

# Digital transformation, resource allocation, and operational efficiency: Basis for performance improvement framework for universities in China

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## Abstract

In this era of swift technological advancements, there have been great changes in the Chinese higher education system specifically due to the integration of digital technology. They need to increase competitiveness and satisfy the expectations of students and faculty, Chinese private universities are increasingly turning to digital technologies and effective resource allocation to improve various aspects of their operations. It is not only changing functions and roles of educational institutions but also redefining operational efficiency. The research sought to evaluate Chinese private universities' digital transformation, resource allocation, and operational efficiency while also putting forth a performance improvement framework. This study employed an adapted modified questionnaire as the main data collecting tool in order to evaluate the data gathered using a descriptive research methodology. The 400 participants were mostly members of the teaching and non-teaching staffs of Chinese private institutions. Using the analytical software SPSS, it was empirically studied by weighted mean, further demonstrating the relationship within digital transformation, resource allocation and operational efficiency. Based on the investigation, process automation, technological infrastructure and research and innovation are closely related to digital transformation. Using cut-to-edge digital tools will enhance the quality of teaching and non-teaching staffs' administrative tasks and research output. In terms of resource allocation, there are significant relationships among human resource allocation, technology investment and facilities and equipment. That is to say, the more rational resource allocation for both physical and non-physical assets, the better the staff to optimize their efficiency and ensure the security and safety. Based on the operational efficiency, job performance, communication and collaboration and data collection and storage have a profound impact on operational efficiency. It also revealed that the better the job performance, communication and collaboration and data collection and storage will be, the higher operational efficiency is. A framework for performance improvement is suggested and grounded on the subsequent statistical findings. Digital transformation has a positive impact on operational efficiency and positive impact on the dimensions of resource allocation. The dimensions of resource allocation have a positive impact on operational efficiency.

**Keywords:** digital transformation, resource allocation, operational efficiency

## **Digital transformation, resource allocation, and operational efficiency: Basis for performance improvement framework for universities in China**

### **1. Introduction**

Nowadays, it is clear that colleges play a crucial position to impact the total country's intellectual, social, and economy improvement. China's higher education framework has experienced considerable development in later decades, confronting a noteworthy increment within the number of colleges and student enrollment, particularly for private colleges. In parallel with the extension, the college has set more prominent accentuation on making strides of the quality of teaching, cultivating investigate greatness, and making worldwide competitiveness. However, a huge number of private universities ignores the importance of digital transformation and resource allocation so that their operational efficiency can not help the university to support the rapid expansion of enrollment.

Digital transformation incorporates a significant effect not only on teaching, learning, research but also on daily administration at the university. If universities can take advantages of digital transformation and resource allocation, China could be a dynamic center of innovation, research, and intellectual pursuit with better operational efficiency, making it a standout among other countries in this digital transformative time. In today's interconnected society, where information is readily available, universities have an even greater obligation to rethink their educational responsibilities through digital strategies that transcend time and place. However, these transformational efforts require significant resource deployment to enable universities to make effective strategic decisions about the allocation of human resource, technological investment, and facilities and equipment resources.

At the same time, the efficient allocation of resources is increasingly critical in the chase of academic development, financial feasibility, and operational effectiveness. The effectiveness of resource allocation is crucial to solve the problem of lack of resources for innovation and entrepreneurship education in Chinese institutions (Wang et al., 2023). As for human resources, it includes the dissemination of workforce and staff, the administration of staff workload, and the recruit of gifted people who contribute to accomplishing regulation goals. Technological investment allocation contains the cost-effective technological budget, suitable decision-making policy, research capabilities and the creation of suitable conditions for academic and research activities. The distribution of facilities and equipment ensure the physical campus comforts and determines the optimal utilization.

Improvement in yield but at the same time, minimization of inputs, has become a great critical point for most of the colleges who are increasingly striving for operational efficiency. The efficiency impact is not only about the financial health of institutions but also regarding several aspects including academic quality, faculty, productivity, student performances, etc. and of course, the competitive nature of universities. The coming together of these three forces, namely digital transformation, resource allocation, and operational efficiency, has led to the Chinese universities to face challenging dynamic of the multiple variables. Finally, in an analysis, Wang et al. (2021) observed that colleges can realize the greatest attributable improvements when optimizing the three aspects simultaneously. Although this digital era offers a great new platform for possibilities to expand educational reach and streamline administrative steps, it needs investment of many formidable resources to make it a success.

