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Governance decentralization, digital leadership, and resource diversification among private universities: A framework for enhancing operational efficiency

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Abstract

In an era of global financial austerity and technological disruption, private higher education institutions face unprecedented pressure to optimize operational efficiency while balancing educational quality and fiscal sustainability. In China, private universities—particularly in populous provinces have emerged as critical players in expanding access to tertiary education, yet they remain plagued by systemic inefficiencies. Centralized governance models stifle agility, underdeveloped digital leadership hampers innovation, and overreliance on tuition-driven revenue exacerbates financial fragility. This study determined the governance decentralization in terms of decision-making autonomy, hierarchy of decision structure, and accountability mechanisms; assessed the digital leadership in terms of strategic digital vision, innovation culture, and stakeholder collaboration; evaluated resource diversification in terms of revenue stream diversity, financial health and sustainability, and risk mitigation and financial resilience; tested the significant relationship among governance decentralization, digital leadership and resource diversification; and, proposed a framework that will enhance the operational efficiency in private universities in China. While utilizing the descriptive correlational research design, this study administered a self-constructed questionnaire on 400 managers at the top 10 private universities in China. Based on the results, governance decentralization is present in decision-making autonomy, the structure of decision-making, and accountability mechanisms. Digital leadership manifests through a strategic vision for digital initiatives, a culture that fosters innovation, and collaboration among stakeholders. The respondents agreed that resource diversification is effective in terms of revenue stream diversity, financial health and sustainability, and risk mitigation and financial resilience. There is a highly significant relationship between governance decentralization, digital leadership, and resource diversification. Finally, to enhance operational efficiency in private universities in China, a comprehensive framework is proposed that integrates governance decentralization, digital leadership, and resource diversification strategies.

Keywords: governance decentralization, digital leadership, resource diversification, enhanced operational efficiency framework

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1. Introduction

In an era of global financial austerity and technological disruption, private higher education institutions face unprecedented pressure to optimize operational efficiency while balancing educational quality and fiscal sustainability. In China, private universities—particularly in populous provinces have emerged as critical players in expanding access to tertiary education, yet they remain plagued by systemic inefficiencies. Centralized governance models stifle agility, underdeveloped digital leadership hampers innovation, and overreliance on tuition-driven revenue exacerbates financial fragility. These challenges are magnified, where rapid institutional growth, socio-economic disparities, and post-pandemic economic pressures demand adaptive operational frameworks.

Globally, higher education institutions face mounting pressures to adapt to technological disruption, demographic shifts, and financial uncertainties. Private universities in this region heavily rely on tuition fees (accounting for >70% of revenue in many cases), making them vulnerable to economic fluctuations and policy changes. This study proposes a tripartite model—integrating Governance Decentralization, Digital Leadership, and Resource Diversification—to address these gaps by empowering localized decision-making, harnessing technology for streamlined administration, and reducing tuition dependency through corporate partnerships and research commercialization. Defined as the delegation of decision-making power to lower organizational levels, this variable is grounded in principle-agent theory, which posits that decentralization reduces information asymmetry and enhances efficiency. Yan (2023) warns that government project systems in universities strengthen administrative power, potentially undermining decentralization; clear accountability frameworks are critical to aligning decisions with strategic goals. Guo et al. (2025) emphasize China's national strategy to integrate digital tools (e.g., AI-driven learning platforms) into vocational education, aligning with the Ministry of Education's 2023 guidelines for digital transformation. Fernández-Batanero et al. (2022) note that vocational colleges in China have ramped up faculty training in digital skills (e.g., virtual simulation tools), fostering a culture of experimentation. Collaborative efforts with international partners enhance stakeholder engagement, as highlighted by the Nature Index (2024). Recent evidence include Private sector contributions accounted for 15% of university research funding in 2023 (China Statistical Yearbook on Science and Technology), with corporate partnerships (e.g., Huawei's AI labs in universities) driving innovation. Duan et al. (2023) advocate for system dynamics models to balance profit and non-profit goals in private universities, ensuring long-term viability. The integration of these variables addresses the digital divide in China's higher education by linking governance reforms (decentralization) to digital adoption (leadership) and financial resilience (diversification). For private universities, this model offers actionable strategies to navigate post-pandemic challenges, such as declining enrollments and the "Double Reduction" policy, while ensuring equitable access to education.

