
		Big data technology is compatible with the existing strategic positioning of universities.
	Complexity	Big data technology is hard to understand and hard to grasp fully.
		The application of big data technology is complex, and the operation interface is not friendly.
	Perceived Cost	Big data technology is very expensive to operate and maintain
		Big data technology personnel training costs are very high.
Organizational Context	Manager Support	Managers are willing to provide material support for applying big data technology.
		Managers are more than willing to take risks with big data technology.
	Financial Ability of Colleges and Universities	Colleges and universities have strong financial capacity.
		Universities have sufficient financial capacity to guarantee the expenditure of big data technology applications.

	University Management Level	The management level of colleges and universities can meet the requirements of teachers and students.
		You are very satisfied with the university management level.
	College Teaching Ability	The teaching level of colleges and universities can meet the requirements of students.
		You think the university teaching ability is very strong.
Environmental Context	Government Support	The government has issued many policies to support the application of big data technology in universities.
		The government will provide financial support for applying big data technology in universities.
	Competitive Pressure	Universities are facing great competitive pressure.
		Pressure from other colleges is forcing schools to adopt new technology.

Chart Source: reference to relevant literature and based on expert opinion

3.5 Content Validity and Reliability

3.5.1 Content Validity

The validity of the questionnaire was tested using IOC (Item-objective Congruence), a method of quantitatively measuring the judgment of content experts on the questionnaire to evaluate the compatibility of the questionnaire with the specification table. The content validity was tested by three experts, including (1) university faculty, (2) university administrators, and (3) university vice presidents. The content and measurements of the questions were evaluated to cover and complete the research questions. The experts were asked to rate the questionnaire according to the following meanings.

+1 The question is consistent with the content of the measurement objective.

0 Not sure that the question was consistent with the content of the

measurement objective.

-1 The question is not consistent with the content of the measurement objective.

The results of all expert evaluations were used to calculate the IOC index according to the formulas of Rovinelli and Hambleton (1977) as follows:

$IOC = \Sigma R/N$

ΣR = total rating score from all experts for each question

N = number of experts

If the calculated IOC index is greater than or equal to 0.5, it is considered that the research objectives measure the questions. Therefore, the questions were chosen. If any question has a value that does not reach the 0.5 criterion and if it is necessary to use that question, then that question has to be revised again according to the advice of experts.

Table 3.2 IOC Results

Factor	**Item**	**Expert 1**	**Expert 2**	**Expert 3**	**IOC index**
Comparative Advantage	Big data technology helps to improve the efficiency of university management	+1	+1	+1	1
	Big data technology contributes to scientific decision-making in universities	+1	+1	+1	1
Compatibility	Big data technology is compatible with existing hardware and software equipment in universities	+1	+1	+1	1
	Big data technology is	+1	+1	+1	1

	compatible with the existing strategic positioning of universities				
Complexity	Big data technology is hard to understand and hard to grasp fully	+1	+1	+1	1
	The application of big data technology is complex, and the operation interface is not friendly	+1	+1	+1	1
Perceived Cost	Big data technology is very expensive to operate and maintain	+1	+1	+1	1
	Big data technology personnel training costs are very high	+1	+1	+1	1
Manager Support	Managers are willing to provide material support for the application of big data technology	+1	+1	+1	1
	Managers are more than willing to take risks with big data technology	+1	+1	+1	1
Financial Ability of Colleges and Universities	Colleges and universities have strong financial capacity	+1	+1	+1	1
	Universities have sufficient financial capacity to guarantee the expenditure of big data technology application	+1	+1	+1	1
University Management Level	The management level of colleges and universities can meet the requirements of	+1	+1	+1	1

	teachers and students				
	You are very satisfied with the management level of the university	+1	+1	+1	1
College Teaching Ability	The teaching level of colleges and universities can meet the requirements of students	+1	+1	+1	1
	You think the university teaching ability is very strong	+1	+1	+1	1
Government Support	The government has issued a large number of policies to support the application of big data technology in universities	+1	+1	+1	1
	The government will provide financial support for the application of big data technology in universities	+1	+1	+1	1
Competitive Pressure	Universities are facing great competitive pressure	+1	+1	+1	1
	Pressure from other colleges is forcing schools to adopt new technology	+1	+1	+1	1
Behavioral Intention	The application of big data in university management is very necessary	+1	+1	+1	1
	The willingness to actively learn big data is strong	+1	+1	+1	1
	I hope to apply big data to university	+1	+1	+1	1

	management				
Actual Act	I take the initiative to learn big data technology every week	+1	+1	+1	1
	Yunnan Economics Trade and Foreign Affairs College big data management platform has been established	+1	+1	+1	1
	University big data has achieved deep integration	+1	+1	+1	1

Expert 1: Yang Qing, Master tutor of Economics, Yunnan Normal University

Expert 2: Zhang Caiyun, counselor, Kunming Health Vocational College

Panelist 3: Xu Wei, Dean of the School of Architectural Engineering, Kunming University of Science and Technology

All problems were calculated to have an IOC index greater than 0.5, so the problems were measured against the study objectives.

3.5.2 Reliability

In a sample of 30 suitable volunteers, questionnaires were pre-tested to assess the effectiveness of the tools used in this study. Using Cronbach's alpha coefficient, this prediction assessed participants' understanding of the problem and internal consistency. A figure of 0.7 or above is considered consistent within the questionnaire. The results of the Reliability Test shown in Table 3.3 indicate that the Cronbach's α Coefficient of each variable is greater than 0.8, which means that each variable is very reliable and can be used for measurement in this paper.

Table 3.3 Reliability Results

Factors	Variables	Cronbach's α Coefficient
University Technical Context	Comparative Advantage	0.868
	Compatibility	0.883
	Complexity	0.894
	Perceived Cost	0.843
University Organizational Context	Manager Support	0.872
	Financial Ability	0.862
	University Management Level	0.863
	University Teaching Level	0.843
University Environmental Context	Government Support	0.848
	Competitive Pressure	0.897
Willingness to Adopt Big Data Technology	Behavioral intention	0.867
	Actual act	0.896

3.6 Data Analysis

3.6.1 Descriptive Statistics

This study used the absolute and the percent frequency to present the demographic factor. Moreover, to analyze the data for the University Technical Context, University Organizational Context, University Environmental Context, and Adoption of Big Data Technology, the absolute frequency, the percent frequency, the arithmetic mean, and the standard deviation are introduced in this study.

For the arithmetic mean, the results obtained from the University Technical Level, University Organizational Level, University Environmental Level, and Adoption Big Data Technology are not precisely equal to the discrete number (1, 2, 3, 4, and 5) as classified in the questionnaires. It is calculated in terms of a continuous number with a decimal that has to be interpreted as related to the objective of the

questionnaires. In this study, the criteria for interpreting these means are as follows.

The arithmetic mean is 1 but less than 1.5, which is at the strongly disagree level.

The arithmetic mean is 1.5, but less than 2.5 is at the disagree level.

The arithmetic mean is 2.5, but less than 3.5 is at the neutral level.

The arithmetic mean is 3.5 but less than 4.5, which is at the agreed level.

The arithmetic mean of 4.5 but less than or equal to 5 is strongly agree.

3.6.2 Inferential Statistics

In inferential statistics, numerous statistics are applied according to the hypothesis.

H_1: Differences in Demographic Factors generate differences in Big Data Technology Adoption.

Independent Samples t-test is used for Gender.

One way ANOVA is used is for other demographic factors.

H_2: TOE (University Technical Context, University Organizational Context, University Environmental Context) Influence on Big Data Adoption.

Multiple Regression Analysis is applied.