A thorough analysis found by Wei et al. (2022) showed that universities voluntarily undergo digital transformation and also successful resource allocation not only for national progress but also for the success of the universities' well-being and reputation. Although the universities are highlighting more of the advantages of digital technology in education, innovation, and research, they should be able to put their resources into effective

use to support their proposals. Furthermore, it is also important to prioritize the operational efficiency into the first position so the resources can be employed efficiently. Thus, these interacting factors should be studied, and a general framework, which can also help with the development of Chinese higher education for sustainable development, should be developed.

Compared with public universities, China's private universities are facing the more change of era on promoting innovation, cultivating research excellence, and offering high-quality education. There has a big gap between public and private universities and government always distribute more resource and chances to public university which lead to all the first class universities are made of public universities, which is a vicious circle. Meanwhile, private universities concentrate only on profit they can make and ignore the importance of a unified and perfect operational process, advanced digital teaching and learning technologies and effective resource allocation. Meanwhile, the magnitude of the task is underscored by the many obstacles that universities face in effectively allocating resources to optimize operational efficiency while harnessing the potential of digitalization. Chinese private universities are a complex topic related to between digital transformation, resource allocation, and descended of operational efficiency embedded in them that makes this study, a difficult examination. It is an engaging adventure that might uncover important and beneficial information about improving the performance of the university, being a source of continuous improvement, and making a significant impact on the rapidly changing world of higher education in not only China, but globally as well.

**Objectives of the Study** - This study aimed to assess the digital transformation, resource allocation, and operational efficiency of Chinese private universities to come up a framework to improve the performance of universities in China. Specifically, it aimed to assess the digital transformation of universities in terms of process automation, technological infrastructure, and research and innovation; determine the university resource allocation in terms of human resource allocation, technology investment, and facilities and equipment; determine the operational efficiency in terms of job performance, communication and collaboration; data collection and storage. Also, it aimed to test the significant relationship among digital transformation, resource allocation and operational efficiency and come up with a performance improvement framework that can be adopted by the universities in China.

## 2. Methods

**Research Design** - Descriptive research design was employed in this study to facilitate the interpretation of the gathered data, the questionnaire served as the principal data collection instrument. According to Atmowardoyo (2018), the descriptive technique entails gathering data to address inquiries regarding the present condition of the subject under investigation. The descriptive research method is a straightforward approach that aims to describe and explain existing occurrences, rules, and ideas via thorough comprehension and verification. It is a general overview of numerous theories, and it is primarily about explaining other people's arguments, yet it is crucial in scientific study. It has the ability to inquire in a specific direction, expose drawbacks, explain occurrences, and introduce personal encounters. The researcher obtained data from participants by distributing questionnaires. This method was employed to efficiently gather the data of the respondents. Therefore, the correlation between the three variables of digital transformation, resource allocation and operational efficiency was obtained.

**Participants of the Study** - In this research, 400 participants were included from both teaching and non-teaching staff from chosen private institutions in China. All of the individuals who participated in the questionnaire survey were employed as staff in universities. The researcher selected both teaching and non-teaching personnel as survey subjects in order to investigate the integration of digital transformation, resource allocation, and operational efficiency, which is the main objective of this study. It pertains not just to education but also to daily administrative tasks. The respondents were made up of 226 females, accounting for 56.5 percent of the participants, and 174 females, or 43.5 percent, demonstrating that more women than men work in private universities in China. This is in line with the prevailing trend of having a higher number of

women than males in university faculties (Editorial Department of Social Reference, 2018).

**Data Gathering Instrument** - Taking into consideration the objectives of this study, the researcher conducted a predictive study on the instructors working at a few institutions in China. This study was done using an empirical research approach, and the necessary data were obtained via the use of questionnaires. The numbers 1~4 indicate the level of agreement of the respondents with the question items, with higher numbers indicating a stronger alignment between their beliefs and the substance of the questions. The Likert scale consists of four particular response options: 1 - strongly disagree, 2 - disagree, 3 - agree, 4 - strongly agree. The survey used an adapted questionnaire that was segmented into four sections. The first part is demographic profile of the respondents, such as age, working experience, educational background. The remaining part conducts study, analysis, and statistics from three perspectives: digital transformation, resource allocation and operational efficiency. The questionnaire describes digital transformation in terms of process automation, technological infrastructure. It evaluates resource allocation from the aspects of human resource allocation, technology investment allocation and facilities and equipment allocation. Operational efficiency is assessed via job performance, communication and collaboration, and data collection and storage.