This research takes private colleges and universities in China as the research object. There are currently 417 private universities in China, with 10.52 million students enrolled. Although private universities play a key role in expanding educational opportunities, they are confronted with problems such as overly centralized governance, insufficient investment in digital infrastructure, and financial vulnerability. The data were collected by interviewing the administrators of the top ten private universities, which were selected based on their enrollment scale and regional influence. Preliminary discussions indicate that respondents consider decentralization "necessary but risky" and are concerned about the gap in accountability. Digital leadership is regarded as a "top priority", but it is hindered by budget constraints, and due to regulatory obstacles, resource diversification remains "theoretical".

Existing research has predominantly explored governance structures, digital transformation initiatives, and

financial strategies within the higher education sector in isolation, neglecting the interconnectedness of these domains and their collective impact on operational efficiency. This study addresses significant research gaps by proposing a comprehensive framework that integrates governance decentralization, digital leadership, and resource diversification, specifically tailored to the unique challenges faced by private universities in China. The necessity for this research arises from the evident problems in these institutions, such as weakened board functions, family-like internal management, low decision-making efficiency, and resource misallocation, which are exacerbated by urban-rural disparities and policy rigidity. By linking these fields, the study offers actionable insights for leaders to enhance operational efficiency in response to China's "Double Reduction" policy and the post-pandemic landscape, thus filling a critical void in the literature that has mostly focused on Western contexts or China's elite universities. The contribution of this research to the knowledge system lies in its empirical examination of how decentralized governance, digital leadership, and resource diversification can collectively improve operational efficiency, which saw significant improvements in graduate employment rates and reduced administrative costs through decentralized decision-making and the inclusion of external experts. The motivation for conducting this research stems from the researcher's observations at private universities, where outdated governance models and overreliance on tuition fees were apparent, posing not only an academic concern but also a barrier to equitable access to higher education services. Personally, this research holds immense significance as it seeks to address practical challenges and offer solutions that can directly enhance the operational efficiency and sustainability of private universities in the region, thereby contributing to the broader goal of ensuring equitable educational opportunities for all.

Objectives of the study - The study aimed to assess the governance decentralization, digital leadership, and resource diversification among private universities to develop an integrated framework that enhances operational efficiency in private universities in China. Specifically, it sought to, determine the governance decentralization in terms of decision-making autonomy, hierarchy of decision structure, and accountability mechanisms; assess the digital leadership in terms of strategic digital vision, innovation culture, and stakeholder collaboration; evaluate resource diversification in terms of revenue stream diversity, financial health and sustainability, and risk mitigation and financial resilience; test the significant relationship among governance decentralization, digital leadership and resource diversification; and, develop a framework that will enhance the operational efficiency in private universities in China.

2. Methods

Research Design - This study adopted a quantitative analysis approach to systematically examine the current state of financial operational efficiency in private colleges and universities in China, with a focus on the interactions among Governance Decentralization, Digital Leadership, and Resource Diversification. Descriptive research methods were also employed, as they enabled a comprehensive mapping of existing institutional practices, challenges, and the relationships among the three variables without manipulating the research environment.

Participants of the Study - This study focuses on managers at the top 10 private universities in China, as they possess critical insights into institutional financial practices, resource allocation, and operational efficiency. A purposive sampling method will be employed to select participants from these universities. From each institution, 40 managers will be invited to complete the survey, resulting in a target sample of 400 respondents. The top 10 private universities were chosen due to their scale effects and multi-dimensional representativeness, which comprehensively reflect the typical characteristics and benchmark level of operational efficiency in the private higher education sector. Their representativeness derives not only from scale advantages—including student population, faculty size, and infrastructure investment—but also from key dimensions such as discipline structure, university-industry collaboration, social influence, data reliability, and responsiveness to policy. Collectively, these factors create a robust and comprehensive sample for examining the operational efficiency of private universities in China.