CHAPTER IV
ANALYSIS RESULT

The sample in this paper comprises administrators selected by universities, and a total of 405 samples were selected. Based on advanced statistical procedures, the data analysis in this study is mainly divided into two categories, namely descriptive statistics and inferred statistics. The descriptive statistics presented in this chapter include absolute frequency, percentage frequency, arithmetic mean, and standard deviation. Based on hypothesis testing, many statistics are applied for Inferential Statistics, including Independent Samples t-test, One-way ANOVA, and Multiple Linear Regression Analysis.

4.1 Descriptive Statistics

4.1.1 Demographic Factors

The descriptive statistical results of various demographic indicators are shown in Table 4.1. This paper finds relatively few males and 59.01% females among the samples participating in this survey, combined with the questionnaire survey results and descriptive statistical analysis. Most students are between 20 and under 35 years old, and the survey objects in this stage account for more than 87%. In terms of education level, they are mainly junior college or undergraduate students, recording more than 74%, and most of them have monthly incomes between 3,000 and less than 10,000 yuan, capturing around 71%. Most jobs are grass-roots employees, and the distribution of working experiences is mainly concentrated on 1 year but less than 3 years.

Table 4.1 Descriptive Statistical Results of Demographic Indicators

Classification	Frequency	% Frequency
1. Gender		
Male	166	40.99
Female	239	59.01
2. Age		
20 but under 25 years old	219	54.07
25 but under 35 years old	135	33.33
35 but under 45 years old	42	10.37
45 years old and older	9	2.22
3. Educational Level		
High School or Middle School	5	1.23
Junior College	94	23.21
Undergraduate	207	51.11
Master's Degree or above	99	24.44
4. Monthly Income		
Less than 3,000 yuan	77	19.01
3,000 but less than 5,000 yuan	151	37.28
5,000 but less than 10,000 yuan	136	33.58
10,000 but less than 15,000 yuan	23	5.68
15,000 yuan and higher	18	4.44
5. Job Position		
Grass-roots staff	295	72.84
Middle-level cadres	81	20.00
Senior leader	29	7.16
6. Working Experiences		
Less than 1 year	61	15.06
1 year but under 3 years	138	34.07
3 years but under 5 years	85	20.99
5 years but under 10 years	65	16.05
10 years and above	56	13.83

4.1.2 University Technical Context

Table 4.2 The Descriptive Statistics of University Technical Context

Classification	Mean	Standard Deviation	Mean Rank	Meaning
7. Comparative Advantage	4.228	.95261	1	Agree
8. Compatibility	4.134	.92118	2	Agree
9. Complexity	3.752	1.02677	4	Agree
10. Perceived Cost	3.952	.92003	3	Agree
University Technical Level	4.0167	.80467	-	Agree

According to the results shown in Table 4.2, the mean value of Comparative Advantage is 4.228, and the standard deviation is 0.95261; the mean value of Compatibility is 4.134, and the standard deviation is 0.92118; the mean value of Complexity is 3.752, and the standard deviation is 1.02677; the mean value of Perceived Cost is 3.952, and the standard deviation is 0.92003. The most important aspects are Comparative Advantage, Compatibility, Perceived Cost, and Complexity.

Table 4.2a The Descriptive Statistics of Comparative Advantage

Classification	Mean	Standard Deviation	Mean Rank	Meaning
7.1 Big data technology contributes to scientific decision-making in universities	4.20	.983	3	Agree
7.2 Big data technology helps to improve management capabilities	4.25	.964	1	Agree
7.3 Big data technology helps to improve the efficiency of university management	4.24	.977	2	Agree
Comparative Advantage	4.228	.95261	-	Agree

From Table 4.2a, it can be concluded that the most essential aspect of Comparative Advantage is "Big data technology helps to improve management

capabilities" Big data technology helps to improve management capabilities" with a mean value of about 4.25, followed by "Big data technology helps to improve the efficiency of university management" and "Big data technology helps to improve the efficiency of university management" with a mean value of approximately 4.24 and 4.20, respectively.

Table 4.2b The Descriptive Statistics of Compatibility

Classification	Mean	Standard Deviation	Mean Rank	Meaning
8.1 Big data technology is compatible with existing hardware and software equipment in universities	4.12	.951	3	Agree
8.2 Big data technology coincides with the characteristics of university management	4.14	.957	2	Agree
8.3 Big data technology can be deeply integrated with university management	4.15	.951	1	Agree
Compatibility	4.134	.92118	-	Agree

From Table 4.2b, it is evident that the most essential aspect of Compatibility is "Big data technology can be deeply integrated with university management," with a mean value of about 4.15, followed by "Big data technology coincides with the characteristics of university management" and "Big data technology is compatible with existing hardware and software equipment in universities" with a mean value of approximately 4.14 and 4.12, respectively.

Table 4.2c The Descriptive Statistics of Complexity

Classification	Mean	Standard Deviation	Mean Rank	Meaning
9.1 Big data technology is hard to understand and hard to grasp fully	3.76	1.086	2	Agree
9.2 The application of big data technology is complex, and the operation interface is not friendly	3.69	1.098	3	Agree
9. Big data technology updates iterate quickly, and it is difficult for managers to keep up with the update speed	3.81	1.060	1	Agree
Complexity	3.752	1.02677	-	Agree

From Table 4.2c, it can be concluded that the most important aspect of Complexity is "Big data technology updates iterate quickly, and it is difficult for managers to keep up with the update speed," with the mean value of about 3.81 followed by "Big data technology is hard to understand and hard to grasp fully" and "The application of big data technology is complex and the operation interface is not friendly" with mean value of approximately 3.76 and 3.69, respectively.

Table 4.2d The Descriptive Statistics of Perceived Usefulness

Classification	Mean	Standard Deviation	Mean Rank	Meaning
10.1 Big data technology personnel training costs are very high	3.92	.952	3	Agree
10.2 Big data technology is very expensive to operate and maintain	3.95	.951	2	Agree
10.3 Big data technology-related equipment is expensive to purchase	3.99	.943	1	Agree
Perceived Cost	3.952	.92003	-	Agree

From Table 4.2d, it is evident that the most essential aspect of Perceived Usefulness is "Big data technology-related equipment is expensive to purchase," with a mean value of about 3.99, followed by "Big data technology is very expensive to

operate and maintain," and "Big data technology personnel training costs are very high" with the mean value of approximately 3.95 and 3.92, respectively.

4.1.3 University Organizational Context

Table 4.3The Descriptive Statistics of University Organizational Context

Classification	Mean	Standard Deviation	Mean Rank	Meaning
11. University Manager Support	3.9350	.92508	2	Agree
12. University Financial Ability	3.9012	.95447	4	Agree
13. University Management Level	3.9086	.97191	3	Agree
14. University Teaching Level	3.9835	.91393	1	Agree
University Organizational Level	3.9321	.86994	-	Agree

The results obtained from Table 4.3 suggest that University Teaching Level is the most important aspect of the University Organizational Level, with a mean value of approximately 3.9835, followed by University Manager Support, University Management Level, and University Financial Ability, with a mean value of about 3.9350, 3.9086, and 3.9012, respectively. Overall, the mean value of the University Organizational Level is about 3.9321, which is at the agreed level.

Table 4.3a The Descriptive Statistics of University Manager Support

Classification	Mean	Standard Deviation	Mean Rank	Meaning
11.1 Managers are willing to provide material support for the application of big data technology	3.97	.941	2	Agree
11.2 Managers are more than willing to take risks with big data technology	3.86	1.018	3	Agree
11.3 Managers are willing to provide human support for big data applications	3.98	.944	1	Agree
University Manager Support	3.9350	.92508	-	Agree

From Table 4.3a, it is evident that the most important aspect of University Manager Support is "Managers are willing to provide human support for big data applications," with a mean value of about 3.98, followed by "Managers are willing to provide material support for the application of big data technology" and "Managers are more than willing to take risks with big data technology" with a mean value of approximately 3.97 and 3.86, respectively.