To guarantee the reliability, stability, and consistency of our questionnaire and scale, the internal consistency and reliability of the questionnaire samples were assessed using Cronbach's alpha analysis test. Currently, within academic circles, academics often use the reliability coefficient to represent dependability while doing Cronbach's alpha study. As the dependability coefficient increases, so does the reliability of the measurement. The coefficient has a value ranging from 0 to 1. In general, if the coefficient is below 0.6, it is typically deemed that the internal consistency dependability is inadequate. When the scale hits a range of 0.7-0.8, it indicates a significant level of dependability. When the scale achieves a value between 0.8 and 0.9, it indicates a high level of dependability. When the scale reach over 0.9, it means that the scale has excellent reliability. Cronbach Alpha coefficients are more than 0.8. Out of these, the coefficients for three elements, namely human resource allocation, technology investment allocation, and facilities and equipment allocation, are all over 0.9. The ending is deemed "Excellent". The values for process automation, technological infrastructure, research and innovation, job performance, communication and collaboration, and data collection and storage are all over 0.8. The conclusion is deemed as "Good". The highest value is 0.920 while the lowest coefficient is 0.820. The data demonstrates a high level of reliability and quality, making it suitable for future large-scale questionnaire surveys.

**Data Gathering Procedure** - The researcher used published thesis, books, papers, and journals as primary sources to compile and acquire data or information. The sample included a wide variety of private universities and data were collected based on university by university. In order to eliminate systematic bias brought on by differences in economic development across regions, the research subjects were recruited from three regions in China: eastern, central, and western. Additionally, the questionnaires were collected from a variety of provinces and universities located within these three regions. This was done to ensure that the sample data and research findings are applicable to a wider range of situations. Following the approval of the final questionnaire from the adviser, the researcher reached out to the individual responsible for overseeing the human resource management or teaching management department of each institution. The individuals in charge disseminated the questionnaire to university teaching and non-teaching staff of private universities in three different regions to get 400 responses. The staff willingly completed the questionnaire and were thereafter collected. The surveys were conducted either in person by the researcher or via the use of Wjx, to guarantee the precision and privacy of the findings. Wjx is an advanced online platform that specializes in conducting professional questionnaire surveys, examinations, evaluations, and voting. Its main aim is to provide customers robust and user-friendly tools for designing online questionnaires, collecting data, generating custom reports, analyzing survey results, and more. A total of 400 surveys were gathered between May 16 and June 22, 2024. There were 400 valid surveys, with an effective rate of 100%.

**Data Analysis** - This paper used a variety of statistical analysis tools to count, analyze, and interpret data in

order to test the significant relationship between digital transformation, resource allocation, and operational efficiency, as well as to develop a performance improvement framework that can be adopted by private universities in China. Weighted Mean and Rank were employed to evaluate the digital transformation of universities in terms of process automation, technological infrastructure, and research and innovation. Additionally, the objective was to ascertain the allocation of university resources in terms of human resource allocation, technology investment allocation, and facilities and equipment. The operational efficiency was determined by utilizing digital transformation and strategically allocating resources in terms of job performance, communication and collaboration, and data collection and storage. According to the Shapiro-Wilk Test, the data set was not normally distributed, as the p-values of all variables were less than 0.05. In order to ascertain the significance of the relationship, Spearman's rho was implemented as part of the non-parametric tests. In addition, SPSS version 28 was employed to process all data in order to improve the interpretation and analysis of the study's findings.

**Ethical Considerations** - The voluntary participation of respondents played a vital role during the approach of study. To make the questionnaire more efficient, ethical consideration was ensured. Ethical issues were considered during the procedure of the study in order to prove that any information gathered was used only for research intention, thereby maintaining the quality and integrity of the study. In addition, it was made clear that if the respondents want to withdraw from the research, they have the right to do that at any stage. Moreover, the respondent should only participate based on informed consent. The researcher also made sure that each respondent was informed via email and call. Then, the researcher promised that privacy and anonymity of interviewees are of utmost importance and must be ensured. Also, participants of the study were not harmed in any way, and priority was given to respect for the dignity of research participants. Finally, the primary data were kept away from the misleading information and biased presentation for raw data was avoided.