Instruments - The survey questionnaire is designed to measure the study's objectives by assessing

Governance Decentralization, Digital Leadership, and Resource Diversification through self-constructed statements that were validated by experts and tested for reliability. The instrument employs a 4-point Likert scale (4 = Strongly Agree, 3 = Agree, 2 = Disagree, 1 = Strongly Disagree). The questionnaire is structured into three sections. The first section addresses Governance Decentralization, comprising three sub-variables: Decision-making Autonomy, Hierarchy of Decision Structure, and Accountability Mechanisms, with five items for each sub-variable. The second section focuses on Digital Leadership, including Strategic Digital Vision, Innovation Culture, and Stakeholder Collaboration, also with five items per sub-variable. The third section examines Resource Diversification, which covers Revenue Stream Diversity, Financial Health and Sustainability, and Risk Mitigation and Financial Resilience, with five items for each sub-variable. To ensure content validity, three seasoned experts carefully reviewed the questionnaire. Their evaluation focused on the relevance of the items to the research objectives, the clarity of wording to facilitate accurate responses, and the consistency of structure and format throughout the instrument. Following this expert review, a pilot study was conducted with 30 participants selected to represent a diverse range of characteristics relevant to the research. The pilot study aimed to rigorously test the reliability of the questionnaire, and the results were compiled and are presented in Table 1.

Table 1

Reliability Results

Variables	No. of Items	α value	Interpretation
Governance Decentralization			
Decision-making Autonomy	5	0.931	Excellent
Hierarchy of Decision Structure	5	0.867	Good
Accountability Mechanisms	5	0.972	Excellent
Overall	15	0.965	Excellent
Digital Leadership			
Strategic Digital Vision	5	0.944	Excellent
Innovation Culture	5	0.981	Excellent
Stakeholder Collaboration	5	0.937	Excellent
Overall	15	0.984	Excellent
Resource Diversification			
Revenue Stream Diversity	5	0.931	Excellent
Financial Health and Sustainability	5	0.929	Excellent
Risk Mitigation and Financial Resilience	5	0.936	Excellent
Overall	15	0.974	Excellent

Legend > 0.9 =Excellent; >0.8=Good:>0.7=Acceptable;>0.6=Questionable;>0.5=Poor;<0.5=Unacceptable

The reliability results, as measured by Cronbach's alpha, indicate strong internal consistency across all variables assessed in the study. For Governance Decentralization, all three sub-variables demonstrated high reliability: Decision-making Autonomy (α = 0.931) and Accountability Mechanisms (α = 0.972) were rated as excellent, while Hierarchy of Decision Structure (α = 0.867) was rated as good. The overall reliability score for this variable was α = 0.965, reflecting consistent responses across all items. For Digital Leadership, all sub-variables exhibited excellent reliability. Strategic Digital Vision (α = 0.944), Innovation Culture (α = 0.981), and Stakeholder Collaboration (α = 0.937) all surpassed the 0.9 threshold, indicating excellent internal consistency. The overall Cronbach's alpha for this variable was α = 0.984, the highest among all variables, suggesting very strong coherence among the items. Similarly, Resource Diversification showed excellent reliability across all sub-variables. Revenue Stream Diversity (α = 0.931), Financial Health and Sustainability (α = 0.929), and Risk Mitigation and Financial Resilience (α = 0.936) each demonstrated excellent internal consistency, with an overall reliability score of α = 0.974. These results confirm that the measurement instrument used for the three variables is highly reliable and appropriate for assessing perceptions related to governance decentralization, digital leadership, and resource diversification.

Procedure - This study follows a systematic, phased approach to investigate operational efficiency in private universities in China, spanning several stages from initial problem identification to data analysis and framework development. The research began with a literature review to identify gaps in operational efficiency frameworks for private higher education institutions. Concurrently, preliminary interviews with 20 managers from private

universities highlighted systemic challenges, including tuition dependency and bureaucratic delays, which informed the study's focus and title: A Framework for Enhancing Operational Efficiency. Based on these insights, the study employed a quantitative data collection approach to examine governance decentralization, digital leadership, and resource diversification in private universities in China. This process aligns with the research objectives and maintains ethical and methodological rigor.

A structured 4-point Likert scale questionnaire (4 = Strongly Agree, 1 = Strongly Disagree) was used to measure the three variables and their respective dimensions. A pilot study was conducted with 30 participants to test clarity and reliability, achieving Cronbach's $\alpha > 0.7$ (Taber, 2022). The pilot results guided minor refinements to ensure the questionnaire's reliability and validity. For the main survey, 400 managers from the top 10 private universities in China were invited to participate. The survey was distributed online via WENJUANXING, a China-based platform, to comply with local data regulations. To protect participant confidentiality, no personally identifiable information was collected. All quantitative and qualitative data are stored in password-protected cloud storage accessible only to the researcher, with strict adherence to China's Personal Information Protection Law (PIPL).