Table 4.3b The Descriptive Statistics of University Financial Ability

Classification	Mean	Standard Deviation	Mean Rank	Meaning
12.1 Colleges and universities have strong financial capacity	3.91	.997	1	Agree
12.2 Universities have sufficient financial capacity to guarantee the expenditure of big data technology application	3.90	.979	2	Agree
12.3 The financial strength of universities is sufficient to support the application of big data	3.89	.994	3	Agree
University Financial Ability	3.9012	.95447	4	Agree

From Table 4.3b, it can be seen that the most important aspect of University Financial Ability is "Colleges and universities have the strong financial capacity," with a mean value of about 3.91, followed by "Universities have the sufficient financial capacity to guarantee the expenditure of big data technology application" and "The financial strength of universities is sufficient to support the application of big data" with a mean value of approximately 3.90 and 3.89, respectively.

Table 4.3c The Descriptive Statistics of University Management Level

Classification	Mean	Standard Deviation	Mean Rank	Meaning
13.1 You are very satisfied with the management level of the university	3.91	1.011	1	Agree
13.2 The management level of colleges and universities can meet the requirements of teachers and students	3.90	1.000	3	Agree
13.3 The management level of colleges and universities is sufficient to cope with complex situations	3.91	.995	1	Agree
University Management Level	3.9086	.97191	-	Agree

From Table 4.3c, it is evident that the most important aspects of University Management Level are both "The management level of colleges and universities is sufficient to cope with complex situations" and "You are very satisfied with the management level of the university" with the mean value of about 3.91 following by "The management level of colleges and universities can meet the requirements of teachers and students" with a mean value of approximately 3.9.

Table 4.3d The Descriptive Statistics of University Teaching Level

Classification	Mean	Standard Deviation	Mean Rank	Meaning
14.1 You think the university teaching ability is very strong	3.96	.966	2	Agree
14.2 The teaching level of colleges and universities can meet the requirements of students	3.91	.965	3	Agree
14.3 The teaching level of colleges and universities will be higher and higher	4.08	.940	1	Agree
University Teaching Level	3.9835	.91393	-	Agree

From Table 4.3d, it is evident that the most important aspect of University Teaching Level is "The teaching level of colleges and universities will be higher and

higher," with a mean value of about 4.08, followed by "You think the university teaching ability is very strong" and "The teaching level of colleges and universities can meet the requirements of students" with a mean value of 3.96 and 3.91.

4.1.4 University Environmental Context

Table 4.4 The Descriptive Statistics of University Environmental Context

Classification	Mean	Standard Deviation	Mean Rank	Meaning
15. Government Support	4.0329	.91258	2	Agree
16. Competitive Pressure	4.1210	.87748	1	Agree
University Environmental Level	4.0770	.84500	-	Agree

It is evident from Table 4.4 that Competitive Pressure is more important than Government Support since the mean value of the former is approximately 4.1210 while the mean value of the latter is about 4.0329. Overall, the mean value of the University Environmental Level is about 3.9321, which is at the agreed level.

Table 4.4a The Descriptive Statistics of Government Support

Classification	Mean	Standard Deviation	Mean Rank	Meaning
15.1 The government has issued a large number of policies to support the application of big data technology in universities	4.05	.949	1	Agree
15.2 The government will provide financial support for the application of big data technology in universities	4.00	.932	3	Agree
15.3 The government has provided special incentives for universities to use big data technology	4.05	.929	1	Agree
Government Support	4.0329	.91258	-	Agree

From Table 4.4a, it is evident that the most important aspects of Government Support are both “The government has issued a large number of policies to support the application of big data technology in universities” and “The government has provided special incentives for universities to use big data technology” with the mean value of about 4.05 following by “The government will provide financial support for the application of big data technology in universities ” with a mean value of about 4.00.

Table 4.4b The Descriptive Statistics of University Financial Ability

Classification	Mean	Standard Deviation	Mean Rank	Meaning
16.1 Universities are facing great competitive pressure	4.18	.907	1	Agree
16.2 Pressure from other colleges is forcing schools to adopt new technology	4.10	.913	2	Agree
16.3 The greater the competitive pressure, the greater the willingness to adopt big data	4.09	.944	3	Agree
Competitive Pressure	4.1210	.87748	-	Agree

From Table 4.4b, it can be concluded that the most essential aspect of Competitive Pressure is “Universities are facing great competitive pressure,” with a mean value of about 4.18, followed by “Pressure from other colleges is forcing schools to adopt new technology” and “The greater the competitive pressure, the greater the willingness to adopt big data” with a mean value of approximately 4.10 and 4.09, respectively.

4.1.5 Big Data Technology Adoption

Table 4.5 The Descriptive Statistics of Big Data Technology Adoption

Classification	Mean	Standard Deviation	Mean Rank	Meaning
17. Behavioral Intention	4.1358	.88406	1	Agree
18. Actual Act	3.9432	.90001	2	Agree
University Management's Big Data Technology Adoption	4.0395	.83676	-	Agree

It can be seen from Table 4.5 that Behavioral Intention is more important than Actual Act since the mean value of the former is approximately 4.1358 while the mean value of the latter is about 3.9432. Overall, the mean value of University Management's Big Data Technology Adoption is about 4.0395, which is at the agreed level.

Table 4.5a The Descriptive Statistics of Behavioral Intention

	Mean	Standard Deviation	Mean Rank	Meaning
17.1 The application of big data in university management is very necessary	4.16	.914	1	Agree
17.2 The willingness to actively learn big data is strong	4.12	.895	3	Agree
17.3 I hope to apply big data to university management	4.14	.903	2	Agree
Behavioral Intention	4.1358	.88406	-	Agree

From Table 4.5a, it is evident that the most essential aspect of Behavioral Intention is "The application of big data in university management is very necessary," with a mean value of about 4.16, followed by "I hope to apply big data to university management" and "The willingness to learn big data actively is strong" with a mean

value of approximately 4.14 and 4.12, respectively.

Table 4.5b The Descriptive Statistics of the University Actual Act

	Mean	Standard Deviation	Mean Rank	Meaning
18.1 I take the initiative to learn big data technology every week	3.97	.925	1	Agree
18.2 A university big data management platform has been established	3.94	.963	2	Agree
18.3 University big data has achieved deep integration	3.93	.996	3	Agree
Actual Act	3.9432	.90001	-	Agree

From Table 4.5b, it is evident that the most essential aspect of Actual Act is “I take the initiative to learn big data technology every week,” with a mean value of about 3.97, followed by “A university big data management platform has been established” and “University big data has achieved deep integration” with a mean value of approximately 3.94 and 3.93, respectively.

4.2. Inferential Statistics

4.2.1 Differences in Demographic Factors Generate Differences in Big Data Adoption

$H_0 : \mu_1 = \mu_2$

$H_a : \mu_1 \neq \mu_2$

Table 4.6 The Independent Samples t-test of the Gender Factor

Factor	Classification	N	Mean	S.D.	t-value	p-value
Gender	Male	166	4.0924	.83576	1.060	.290
	Female	239	4.0028	.83724		

***. The mean difference is significant at the 0.05 level.**

Table 4.6 shows that the p-value of Big Data Adoption concerning Gender is about 0.290, much higher than the critical value of 0.05. Therefore, the null hypothesis (H_0) cannot be rejected, which implies that differences in Gender generate no differences in Big Data Adoption.

4.2.2 Differences in Age, Educational Level, Monthly Income, Job Position, and Working Experiences Generate Differences in Big Data Adoption

$H_0 : \mu_i = \mu_j$

$H_a: \mu_i \neq \mu_j$ at last one Pair where $i \neq j$.