### 3. Results and discussion

**Table 1**

*Summary Table on Digital Transformation of Universities*

Key Result Areas	Composite Mean	VI	Rank
Process Automation	3.10	Agree	2
Technological Infrastructure	3.09	Agree	3
Research and Innovation	3.28	Agree	1
Composite Mean	3.16	Agree	

*Legend: 3.50-4.00=Strongly Agree; 2.50-3.49=Agree; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree*

Table 1 presents the summary outcome of digital transformation with a composite mean of 3.16. Among the indicators under digital transformation, research and innovation ranked first with mean value of 3.28. The level of digital transformation exhibited similarities in process automation and technological infrastructure, as indicated by mean scores of 3.10 and 3.09, ranking 2 and 3 respectively. The digital transformation in private higher education institutions in China is moderately evident, as assessed by the teaching and non-teaching staff. This assessment considers process automation and technological infrastructure. It is highly probable that the employees see their educational institution as a highly successful organization in terms of digital transformation. Based on the analysis of tabular data, when university teachers use the digital tools, it has the most significant impact on research and innovation development. According to the study of Marion et al. (2020), digital tools have a far wider and more profound influence on research and innovation development. They impact the output and efficiency of processes, while also facilitating novel arrangements of individuals and teams.

In terms of process automation, the mean 3.10 shows that the participants think that the digital transformation is very relevant to the process automation. They admit that their colleges widely using process automation to ensure the academic development and daily operational activities. It helps the private college to decrease the manual mistakes and save costs. In terms of technological infrastructure, the interviewees agree that their colleges in China are equipped by enough technological infrastructure and also keep it up to date; it

obtained a weighted mean of 3.09. It shows that Chinese universities have made significant investments in both funds and technology for the infrastructure building of their campuses, which is inherently complicated (Zhou, 2018). The university resource allocation is summarized in Table 2. The results clarify the pertinent resource allocation indicators from three different angles: human resource allocation, technology investment and facilities and equipment. According to the composite mean value of the measure, which is 3.06, the respondents' degree of resource allocation was quite obvious. It is evident that the three sub-variables in resource allocation—human resource allocation at 3.06, technology investment at 3.03, and facilities and equipment at 3.09—have somewhat similar ratings. It demonstrates that these three factors are proper and suitable for interpreting resource allocation.

**Table 2***Summary Table on University Resource Allocation*

Key Result Areas	Composite Mean	VI	Rank
Human Resource Allocation	3.06	Agree	2
Technology Investment	3.03	Agree	3
Facilities and Equipment	3.09	Agree	1
Grand Composite Mean	3.06	Agree	

*Legend: 3.50-4.00=Strongly Agree; 2.50-3.49=Agree; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree*

Even though China completed the educational reform, the resource is not as adequate as thought. Because of a scarcity of resources for innovation and entrepreneurship education at Chinese universities during the age of multidimensional subjects pursuing this form of education, resource allocation effectiveness is critical. In the new era, boosting higher education resource allocation efficiency is the only method to efficiently use education resources and accomplish sustainable growth in higher education (Ma et. al.,2021). Facilities and equipment got the highest rank with weighted mean of 3.09. The primary condition and hardware guarantee of instructional development and academic research activities in colleges and universities is the school facility. Under the institutional framework that is dominated by pertinent national laws and regulations, the school facility administration system of Chinese universities and colleges has obtained its initial form. School facility management companies have been established by the majority of universities and colleges in accordance with the policy requirements.

Next in rank is human resource allocation with a weighted mean of 3.06. China has a policy called “ the strategy on developing a quality workforce in the new era”. It emphasizes the utilize of human and talents. As a pillar industry in the development of education, Chinese universities should pay more attention to the allocation and utilization of human resources and talents. Technology investment (3.03) obtained the third rank. China has shown remarkable improvement in higher education within the past decade establishing a solid foundation that incorporates advanced technologies into learning and researching. This focus is in line with China's broader national strategy to offer strategic automatic priority to realize its vision of being an innovative nation in the technological era.

**Table 3***Summary Table on Operational Efficiency*

Key Result Areas	Composite Mean	VI	Rank
Job Performance	3.08	Agree	2.5
Communication and Collaboration	3.08	Agree	2.5
Data Collection and Storage	3.10	Agree	1
Grand Composite Mean	3.09	Agree	

*Legend: 3.50-4.00=Strongly Agree; 2.50-3.49=Agree; 1.50-2.49=Disagree; 1.00-1.49=Strongly Disagree*

Table 3 presents the summary of operational efficiency. The findings show the relevant indicators of operational efficiency from three aspects: job performance, communication and collaboration and data collection and storage. The mean value of the index is 3.09. As shown on table 3, data collection and storage scored 3.10,

ranking first; communication and collaboration and job performance ranked 2nd with a score of 3.08. It shows that these three aspects are appropriate and appropriate to interpret the relevant indicators of operational efficiency.