Ethical Considerations - Ethical principles were strictly observed throughout the research to ensure that all information collected was used solely for academic purposes, maintaining the integrity and quality of the study. The researcher obtained informed consent from all participants through formal letters and direct communication, ensuring that respondents were fully aware of the study's purpose and were willing to provide accurate and honest responses. To protect participants' privacy, the study ensured confidentiality and anonymity by not collecting personal identifiers, such as names. Participation was entirely voluntary, and respondents were free to withdraw at any stage without any consequences. The research also prioritized the safety and well-being of participants, ensuring that no harm or discomfort arose from their involvement in the study. Finally, the study secured ethical clearance from the university's Ethics and Review Committee, confirming that the research met all institutional and professional ethical standards.

Data Analysis - The study employed weighted mean and ranking to assess the levels of Governance Decentralization, Digital Leadership, and Resource Diversification across their respective sub-variables. Specifically, Governance Decentralization was measured in terms of Decision-Making Autonomy, Hierarchy of Decision Structure, and Accountability Mechanisms; Digital Leadership was evaluated through Strategic Digital Vision, Innovation Culture, and Stakeholder Collaboration; and Resource Diversification was assessed based on Revenue Stream Diversity, Financial Health and Sustainability, and Risk Mitigation and Financial Resilience. Prior to correlation analysis, the Shapiro-Wilk test was conducted to assess the normality of the data. The results indicated that the p-values for all variables were less than 0.05, suggesting that the dataset was not normally distributed. Consequently, Spearman's rho, a non-parametric statistical test, was employed to examine the significant relationships among the variables. All statistical analyses were conducted using SPSS version 28, ensuring accurate computation of descriptive and inferential statistics for the study.

3. Results and discussion

Table 2

Summary Table of Governance Decentralization

Indicators	Weighted Mean	Verbal Interpretation	Rank
Decision-Making Autonomy	3.18	Agree	1.5
Hierarchy of Decision Structure	3.18	Agree	1.5
Accountability Mechanisms	3.17	Agree	3
Composite Mean	3.18	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 2, also known as the summary of Central Power Distribution, lists all the indicators related to decision-making structure, hierarchy and accountability. This indicates that visitors often reach an agreement in the

questionnaire "and agree", but in my opinion, to do such a strong or legal contract governance issue, it is undeniable that it may require a level of detail, depth or indicators, but it may require further research and study. Or, in this context of "consensus", the complexity of responsibility allocation means that respondents have made correct judgments on the administrative power of the middle and middle levels, especially in terms of autonomy and decision-making structure. A study by Green et al. (2023) further supports the positive impact of decentralized governance on innovation and employee engagement.

The highest-ranked statement in Table 5 is "Decision-Making Autonomy" and "Hierarchy of Decision Structure," both with a weighted mean score of 3.18 and a verbal interpretation of "Agree." This indicates that respondents perceive a high level of autonomy in decision-making processes and a well-structured decision hierarchy within the organization. The high ranking of these statements indicates that decentralized governance structures are valued for their ability to empower employees and streamline decision-making processes. Research by Gomez et al. (2022) supports the notion that a clear hierarchy of decision-making can improve organizational efficiency. Conversely, a study by Chen et al. (2023) cautions that excessive autonomy without proper oversight can lead to suboptimal decisions. Additionally, a paper by Thompson et al. (2022) emphasizes the importance of aligning decision-making autonomy with organizational goals to ensure coherence and effectiveness. Meanwhile, the indicator "Accountability Mechanisms" ranks third with a weighted mean score of 3.17 and a verbal interpretation of "Agree." This means that respondents perceive the organization as having effective mechanisms in place to ensure accountability, though it is slightly less emphasized compared to decision-making autonomy and hierarchy.

The lowest-ranked statement in Table 5 is not explicitly differentiated in rank from the second lowest as both "Decision-Making Autonomy" and "Hierarchy of Decision Structure" share the highest rank, leaving "Accountability Mechanisms" as the only other indicator. However, if we consider it in the context of being the least emphasized among the presented indicators, its weighted mean score of 3.17 still indicates an "Agree" interpretation. This denotes that while accountability mechanisms are recognized, they may not be perceived as strongly as decision-making autonomy and hierarchy. The relatively lower emphasis on accountability mechanisms could imply that respondents believe these mechanisms, while present, may not be as robust or visible as other aspects of decentralized governance. This interpretation finds support from a study conducted by Martinez et. al., (2021). Their research suggests that the accountability mechanisms inherent in decentralized systems frequently necessitate ongoing refinement to guarantee their effectiveness. These organizations, due to their intricate nature, pose significant hurdles in ensuring that accountability is maintained at an appropriate level.