Table 4.7 The One-Way ANOVA of Age, Educational Level, Monthly Income, Job Position, and Working Experiences

Factor	Classification	SS	Df	MS	F=value	p-value
Age	Between Groups	1.047	3	.349	.497	.685
	Within Groups	281.821	401	.703		
	Total	282.868	404			
Educational Level	Between Groups	.517	3	.172	.245	.865
	Within Groups	282.351	401	.704		
	Total	282.868	404			
Monthly Income	Between Groups	8.935	4	2.234	3.262	.012*
	Within Groups	273.933	400	.685		
	Total	282.868	404			
Job Position	Between Groups	4.490	2	2.245	3.242	.040*
	Within Groups	278.378	402	.692		
	Total	282.868	404			
Working Experiences	Between Groups	11.809	4	2.952	4.357	.002*
	Within Groups	271.059	400	.678		
	Total	282.868	404			

***. The mean difference is significant at the 0.05 level.**

It is evident from Table 4.7 that the p-values of Big Data Adoption concerning Age and Educational Level are approximately .685 and .865, respectively, which are much higher than the critical value of 0.05. Therefore, the null hypothesis (H_0) of these aspects cannot be rejected, meaning that differences in Age and

Educational Level generate no differences in Big Data Adoption. On the contrary, the p-values of monthly income, job position, and working experience are about .012, .040, and .002, respectively, much lower than the critical value of 0.05. Therefore, the null hypothesis (H_0) is rejected, meaning that differences in these 3 factors generate differences in Big Data Adoption. The details of these differences can be seen in Table 4.7a, Table 4.7b, and Table 4.7c.

As far as the Money Income is concerned, the mean differences of its members based on the Least Significant Difference Method (LSD) in Table 4.7a show that there are statistically significant between the group “Less than 3000 yuan” and other groups except the group “15,000 yuan and higher”. The group “3,000 yuan but less than 5,000 yuan” is statistically different from the group “less than 3,000 yuan” and the group “10,000 yuan but less than 15,000 yuan”. The group “5,000 yuan but less than 10,000 yuan” is statistically different from the group “less than 3,000 yuan”. The group “10,000 yuan but less than 15,000 yuan” is statistically different from the group “less than 3,000 yuan” and the group “3,000 yuan but less than 5,000 yuan”. The group “15,000 yuan and higher” is not statistically different from any other group.

Table 4.7a Multiple Comparisons of Monthly Income

Dependent Variable: **Big Data Adoption (LSD)**						
Income(I)	Income(J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Less than 3000 Yuan	3000 < 5000	-.24757*	.11588	.033	-.4754	-.0198
	5000 < 10000	-.31715*	.11802	.008	-.5492	-.0851
	10000 < 15000	-.64041*	.19665	.001	-1.0270	-.2538
	15000 and more	-.22415	.21666	.301	-.6501	.2018
3000 < 5000 Yuan	Less than 3000	.24757*	.11588	.033	.0198	.4754
	5000 < 10000	-.06958	.09783	.477	-.2619	.1227
	10000 < 15000	-.39284*	.18523	.035	-.7570	-.0287
	15000 and more	.02342	.20635	.910	-.3822	.4291
5000 < 10000 Yuan	Less than 3000	.31715*	.11802	.008	.0851	.5492
	3000-5000	.06958	.09783	.477	-.1227	.2619
	10000 < 15000	-.32326	.18658	.084	-.6901	.0435
	15000 and more	.09300	.20756	.654	-.3150	.5010
10000 <15000 Yuan	Less than 3000	.64041*	.19665	.001	.2538	1.0270
	3000 < 5000	.39284*	.18523	.035	.0287	.7570
	5000 < 10000	.32326	.18658	.084	-.0435	.6901
	15000 and more	.41626	.26043	.111	-.0957	.9282
15000 Yuan and more	Less than 3000	.22415	.21666	.301	-.2018	.6501
	3000 < 5000	-.02342	.20635	.910	-.4291	.3822
	5000 < 10000	-.09300	.20756	.654	-.5010	.3150
	10000 < 15000	-.41626	.26043	.111	-.9282	.0957

***. The mean difference is significant at the 0.05 level.**

Table 4.7b The Multiple Comparisons of Job Position

Dependent Variable: Big Data Adoption (LSD)						
Position (I)	Position l (J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Gross-root Manager	Middle-Level Cadres	-.14601	.10439	.163	-.3512	.0592
	Senior Leader	-.37271*	.16194	.022	-.6911	-.0543
Middle-Level Cadres	Gross-root Manager	.14601	.10439	.163	-.0592	.3512
	Senior Leader	-.22669	.18008	.209	-.5807	.1273
Senior Leader	Gross-root Manager	.37271*	.16194	.022	.0543	.6911
	Middle-Level Cadres	.22669	.18008	.209	-.1273	.5807
***. The mean difference is significant at the 0.05 level.**						

Concerning the job position, the mean differences of its members based on the least significant difference method (LSD) in Table 4.7b suggest that there are statistically significant differences between the group “Gross-root Manager” and the group “Senior Leader”. The group “Middle-Level Cadres” is not statistically different from any other group.

Table 4.7c The Multiple Comparisons of Working Experiences

	Dependent Variable:	**Big Data Adoption (LSD)**				
Working Experiences(I)	Working Experiences(J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Less than 1 year	1 but less than 3 years	-.23903	.12657	.060	-.4879	.0098
	3 but less than 5 years	-.32427*	.13814	.019	-.5958	-.0527
	5 but less than 10 years	-.58008*	.14675	.000	-.8686	-.2916
	10 years and more	-.40837*	.15235	.008	-.7079	-.1089
1 but less than 3 years	Less than 1 year	.23903	.12657	.060	-.0098	.4879
	3 but less than 5 years	-.08524	.11350	.453	-.3084	.1379
	5 but less than 10 years	-.34104*	.12384	.006	-.5845	-.0976
	10 years and more	-.16934	.13043	.195	-.4257	.0871
3 but less than 5 years	Less than 1 year	.32427*	.13814	.019	.0527	.5958
	1 but less than 3 years	.08524	.11350	.453	-.1379	.3084
	5 but less than 10 years	-.25581	.13564	.060	-.5225	.0108
	10 years and more	-.08410	.14168	.553	-.3626	.1944
5 but less than 10 years	Less than 1 year	.58008*	.14675	.000	.2916	.8686
	1 but less than 3 years	.34104*	.12384	.006	.0976	.5845
	3 but less than 5 years	.25581	.13564	.060	-.0108	.5225
	10 years and more	.17170	.15009	.253	-.1234	.4668
10 years and more	Less than 1 year	.40837*	.15235	.008	.1089	.7079
	1 but less than 3 years	.16934	.13043	.195	-.0871	.4257
	3 but less than 5 years	.08410	.14168	.553	-.1944	.3626
	5 but less than 10 years	-.17170	.15009	.253	-.4668	.1234

***. The mean difference is significant at the 0.05 level.**

In terms of Working Experiences, the mean differences of its members based on the Least Significant Difference Method (LSD) in Table 4.7c indicate that there are statistically significant between the group “Less than 1 year” and other groups except the group “1 but less than 3 years”. The group “1 but less than 3 years” is statistically different from the group “5 but less than 10 years”. The group “3 but less than 5 years” is statistically different from the group “Less than 1 year”. The group “5 but less than 10 years” is statistically different from the group “Less than 1 year” and

the group “1 but less than 3 years”. The group “10 years and more” is statistically different from the group “Less than 1 year”.