The universities were suggested to use two-stage DEA models to evaluate the efficiency scores of 52 Chinese universities in 2014 from both internal and external perspectives. The primary findings suggest that the average operational efficiency of universities is comparatively high, with approximately 53 percent of them being efficient, as indicated by both internal and external evaluations (Chen et al., 2023). Generally speaking, under the new situation and new era, there are varieties of tools for data collection and storage, it is more practical to store and get the data safely and effectively. Incorporating technologies in performance management makes it easier to monitor employee productivity and rates of engagement and provide relevant feedback as necessary. It also improves analysis of performance indicators for the institution and makes data-driven decision-making possible because it finds areas where problems lie and can offer solutions on how they should be addressed. Subsequently, lack of up-to-date skills and knowledge compromises the quality of services delivered by the employees, which in turn affects the university's performance levels by providing online training programs that support continuing professional development.

Technology- automation of clerical activities in organizations decreases or eliminates manual effort, time and mistakes needed in completing repetitive clerical activities so that organizational staff can appropriately use time and energy on other relevant or important organizational activities and increase the speed at which clerical activities are executed. The digital platforms and other applications such as the project management software and other communication applications that are incorporated within the working environment improve and facilitate teamwork and sharing of information and thus improving the flow of activities. Performance analysis and reporting on a daily, weekly, monthly or at any other determined frequency is also paramount in offering a clear picture of the emerging KPIs for redesign and enhancement. Further, the use of technology for active employee participation and for incentives and rewards through games or ratings, or constant appreciation results in productiveness and employee satisfaction. Altogether, these specific strategies align with the individual contributions of each worker on the job as well as their teamwork to achieve the overarching goals of the university as an organizational institution oriented to achieving better performance, maintain high standards of education, and compete in the modern educational environment, which is shifting toward digitalization. Established in 2013, "Counting On Me" has emerged as a prominent computing platform at the university level in China. The platform has been used by over 900 scientific research teams and 180 undergraduate and graduate courses. It has facilitated the publishing of over 400 publications in prestigious academic journals like Science and Nature. Additionally, it has provided more than 10,000 students with the opportunity to finish their "cloud-based practice". It is obvious this data storage and collection platform will write a new chapter for digital education development.

**Table 4**

*Relationship Between Digital Transformation and Resource Allocation*

Variables	rho	p-value	Interpretation
<b>Process Automation</b>			
Human Resource Allocation	0.522**	< .001	Highly Significant
Technology Investment	0.636**	< .001	Highly Significant
Facilities and Equipment	0.590**	< .001	Highly Significant
<b>Technological Infrastructure</b>			
Human Resource Allocation	0.593**	< .001	Highly Significant
Technology Investment	0.578**	< .001	Highly Significant
Facilities and Equipment	0.626**	< .001	Highly Significant
<b>Research and Innovation</b>			
Human Resource Allocation	0.642**	< .001	Highly Significant
Technology Investment	0.606**	< .001	Highly Significant
Facilities and Equipment	0.629**	< .001	Highly Significant

\*\* . Correlation is significant at the 0.01 level

The correlation between digital transformation and resource allocation is illustrated in Table 4. The results of the computation of the rho-values, which range from 0.522 to 0.642, suggest a moderate to strong direct relationship between the sub variables of digital transformation and resource allocation. The p-values that were obtained are all less than the  $0.01\alpha$  level. This implies that there is a substantial correlation between resource allocation and digital transformation. In other words, the more effective the resource allocation, the better is the digital transformation. The empirical results indicate that each dimension of digital transformation has a positive impact on each dimension of resource allocation. This result is a strong indication that digital transformation can have a significant impact on resource allocation, and enhancing digital transformation is an effective method of improving the effectiveness of resource allocation.