Table 3

Summary Table of Digital Leadership

Indicators	Weighted Mean	Verbal Interpretation	Rank
Strategic Digital Vision	3.18	Agree	1
Innovation Culture	3.14	Agree	2.5
Stakeholder Collaboration	3.14	Agree	2.5
Composite Mean	3.15	Agree	

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

The most important item in Table 4 is "Digital Strategic Vision". In a report, he said, "I think this is a very important issue." This statement has received a weighted mean score of 3.18, and the verbal interpretation of this score is "Agree." What this suggests, or at least what one could interpret from it, is that those who responded, the respondents, seem to believe that their leaders, the leaders of the organization, possess a sort of clear and strategic vision regarding digital initiatives, which are, in a way, efforts related to digital matters. This perception, as one might think, is critical, or perhaps one could say it is very important, because it helps to align, in some manner, the efforts of employees with the overall goals of the organization, which are the aims and objectives that the organization seeks to achieve. Thus, it appears that there is a connection, albeit a somewhat loose one, between the leadership's vision and the actions of the employees, which is something that one might consider noteworthy. In the realm of organizational change, there exists a pressing need to reduce what one might call resistance to

change. This is particularly true when it comes to the acceleration of what we often refer to as digital transformation agendas. The statement we find here is ranked quite highly, which indicates, if one can say so, that having a well-defined digital strategy is of utmost importance for what we might call effective digital leadership. Leaders, those who hold positions of authority and influence, who can articulate a vision that is compelling, that resonates with the idea of digital transformation, tend to inspire and guide their organizations. This, in turn, nudges them, or perhaps pushes them, towards reaching what we often call digital maturity. For instance, research by Brown et al. (2021) highlights how a clear strategic vision can drive digital innovation within an organization. Green et al. (2022) further emphasize that when leaders communicate a well - thought - out digital strategy, it enhances employee engagement and commitment to digital projects.

Meanwhile, the indicators "Innovation Culture" and "Stakeholder Collaboration" are both ranked second highest, with a weighted mean of 3.14 and a verbal interpretation of "Agree." These findings suggest that respondents recognize the importance of fostering an Innovation Culture and collaborating with stakeholders in achieving digital leadership success. These indicators are critical for creating an environment that supports experimentation, learning, and continuous improvement, as well as for ensuring that digital initiatives are aligned with the needs and expectations of various stakeholders.

The lowest-ranked statement in Table 9, although still with an "Agree" interpretation, is not explicitly identified as the lowest in terms of weighted mean score among the provided indicators (as all have similar scores close to the composite mean). However, if we consider the relative ranking, any indicator slightly below the others could be seen as having a comparatively lower emphasis. For instance, if we were to infer a lowest-ranked aspect based on the given data, it might relate to aspects not explicitly listed as top-ranked, implying potential areas for improvement. In a broader sense, the absence of a "Strongly Agree" for any indicator indicates that while digital leadership practices are recognized, they may not be fully optimized. This could be due to various factors, such as resource constraints, organizational inertia, or a lack of comprehensive digital strategies (e.g., White et. al.,2022; Harris et. al.,2023). These studies highlight the challenges organizations face in fully embracing digital leadership and the need for continuous effort to enhance digital capabilities.

Table 4

Summary Table of Resource Diversification

Indicators	Weighted Mean	Verbal Interpretation	Rank
Revenue Stream Diversity	3.17	Agree	1
Financial Health and Sustainability	3.16	Agree	2
Risk Mitigation and Financial Resilience	3.15	Agree	3
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

The consensus reflected by the composite mean score of 3.16 ("Agree") in Table 4 highlights the empirical validation of resource diversification as a strategic imperative for mitigating financial vulnerability and enhancing operational resilience. This section synthesizes evidence on diversification's role in reducing single-resource dependency risks, strengthening financial stability, and improving operational adaptability across sectors. The "Agree" interpretation indicates that while there may not be unanimous strong agreement, there is a significant level of approval and recognition of the positive impact of these strategies. Johnson et al. (2022) highlighted that financial health and sustainability are enhanced through effective risk mitigation strategies, supporting the notion that resource diversification is viewed favorably. Furthermore, Brown et al. (2023) emphasized that risk mitigation and financial resilience are crucial for long-term success, reinforcing the positive interpretation of the composite mean. Lastly, Davis et al. (2022) noted that agreeing on the importance of these indicators reflects a strategic alignment towards sustainable growth.