4.3 The Influence of TOE on Big Data Adoption

The results obtained from the study are presented in Table 4.8 and can be written in terms of equation (1).

$$Y = .392 + .137X_1 + .345X_2 + .427X_3$$

(.000) (.003) (.000) (.000) ……..……(1)

Adjusted $R^2 = 0.761$

Table 4.8 The Results of Multiple Linear Regression of TOE (Technical Context, Organizational Context, and Environmental Context) on Big Data Adoption

Models	**Unstandardized coefficients**		**Standardized coefficient**	**t-value**	**Sig**
	B	Standard error	Beta		
(Constant)	.392	.107		3.648	.000*
Technical Context (X_1)	.137	.046	.132	2.980	.003*
Organizational Context (X_2)	.345	.049	.359	7.025	.000*
Environmental Context (X_3)	.427	.049	.431	8.676	.000*
a. Dependent variable: Big Data Adoption					

As far as the Standardized Coefficient is concerned, it can be seen from Table 4.8 that Environmental Context (X_3) is the most important factor influencing Big Data Adoption, with a coefficient of about .431, followed by Organizational Context (X_2) and Technical Context (X_1) the coefficients of which are about .359 and .132, respectively. The Adjust R^2 of this Multiple Linear Regression is approximately .761, meaning that one unit change in these three factors will cause the Big Data Adoption to change in the same direction by approximately .761 units. This Adjust R^2 is moderate since other factors influence Big Data Adoption, evidenced by the constant p-value of approximately .000.

4.3.1 The Influence of Technical Context on Big Data Adoption

The results obtained from the study are presented in Table 4.9 and can be written in terms of equation (2).

$$Y=.806 +.089X_1 +.326X_2 +.089X_3 +.297X_4$$

(.000) (.025) (.000) (.035) (.000) ……..……(2)

Adjusted $R^2 = 0.600$

Table 4.9 The Results of Multiple Linear Regression of Technical Context on Big Data Adoption

Models	Unstandardized coefficients		Standardized coefficient	t-value	Sig
	B	Standard error	Beta		
(Constant)	.806	.136		5.912	.000
Comparative Advantage (X_1)	.089	.040	.102	2.246	.025
Compatibility (X_2)	.326	.043	.359	7.532	.000
Complexity (X_3)	.089	.042	.109	2.112	.035
Perceived cost (X_4)	.297	.053	.326	5.653	.000
a. Dependent variable: Big Data Adoption					

It can be seen from Table 4.9 that Compatibility X_2 is the most important factor influencing Big Data Adoption with a coefficient of about .326, followed by Perceived Cost X_4, Complexity X_3, and Competitive Advantage X_1, the coefficients of which are about .297, .089, and .089 respectively. Similar results can be seen in terms of the Standardized coefficient. The Adjust R^2 of this Multiple Linear Regression is approximately .600, which is moderate, meaning that one unit change in these four factors will cause the Big Data Adoption to change in the same direction by approximately .600 units.

4.3.2 The Influence of Organizational Context on Big Data Adoption

The results obtained from the study are presented in Table 4.10 and can be written in terms of equation (3).

$$Y=.833 +.223X_1 +.092X_2 +.116X_3 +.381X_4$$

(.000) (.000) (.069) (.031) (.000) ……(3)

Adjusted $R^2 = 0.700$

Table 4.10 The Results of Multiple Linear Regression of Organizational Context on Big Data Adoption

Model	**Unstandardized coefficients**		**Standardized coefficient**	**t-value**	**Sig**
	B	Standard error	Beta		
(Constant)	.833	.107		7.753	.000
Manager Support (X_1)	.223	.046	.247	4.892	.000*
Financial Ability (X_2)	.092	.050	.105	1.824	.069
Management Level (X_3)	.116	.053	.134	2.168	.031*
Teaching Level (X_4)	.381	.058	.416	6.615	.000*
a. Dependent variable: Big Data Adoption					

It can be concluded from Table 4.10 that University Teaching Level X_4 is the most important factor influencing Big Data Adoption, with a coefficient of about .381, followed by Manager Support X_1 and University Management Level X_3, the coefficients of which are about .223 and .116, respectively. Similar results can be seen in terms of the Standardized coefficient. The Adjust R^2 of this Multiple Linear Regression is approximately .700, which is relatively high, meaning that one unit change in these four factors will cause the Big Data Adoption to change in the same direction by approximately .700 units.

4.3.3 The Influence of Environmental Context on Big Data Adoption

The results obtained from the study are presented in Table 4.11 and can be written in terms of equation (4).

$$Y=.633 + .391X_1 +.444X_2$$

(.210) (.000) (.000) ……(4)

Adjusted $R^2 = 0.708$

Table 4.11 The Results of Multiple Linear Regression of Environmental Context on Big Data Adoption

Model	Unstandardized coefficients		Standardized coefficient	t-value	Sig
	B	Standard error	Beta		
(Constant)	.633	.111		5.685	.633
Government Support (X_1)	.391	.040	.426	9.863	.391
Competitive Pressure (X_2)	.444	.041	.466	10.790	.444
a. Dependent variable: Big Data Adoption					

From Equation 4 and Table 4.11, Actual Act X_2 is found to be more important than Behavioural Intention X_1 when Big Data Adoption is concerned. The coefficient of the former is about .444 compared to .391 for the latter. Similar results can be seen in terms of the Standardized coefficient. The Adjust R^2 of this Multiple Linear Regression is approximately .708, which is relatively high, meaning that one unit change in these four factors will cause the Big Data Adoption to change in the same direction by approximately .708 units.

Table 4.12 The Summary Results of Hypothesis Testing

Hypothesis	Not Reject H_0	Reject H_0
Hypothesis 1		
1.1 Gender	.290	
1.2 Age	.685	
1.3 Education Level	.865	
1.4 Monthly income		.012*
1.5 Job Position		.040*
1.6 Working Experiences		.002*
Hypothesis 2		
2.1 University Technical Level		.000*
2.1 University Technical Context		.000*
2.2 University Organizational Context		.000*
2.3 University Environmental Context		.000*
Hypothesis 2.1		
2.1.1 Comparative Advantage		.025*

2.1.2 Compatibility		.000*
2.1.3 Complexity		.035*
2.1.4 Perceived Cost		.000*
Hypothesis 2.2		
2.2.1 Manager Support		.000*
2.2.2 Financial Ability	.069	
2.2.3 University Management Level		.031*
2.2.4 University Teaching Level		.000*
Hypothesis 2.3		
2.3.1 Government Support		.000*
2.3.2 Competitive Pressure		.000*

CHAPTER V
CONCLUSION AND DISCUSSION

Taking School Yunnan Economics Trade and Foreign Affairs College as the research object, this study only seeks to understand the influencing factors of university administrators' willingness to adopt big data technology. It aims to provide a knowledge framework for applying big data technology in university management. The concept of adoption willingness and the influencing factors of big data technology adoption willingness has been studied. According to this study, the statistical factors of college managers themselves, the advantages of big data technology, the organizational management level of colleges and universities, and the environment of colleges and universities will affect the big data of college managers. Willingness to adopt technology makes a big difference. Although this study focuses on Yunnan economics trade and foreign affairs college administrators' willingness to adopt big data technology, its general significance guides applying big data technology in more universities.

5.1 Conclusions

Through the survey of demographic characteristics, it is found that the proportion of males and females in this survey sample is relatively uniform, but the proportion of females is higher. Regarding age, the proportion of 20-25 years old is the largest, and the number of people is the largest. From the point of view of teaching level, the undergraduate degree of management personnel accounts for the largest proportion and the largest number. Regarding monthly income, most respondents earned between 3,000 yuan and 10,000 yuan, while fewer earned more than 10,000 yuan. From the perspective of job distribution, the vast majority of the samples participating in this survey are grassroots managers. Regarding work experience, most managers have more than one year and less than three years.

The t-sample independent test and one-way variance test of demographic differences found that gender difference, age difference, monthly income difference, and working years difference will significantly impact university managers' willingness to adopt big data technology.

After the regression analysis of big data technology characteristics, it was found that the comparative advantage, compatibility, complexity, and perceived cost of big data technology will significantly impact the willingness of university administrators to adopt big data. Big data technology advantages have the most important impact on the willingness of college administrators to adopt big data. The regression coefficient is 0.573, and the regression coefficients of compatibility, complexity, and perceived cost are 0.138, -0.136, and -0.116, respectively. It can be seen that complexity and perceived cost will have a significant negative impact on the willingness to adopt big data technology.