The allocation of resources in Chinese universities has been considerably enhanced as a result of digital transformation, which has resulted in substantial positive outcomes. In terms of private universities in China, in fact, they are still for-profit enterprises. Only reasonable allocation of resources can maximize the profits of enterprises. Embracing digital transformation means these institutions have fully utilized human resources; this has been achieved by making sure academic and administrative faculty is used effectively in a way that is productive, flexible and result-oriented. These advanced technological solutions have helped condition innovative teaching methods, ground-breaking research, and expedite administrative processes. Enhanced facilities and modern equipment have built a healthy backbone that complements the academic and research mandates of both universities. Digital tools have been integrated to help people make better decisions - both strategic or data-driven ones; manage resources; and perform better. Consequently, digital transformation has not only significantly improved the operational productivity of Chinese universities but also enhanced their international competitiveness and capacity of global education and research.

Educational equity theory, which was developed in the 1960s and is based on social justice principles (Gümüş et al., 2021), prioritizes equitable educational procedures and outcomes, equal educational opportunities, and fair resource allocation (Zahra, 2021). According to the study of Zhu et al. (2024), the factors such as resource allocation, educational opportunities, and equity in outcomes can be substantially influenced by the relationship between the digital divide and platform adoption.

**Table 5**

*Relationship Between Digital Transformation and Operational Efficiency*

Variables	rho	p-value	Interpretation
<b>Process Automation</b>			
Job Performance	0.567**	< .001	Highly Significant
Communication and Collaboration	0.580**	< .001	Highly Significant
Data Collection and Storage	0.507**	< .001	Highly Significant
<b>Technological Infrastructure</b>			
Job Performance	0.641**	< .001	Highly Significant
Communication and Collaboration	0.605**	< .001	Highly Significant
Data Collection and Storage	0.601**	< .001	Highly Significant
<b>Research and Innovation</b>			
Job Performance	0.584**	< .001	Highly Significant
Communication and Collaboration	0.552**	< .001	Highly Significant
Data Collection and Storage	0.562**	< .001	Highly Significant

\*\* Correlation is significant at the 0.01 level

The correlation between operational efficiency and digital transformation is illustrated in Table 5. A moderate to strong direct relationship between the sub variables of digital transformation and operational efficiency is suggested by the computed rho-values, which range from 0.507 to 0.641. The p-values that were obtained are all less than the  $0.01\alpha$  level. This implies that there is a substantial correlation between operational efficiency and digital transformation. In other words, the more effective the operation of the universities, the better is the digital transformation. The empirical results indicate that each dimension of operational efficiency is positively influenced by digital transformation. This result is a strong indication that digital transformation can



significantly influence operational efficiency. Enhancing digital transformation is a viable approach to improving the effectiveness of daily operations.

Process automation saves time on administrative tasks and ultimately helps faculty and staff perform at their best, communicate and collaborate more effectively and focus on the most strategic and educational aspects of their work. This means the implementation of state-of-the-art technological infrastructure, so performance is optimized, communication is seamless, and data is managed effectively, safely. The benefits of this infrastructure are necessary for the needs of a contemporary college or university. Those universities, where research and innovation are predominant gives the universities a better place academically in nature. This would result in a greater output and reputation of research projects among Chinese private universities through the provision of access to advanced research tools and by promoting interdisciplinarity within their universities. Rigorous research methodologies require systems to collect and store data effectively, as well as to uphold secure and efficient data management.

Together, these components also help to form an academic ecosystem that strengthens the quality of education for students and makes it easier for faculty and staff to reach their career aspirations. Through these and other mechanisms, Chinese private universities can maintain the competitiveness of their programs and offer quality education and research opportunities. Efficient and targeted education governance will be established by administrators. The efficacy of education management can be improved and a solid foundation for well-informed education decisions can be established by implementing AI and big data technologies to facilitate corporate collaboration, process optimization, structural remodeling, and targeted management (Zhou et al., 2023).

**Table 6**

*Relationship Between Resource Allocation and Operational Efficiency*

Variables	rho	p-value	Interpretation
<b>Human Resource Allocation</b>			
Job Performance	0.573**	< .001	Highly Significant
Communication and Collaboration	0.582**	< .001	Highly Significant
Data Collection and Storage	0.520**	< .001	Highly Significant
<b>Technology Investment</b>			
Job Performance	0.636**	< .001	Highly Significant
Communication and Collaboration	0.646**	< .001	Highly Significant
Data Collection and Storage	0.596**	< .001	Highly Significant
<b>Facilities and Equipment</b>			
Job Performance	0.570**	< .001	Highly Significant
Communication and Collaboration	0.596**	< .001	Highly Significant
Data Collection and Storage	0.592**	< .001	Highly Significant