The regression analysis of the organizational level of colleges and universities shows that organizational support, financial strength, management level of colleges and universities, and teaching level of colleges and universities all have a significant impact on the willingness to adopt big data technology, among which teaching level is the most important factor, and its regression coefficient is 0.343. The regression coefficients of organizational support, financial strength, and university management level are 0.343, -0.048, and 0.030, respectively.

After regression analysis, it is found that competitive pressure and government support significantly impact the willingness to adopt big data technology at the university environment level. Among them, competitive pressure has the largest impact, with a regression coefficient of 0.591, followed by government support, with a regression coefficient of 0.244.

5.2 Discussion

5.2.1 Factors Influencing Big Data Technology Adoption

Esteves et al. built a model to predict enterprise big data technology adoption intention based on risk and return perspectives and combined with planned

behavior theory. Gunasekaran et al. (2004) studied the adoption of big data predictive analytics technology and its impact on organizational and supply chain performance from connectivity, information sharing, and senior management commitment. Agrawal uses TOE exploration. The determinants influencing the adoption of big data technologies in emerging economies are examined without distinguishing stages. The key influencing factors are the adoption process, complexity, compatibility, top management support, organizational size, competitive intensity, and the six environmental uncertainty variables. Sun et al. based on the analysis of business intelligence. The literature summarizes similar factors that influence the adoption of big data. The dynamic capability theory analyzes the impact of enterprises' adoption of big data analytics technology on the supply chain through the analysis of 161 companies. The data collected by Chinese companies shows that expected benefits and technical compatibility directly affect organizations' adoption of big data technologies. However, organizational readiness and competitive pressure indirectly affect the organization through top management's support—data technology adoption. Verma et al. explored the cognitive strategic value of big data technology and the TOE framework. The factors that influence the adoption of big data technology in emerging economies are the strategic value of big data technology, compatibility, complexity, top management support, IT assets, organizational data environment, perceived costs, and external pressures. Industry types were identified as key influencing factors for organizational adoption.

5.2.2 Big Data Technology Application Strategy

From the perspective of big data, the educational management of college students is showing an increasingly advanced development trend. Before applying big data technology and resources, colleges and universities must follow the situation of big data to establish a correct application concept and provide guidance and help for the practical application of big data. Colleges and universities should start from the

following aspects: First, we should pay due attention to the historical data information resources related to student education management and actively use the power of big data technology to explore further the existing and undiscovered information content in these historical data, to provide an essential reference basis for innovation and reform of student education management and clear the direction of talent training. Second, it is necessary to make every effort to ensure the smoothness between the internal education management system and data resources. At the same time, it is also necessary to continuously improve the analysis of the relationship between the student education management data and the data inside and outside the school and gradually dig into the relationship to lay the foundation for implementing student education management. Third, it is necessary to closely combine the development rhythm of big data technology to actively change the corresponding educational concepts and thinking, pay close attention to the application of big data technology when carrying out specific management work, and closely link it with the updating needs of the internal education management system of the school, to build a comprehensive student education management model that is more in line with the development characteristics of The Times.

5.2.3 Influencing Factors of University Administrators' Willingness to Adopt Big Data Interactively

5.2.3.1 Effects of Demographic Factor

Lin and Huang (2009) investigated the attitudes, beliefs, and application status of information technology among 615 teachers across China through an online questionnaire. The findings are as follows: (1) At present, most of the computer application activities in teaching are the "subsidiary activities" of traditional educational activities, and there are significant differences in teachers' application behaviors in terms of gender and teaching age; (2) On the whole, teachers agree with the value of information technology for students' learning and the improvement of teachers' professional ability, and their willingness to apply it is also high. However, at

the same time, teachers believe that the application of information technology in teaching needs to pay a certain cost, and there are significant differences in teachers' attitudes on gender, teaching age, and region; (3) Teachers' application intention, cost identification, gender, teaching age and value identification had certain predictive power on their application behavior, and "application intention" was the most predictive.

Sun (2015) summarized the research results on the impact of gender differences on information technology teaching through literature analysis, providing good theoretical support for the whole paper. Then, research methods such as questionnaire surveys and interviews are used to analyze and study the influencing factors and degree of gender differences in information technology teaching, proving that gender differences will impact students' learning interests, motivation, and strategies in information technology learning.

Huang et al. (2018) argued that there was no statistical significance in the differences in attitudes toward the influencing factors between different genders, ages, titles, and position groups. The multiple linear regression analysis results show that management style and the "lack of big data professionals" significantly negatively impact the popularity of big data applications in hospitals.

5.2.3.2 Effects of Characteristics of Big Data Technology

Mcafee & Brynjolfsson (2012) believe that the analysis and prediction technology based on big data brings opportunities to the management of college students. By integrating various data of the student administration department, building an information-sharing platform, and collecting and analyzing the information on students' network behaviors, students' information can be grasped in real-time and dynamically, and students' management can be effectively done.

According to Chen (2017), using technologies such as big data, cloud computing, and Internet of Things to optimize the structure of school-running elements and improve management level is an essential tool and basis for colleges and universities to improve school-running efficiency and promote the transformation of higher education management from incremental development to quality development. Koman and Kundrikova (2016) believe that the big media environment has strong complexity but also has special immediacy and openness. The mass determines the broad characteristics of the big data environment, and the compatibility and equality

enable the information of the big data environment to be shared. At the same time, interactivity, influence, penetration, and concealment are essential characteristics of a big data environment. These characteristics not only affect how to shape the ideological values of modern college students but also affect the education and teaching of ideological and political work in colleges and universities.

5.2.3.3 Effects of the Organizational Level of Universities

Wang (2015) believes that the development of education informatization has presented the characteristics of intelligence, openness, individuation, and socialization. The smart campus management system aims to establish a unified, open, advanced, safe, humanized, and comprehensive application intelligent campus management platform to realize the integration and allocation optimization of various resources in colleges and universities. Through the filtering and integration, analysis, and human-oriented behavior analysis of cumbersome big data in colleges and universities, the efficiency and management level can be improved, and the application of information technology in colleges and universities can be achieved To a higher level.

Wang (2022) believes that the continuous development of society has promoted the improvement of the level of big data technology. Applying this advanced technology method in different industries has promoted the smooth progress of all parts of the work, reflected good results, and affected society's thinking correspondingly. The educational management of colleges and universities is carried out in the era of big data, which has changed the overall educational management mode and integrated more information elements and communication media.

Yan and Tu (2019) believe that big data plays an increasingly important role in various industries with the advent of the era of big data and the development of science and technology, such as computer information technology, network technology, and cloud technology. Big data also brings new directions and ideas for university management and information construction. Therefore, this paper analyzes innovative strategies for university management in the era of big data in order to promote the improvement of the university management level.

5.2.3.4 Effects of University Environment Level

Ma (2005) believes that increasing support for generic technology

research is not simply increasing financial input but, more importantly, adopting targeted, efficient, and conducive methods to the diffusion and application of generic technology organizations and policies. Government support for generic technology research must be matched with industrial organization policies, fiscal policies, intellectual property policies, and other relevant policies to play a role.

Li (2018) believes that in the current era of big data, all kinds of information knowledge and technologies generated by big data can effectively guide campus infrastructure construction, informatization construction, subject curriculum setting, and even campus culture construction, which will enhance the education and teaching level of colleges and universities, improve their core competitiveness, enhance their visibility, and promote the healthy and sustainable development of colleges and universities All of these are of great practical significance.

Wang et al. (2015) believe that when the informatization construction of colleges and universities has developed to a stage where data service is the core, how to dig out the important information hidden in big data and make use of the information to provide better services for teachers and students is a problem that all colleges and universities must face. This paper analyzes this and puts forward some thoughts. In response to these considerations, this paper proposes the solution of the intelligent cloud data service platform, expounds on the construction objectives, principles, and contents of the platform, discusses the overall architecture and security system used by the platform, describes the problems that may be encountered during the construction process and puts forward solutions. At last, the expected effect of the platform construction is evaluated.

5.3 Recommendation for Future Research

5.3.1 Give Full Play to the Advantages of Big Data Technology

In the age of data, colleges and universities must accelerate the innovation of educational management forms. College leaders and management should improve their understanding of education management, guide all faculty and staff to establish correct concepts, emphasize the urgency and significance of establishing "big data awareness", and raise the "big data awareness" to a high enough level, for example, it

can be included in the construction of campus culture as a key point. Set up a special leading agency responsible for a series of work in constructing the digital campus, set up publicity columns for campus culture walls, and imperceptibly penetrate the "big data awareness". In addition, when organizing relevant meetings, colleges and universities can also emphasize "big data awareness" to cultivate the "big data awareness" of college education management workers.

5.3.2 Use Big Data to Improve the Management Level of Colleges and Universities

Information technology and big data technology should be flexibly used in education management to promote the digital development of education management. Information technology, big data, and other advanced technologies to optimize education management can help establish a more detailed system. By applying advanced technology, flat education management can become three-dimensional, which is conducive to improving the precision of education management. In order to ensure the smooth development of data management in colleges and universities and ensure data security, special experimental centers or data management departments can be set up to collect, organize, and analyze data with the help of information technology and big data technology.

In the era of big data, traditional education and teaching resources have been unable to meet the needs of students. Colleges and universities should effectively apply big data technology and digital education and teaching resources to meet the needs of college education and ensure the smooth development of college education management. Secondly, strengthen the training of information-based talents. The development of university education management is inseparable from the management personnel. In order to optimize education management, the comprehensive quality of management personnel should be improved. Colleges and universities should start with strict requirements from the source, appropriately raise the entry threshold of education management staff, and select capable and responsible personnel for their posts to optimize the structure of the education management workforce.

5.3.3 Optimize the Application Environment of Big Data Technology

In the era of big data, science and technology are rapidly upgraded. In order

to optimize college education management, it is necessary to accelerate the construction of information. There are two key points in the informatization construction of colleges and universities: the construction of relevant infrastructure and the training of informatization talents. First, related infrastructure construction. In the process of informatization construction in colleges and universities, infrastructures such as teaching computers, multimedia equipment, digital libraries, smart classrooms, private network resources, and information management systems all need sufficient financial support. Therefore, university leaders should emphasize information construction and increase investment in related infrastructure. Strengthening the construction of infrastructure is an essential prerequisite for promoting the optimization of university education management.

REFERENCES

Alshqirate, A., Alblawi, A. & Asfer, M. (2020). The potential of a parabolic trough solar concentrator for electric energy production. *Heat Transfer*, 20 (10): 28-29.

Baker, J. (2011). The Technology–Organization–Environment Framework. In *Information System Theory*, Chapter 12, 231-245. University of Hamburg, Hamburg, Germany. DOI:10.1007/978-1-4419-6108-2_12

Cai, L (2020). A preliminary study on the impact of informatization on school management system. *Open Education Research*, 20(3):4.

Chaurasia S. (2019). From Big Data to Big Impact: Analytics for teaching and learning in higher education. *Industrial & Commercial Training*, 49(4), 26-27.

Chen, G. (2017). The impact of big data on the education management of Chinese universities and its countermeasures, *Wuhan University*, 14 (20), 22-23.

Collins, P. D., Hage, J., & Hull, F. M. (1988). Organizational and technological Predictors of change in automaticity. *Academy of Management Journal*, 31(3), 512–543

Galbraith, J.R. (1973). *Designing complex organizations*. Reading, Mass., Addison-Wesley Public Company.

Gangwar, H. (2018). Understanding the Determinants of Big Data Adoption in India: An Analysis of the Manufacturing and Services Sectors. *Information resources management journal*, 17 (4), 25-26. DOI:10.4018/irmj.2018100101.

Gunasekaran, A., Patel, C., & McGaughey, R. (2004). A Framework for Supply Chain Performance Measurement. *International Journal of Production Economics* 87(3), 333-347.

Huang, X., Luo, X., & Wang, P. (2018). Analysis of influencing factors and countermeasures of big data applications in hospitals. *Chinese Hospital Administration*, 38(3):4.

Kim, H. H. (2018). Mining big data using a parsimonious factor, machine learning, variable selection, and shrinkage methods. *International Journal of Forecasting*, 15 (20), 22-24. (in Chinese)

Koman, G., & Kundrikova, J. (2016). Application of Big Data Technology in Knowledge Transfer Process between Business and Academia – ScienceDirect.Procedia Economics and Finance, 39, 605-611. DOI:10.1016/S2212-5671(16)30305-7.

Levin, R., Klevorick, A.K., Nelson, R.R. ,& Winter, S. (1987). Appropriating the Return from Industrial R & D. Brookings Papers on Economic Activity 18(3), 783 – 832.

Li, C (2018). Discussion on the improvement of core competitiveness of universities in the era of big data. *Knowledge Library*, 20(14):2.

Liang, Y., & Ji, Q. (2023). Research on data governance system and path of universities from the perspective of big data [J]. *Chinese Science and Technology Journal Database (full-text edition) Educational Science*, 14(3):3.

Lin, X., & Huang, R. (2009). A survey on the attitude and behavior of information Technology application among primary and secondary school teachers. *China Audio-visual Education*, 15(9),6.

Liu, H. (2020). Research on multi-level governance of informatization leadership in

Liu, Y. L., & Zhou, H. T. (2021). Governance of higher online education in the Post-epidemic era: practical logic and policy response [J]. *China Audio-visual Education*, 20(003), 8-14.

Ma, M. J. (2005). General rules and organization of government support for generic technology research. *Chinese Manufacturing Information Technology*, 20

(12),23-24.

Ma, X. (2020). Construction of university teaching quality evaluation system based on big data. *Trends in domestic higher education teaching and Research*,12(15):1. *Management Review*, 28(3), 74–94.

Mansfield, E. (1968). *Industrial Research and Technological Innovation*. New York:

Mansfield, E., Rapoport, J., Romeo, A., Villani, E., Wagner, S., & Husic, F. (1977). *The Production and Application of New Industrial Technology*. New York: Norton.

Marinos, G. (2021). Leveraging Data Quality to Manage Risk and Improve Business Norton. Performance[J]. *Wall street & technology*,10(4):22.

Mcafee, A., & Brynjolfsson, E. (2012). Big data: the management revolution.[J]. *Harvard Business Review*, 90(10):60-6, 68, 128.

Picciano, A. G. (2018). The Evolution of Big Data and Learning Analytics in American Higher Education[J]. *Journal of Science Asynchronous Learning Networks*, 16(4), 9-20.

Ping (2020). Research on intelligent teaching in schools based on big data -- A case study of Yangming Middle School in Shaoxing City. *Journal of Curiosity,* 14(12):3.

Prado, R., Prado, E., & Grotta, A. (2021). Benefits of the Enterprise Data Governance in Industry: A Qualitative Research[C]//*23rd International Conference on Enterprise Information Systems*, 14 (20), 22-23.
DOI: 10.5220/0010418606990706.

Rahi, S. (2017). Research Design and Methods: A Systematic Review of Research Paradigms, Sampling Issues, and Instruments Development. *International Journal of Economics & Management Sciences* 6 (2): 403.
doi: 10.4172/2162-6359.1000403

Rovinelli, R. J., & Hambleton, R. K. (1977). On the use of content specialists in the assessment of criterion-referenced test item validity. *Tijdschrift voor Onderwijsresearch, 2*(2), 49–60.

Shu, H. (2020). Research on optimization measures of intelligent campus information systems in universities. The Classic of Mountains and Seas: *Frontiers of Education*, (3):96.