\*\**. Correlation is significant at the 0.01 level*

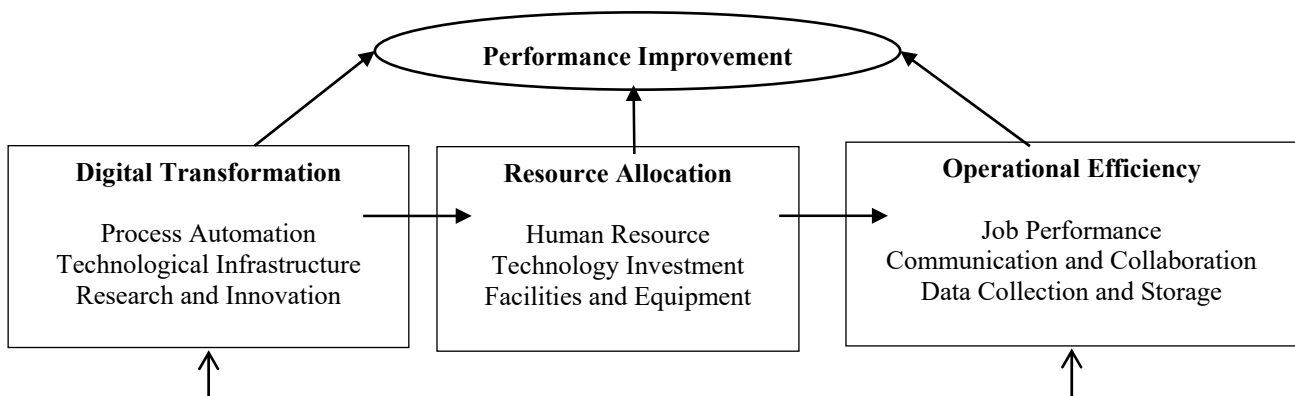
The correlation between operational efficiency and resource allocation is demonstrated in Table 6. The results of the computation of the rho-values, which range from 0.520 to 0.646, suggest a moderate to strong direct relationship between the sub variables of operational efficiency and resource allocation. The p-values that were obtained are all less than the  $0.01\alpha$  level. This implies that there is a substantial correlation between operational efficiency and resource allocation. In other words, universities operate more efficiently when they allocated resources effectively. The empirical results demonstrate that each dimension of operational efficiency is positively influenced by each dimension of resource allocation. This result is a strong indication that resource allocation can significantly influence operational efficiency, and that effectively allocating resources is a critical step in enhancing the effectiveness of daily operations. Ma et al. (2021) agreed that the efficacy of resource allocation is a critical research aspect of the efficiency of higher education. It was stated in the study of Wang et al. (2021) that the efficacy of innovation and entrepreneurship education is positively impacted by the input of university resources, students' resources, and platform resources. From an economics standpoint, Ma (2020) pointed out that the optimal allocation of higher education resources meant the rational distribution and effective employment of these resources to enhance the quality and efficacy of school operations. It can be obviously seen

that these institutions have been able to optimize the use of both human and material resources, reduce waste, and expedite their operations through the effective allocation of resources to optimize operational efficiency, which is facilitated by sophisticated digital tools and technologies.

### ***Proposed Performance Improvement Framework***

A framework for performance improvement in the universities in China was developed to motivate all teaching and non-teaching staff to actively use digital platforms and effectively allocate resources in their work at the private universities in China. Furthermore, this will be a useful approach to raise the quality of teaching and services provided by the universities and to increase the level of global competitiveness of the education institutions.

The figure below shows the integrated framework for performance improvement in Chinese universities. Based on the theoretical analysis of the relationship between the dimensions of digital transformation such as resource allocation and operational efficiency, the results of the empirical study show that the dimensions of digital transformation, resource allocation have a significant positive effect on the improvement of operational efficiency. Therefore, strengthening the appliance of digital platforms and the rational allocation of different kinds of resources at the strategic level is an effective way to improve university's operational efficiency. It is obvious that successful performance improvement requires that the digital transformation and resource allocation tend to be rationally used.



*Figure 1 Performance Improvement Integration Framework*

Based on a thorough theoretical analysis of the relationship between the dimensions of digital transformation and the dimensions of resource allocation, and through empirical research, the results show that the dimensions of digital transformation have a positive effect on the dimensions of resource allocation. Digital transformation plays a vital function in encouraging resource allocation. Therefore, an effective use of digital platforms is a necessary procedure for guaranteeing resource allocation, especially nowadays that the distribution of educational resources is extremely unequal while the main goal for the private university is make profit,. Thus, digital transformation plays a vital role in the resource allocation to control the cost in the universities.