Stockdale, S., Ford, E., & Jackson, R. (2021). For the greater good? Patient and public attitudes to using medical free text data in research[J]. *International Journal for Population Data Science*, 1(1):229.

Sun, H. T., & Zheng, Q. H. (2019). Core technology, application status and development trend of big data in education [J]. *Journal of Distance Education*, 34(5):9.

Sun, M. (2015). On information technology teaching [J]. *Reading and Writing: Educational Teaching Research*, 10 (20), 22-24.

Thabit, T. H., Ishhadat, H. S., & Abdulrahman, O. T. (2020). Applying Data Governance Based on COBIT2019 Framework to Achieve Sustainable Development Goals [J]. *Journal of Middle Technical University*, 18 (3), 255-256. DOI: 10.51173 / JT. V2I3. 212.

The Pew Research Center (2021). How does gender affect perceptions of AI?https://cn.weforum.org/agenda/2022/08/xing-bie-ru-he-ying-xiang-dui-ren-gong-zhi-neng-de-kan-fa/

Tornatzky, L. G., & Fleischer, M. (1990). *The Processes of Technological Innovation*. Lexington, MA: Lexington Books.

Tushman, M., & Nadler, D. (1986). Organizing for innovation. *California* Universities. *Higher Education Exploration*,1(3):6.

Wang, H., Fang, Y., & Chen, X. (2015). Building intelligent cloud data service platform to let universities' big data "speak ": improving the core competitiveness of

schools. *Journal of East China Normal University: Natural Science Edition*, 20(3),8.

Wang, R., & Xu, P. (2020). Constraints and countermeasures of university , management informatization construction. *Journal of Higher Education Administration*, 20(1), 4.

Wang, T. (2015). Using big data analysis to boost the construction of a smart campus. *Peer*, 9 (10), 23.

Wang, X. (2022). Discussion on the optimization approach of university education management based on big data era, *Educational Science Development*, 4(3),171-173. (in Chinese)

Wu, X.D., & Dong, B. (2019). Data governance technology [J]. *Journal of Software*, 30(9):27.

Yan, Z., & Tu, C. (2019). An analysis of innovative strategies of the university Management in the era of Big Data. *Education Informatization Forum*, 3(9),2.

Yu, P., & Li, Y. (2020). Research on higher education data ecological governance System from the perspective of a smart campus [J]. *China Audio-visual Education*, 20 (10), 28-29.

Zhao, G. (2019). From Digital Campus to e-democracy: An analysis and discussion on the future development trend of university informatization. *Beijing Education*: *Higher Education Edition*, 20(6):4.

Zhao, M. (2018). Research on the educational application in the era of Big Data. *Information Recording Materials*, 1(2):2.

APPENDICES

Dear Madam/Sir,

Hello! Thank you for participating in this survey. The results will be used solely for academic research, with no right or wrong answers. Although responses will be identified, please be assured that the privacy of all organization members will be fully respected. We encourage you to select the options that genuinely reflect your thoughts and feelings.

Part 1: Demographic Factor

Please answer the following questions based on your actual experiences at work, marking "√" next to the option that best matches your feelings. There are no right or wrong answers. Select the option that reflects your perspective (1-5, where 1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Somewhat agree, and 5 = Strongly agree).

1. Gender:

☐Male

☐Female

2. Age:

☐20 but less than 25 years old

☐25 but less than 35 years old

☐35 but less than 45 years old

☐45 years old and more

3. Educational Level:

☐High school or junior high school

☐Junior College

☐Undergraduate

☐Master's degree and above

4. Monthly Income:

☐Below 3,000 yuan

☐3,000 but less than 5,000 yuan

☐5,000 but less than 10,000 yuan

☐10,000 but less than 15,000 yuan

☐15,000 yuan and more

5. Working Position

☐Grass-roots Manager

☐Middle-level Cadres

☐Senior Leader

6. Working Experiences

☐Less than 1 year

☐1 but less than 3 years

☐3 but less than 5 years

☐5 but less than 10 years

☐10 years and more

Part 2: University Technical Context

Please respond to the following questions based on your genuine experiences at work. Mark "√" next to the option that best reflects your feelings. There are no right or wrong answers; select the option that aligns with your perspective (1-5,

where 1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Somewhat agree, and 5 = Strongly agree).

Classification	Item	5	4	3	2	1
7. Comparative Advantage	Big data technology contributes to scientific decision-making in universities.					
	Big data technology helps to improve management capabilities.					
	Big data technology helps to improve the efficiency of university management.					
8. Compatibility	Big data technology is compatible with existing hardware and software equipment in universities.					
	Big data technology coincides with the characteristics of university management.					
	Big data technology can be deeply integrated with university management.					
9. Complexity	Big data technology is hard to understand and hard to grasp fully.					
	The application of big data technology is complex, and the operation interface is not friendly.					
	Big data technology updates iterate quickly, making it difficult for managers to keep up with the update speed.					

10. Perceived Cost	Big data technology personnel training costs are very high.	
	Big data technology is very expensive to operate and maintain	
	Big data technology-related equipment is expensive to purchase	

Part 3: University Organizational Context

Please respond to the following questions based on your genuine experiences at work. Mark "√" next to the option that best reflects your feelings. There are no right or wrong answers; simply select the option that aligns with your perspective (1-5, where 1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Somewhat agree, and 5 = Strongly agree).

Classification	Item	5	4	3	2	1
11. Manager Support	Managers are willing to provide material support for applying big data technology.					
	Managers are more than willing to take risks with big data technology.					
	Managers are willing to provide human support for big data applications.					
12. Financial Ability	Colleges and universities have strong financial capacity.					
	Universities have sufficient financial capacity to guarantee					

	the expenditure of big data technology applications.					
	The financial strength of universities is sufficient to support the application of big data.					
13. University Management Level	You are very satisfied with the university management level.					
	The management level of colleges and universities can meet the requirements of teachers and students.					
	The management level of colleges and universities is sufficient to cope with complex situations.					
14. University Teaching Level	You think the university teaching ability is very strong					
	The teaching level of colleges and universities can meet the requirements of students.					
	The teaching level of colleges and universities will be higher and higher.					

Part 4: University Environment Context

Please respond to the following questions based on your genuine experiences at work. Mark "√" next to the option that best reflects your feelings. There are no right or wrong answers; simply select the option that aligns with your perspective (1-5, where 1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Somewhat agree, and 5 = Strongly agree).

Classification	Item	5	4	3	2	1
15. Government Support	The government has issued many policies to support the application of big data technology in universities.					
	The government will provide financial support for applying big data technology in universities.					
	The government has provided special incentives for universities to use big data technology.					
16. Competitive Pressure	Universities are facing great competitive pressure.					
	Pressure from other colleges is forcing schools to adopt new technology.					
	The greater the competitive pressure, the greater the willingness to adopt big data					

Part 5: Big Data Technology Adoption

Please respond to the following questions based on your genuine experiences at work. Mark "√" next to the option that best reflects your feelings. There are no right or wrong answers; simply select the option that aligns with your perspective (1-5, where 1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Somewhat agree, and 5 = Strongly agree).

Classification	Item	5	4	3	2	1
17. Behavioral intention	The application of big data in university management is very necessary.					
	The willingness to actively learn big data is vital.					
	I hope to apply big data to university management.					
18. Actual act	I take the initiative to learn big data technology every week.					
	A university big data management platform has been established.					
	University big data has achieved deep integration.					

BIOGRAPHY

NAME	Miss Chunmei SHAO
TELEPHONE NO.	+86 15969468284
ADDRESS	Yang Lin Zhen, Songming Country, Kunming City, Yunnan Province, China
EDUCATIONAL BACKGROUND	Major: Visual Communication Chongqing Technology and Business University
GRADUATION APPROVAL DATE	JUNE 2013
OCCUPATION	Teacher