## **4. Conclusions and recommendations**

The respondents moderately agreed on the progress of digital transformation. The respondents moderately agreed on resource allocation in terms of human resource allocation, technology investment and facilities and equipment. The respondents agreed that operational efficiency considers job performance, communication and collaboration and data collection and storage. There is highly significant relationship between digital transformation, resource allocation and operational efficiency. A framework aimed at enhancing operational efficiency has been developed to improve the performance of Chinese universities. Based on the findings of this

study, the researchers put up the following suggestions and recommendations: The university administration may form cross-functional digital transformation committees comprising members from IT, academics, finance, and administration to oversee digital transformation initiatives, initiate a campaign to raise awareness and promote participation in digital transformation efforts, including workshops, seminars, and hackathons and build robust digital platforms to align educational goals with current needs, thereby improving efficiency and reliability. The university administration may enhance operational efficiency through use of visitor management, access control systems, record keeping, and equipment control procedures. The university HR may implement a human resource allocation plan with dedicated committees for fair distribution, utilizing feedback and balanced scorecards for evaluation. The university executives and strategic planners may adopt the framework to achieve performance improvement. Future researchers may explore the long-term impacts of digital transformation, resource allocation on operational efficiency in universities and investigate additional variables like cost effectiveness.

## 5. References

- Atmowardoyo ,H.(2018) Research Methods in TEFL Studies: Descriptive Research, Case Study, Error Analysis, and R & D ISSN 1798-4769 Journal of Language Teaching and Research, Vol. 9, No. 1, pp. 197-204, DOI: <http://dx.doi.org/10.17507/jltr.0901.25>
- Chen, Y., Pan, Y., Liu, H., Wu, H., & Deng, G. (2023). Efficiency analysis of Chinese universities with shared inputs: An aggregated two-stage network DEA approach. *Socio-Economic Planning Sciences*, 90, 101728.
- Editorial Department of Social Reference. (2018). Problems reflected by imbalance between male and female teachers in colleges and universities. *Social Reference*. <https://baijiahao.baidu.com/s?id=1606671415469107604&wfr=spider&for=pc>
- Gümüş, S., Arar, K., & Oplatka, I. (2021). Review of international research on school leadership for social justice, equity and diversity. *Journal of Educational Administration and History*, 53(1), 81-99.
- Marion, T., & Fixson, S. (2020). The Transformation of the Innovation Process: How Digital Tools are Changing Work, Collaboration, and Organizations in New Product Development\*. *Journal of Product Innovation Management*.
- Ma, D., & Li, X. (2021). Allocation Efficiency of Higher Education Resources in China. *International Journal of Emerging Technologies in Learning (iJET)*, 16(11), 59-71.
- Wang, P., & Chen, S. (2021). Intersections of Digitalization, Resources, and Efficiency. *Asian Journal of Higher Education*, 20(1), 56-70.
- Wang, C., & Fu, B. (2023). A study on the efficiency of allocation and its influencing factors on innovation and entrepreneurship education resources in Chinese universities under the five-in-one model. *The International Journal of Management Education*, 21(1), 100755.
- Wei, R., & Lu, Z. (2022). Digital Transformation and University Performance: An Integrative Review. *Journal of Chinese Higher Education Insights*, 20(1), 7-21.
- Zahra, S. A. (2021). The resource-based view, resourcefulness, and resource management in startup firms: A proposed research agenda. *Journal of Management*, 47(7), 1841-1860.
- Zhou, L., Meng, W., Wu, S., & Cheng, X. (2023). Development of Digital Education in the Age of Digital Transformation: Citing China's Practice in Smart Education as a Case Study. *Science Insights Education Frontiers*, 14(2), 2077-2092.
- Zhou, Z. (2018). Innovative Thought of Tendering Management Mechanism of Universities and Colleges in China under New Circumstances--Taking North China Electric Power University as an Example., 2, 52.
- Zhu, H., Pongtornkulpanich, A., & Chankoson, T. (2024). Development Model of Factors Influencing the Adoption of Online Education Platforms for Promoting Educational Equity in Chinese Higher Education. *Educational Administration: Theory and Practice*, 30(4), 5738-5752.