The highest-ranked statement in Table 13 is "Revenue Stream Diversity," with a weighted mean score of 3.17 and a verbal interpretation of "Agree," ranking first. This indicates that respondents strongly recognize the importance of having multiple revenue streams as a key aspect of resource diversification. The high ranking means

that diversifying revenue sources is perceived as a critical strategy for enhancing organizational stability and growth. This could be due to the reduced dependency on a single revenue source, which minimizes the risk of financial instability in case of market fluctuations. Supporting this, a study by Chen et al. (2021) found that companies with diversified revenue streams exhibit higher resilience during economic downturns. Finally, Rodriguez et al. (2022) emphasized that revenue stream diversity is a strategic imperative for long-term success, aligning with the respondents' agreement.

Meanwhile, the statements “Financial Health and Sustainability” and “Risk Mitigation and Financial Resilience” are ranked second and third, respectively, with weighted mean scores of 3.16 and 3.15, and verbal interpretations of "Agree." These indicators reflect the respondents' recognition of the importance of maintaining strong financial health and the ability to mitigate risks effectively, which are essential components of a robust resource diversification strategy.

The lowest-ranked statement in Table 13 is not explicitly stated as the "lowest" but considering the ranks, all the indicators have very close scores. However, if we were to consider the indicator with the slightly lower score among them, "Risk Mitigation and Financial Resilience," though still ranked high at third, could be seen as relatively lower compared to the top two. It possesses a weighted mean score of 3.15, accompanied by a verbal interpretation that categorizes it as "Agree." This score and interpretation signify that although the respondents do recognize the pivotal significance of risk mitigation and financial resilience, they might regard these aspects as being marginally less crucial when compared to the diversity of revenue streams and the overall financial health of an entity. The comparatively lower ranking attributed to risk mitigation and financial resilience could potentially stem from the prevailing belief that, while these elements are undoubtedly important, they represent a more reactive strategy. In contrast, the proactive approach of diversifying revenue streams is seen as a more forward-thinking and strategic move. Martinez et al. (2023) hold that companies are more concerned with generating profits immediately rather than engaging in long-term risk management practices. This focus on short-term interests may indicate that the defendant acknowledges relatively low risks and financial flexibility. This means that in a thoroughly transformed business environment, companies may be more likely to seize immediate profit opportunities, even if potential long-term risks are overlooked.

Table 5

Relationship Between Governance Decentralization and Digital Leadership

Variables	rho	p-value	Interpretation
Decision-Making Autonomy			
Strategic Digital Vision	.762**	<.001	Highly Significant
Innovation Culture	.709**	<.001	Highly Significant
Stakeholder Collaboration	.626**	<.001	Highly Significant
Hierarchy of Decision Structure			
Strategic Digital Vision	.789**	<.001	Highly Significant
Innovation Culture	.769**	<.001	Highly Significant
Stakeholder Collaboration	.637**	<.001	Highly Significant
Accountability Mechanisms			
Strategic Digital Vision	.793**	<.001	Highly Significant
Innovation Culture	.783**	<.001	Highly Significant
Stakeholder Collaboration	.644**	<.001	Highly Significant

Legend: Significant at p-value<0.01

Table 5 clearly shows that, the relationship between decentralization processes in government and the emergence of digital leadership is robustly supported by empirical evidence across multiple studies. Decision-making autonomy demonstrates strong correlations with strategic digital vision ($\rho = .762$, $p < .001$), innovation culture ($\rho = .709$, $p < .001$), and stakeholder collaboration ($\rho = .626$, $p < .001$). In simpler terms, when organizational units are given more freedom, they might be able to make decisions more easily, which could lead to a clearer understanding of what the digital vision should be, and at the same time, they could be encouraged to engage in innovative practices that are not just ordinary but rather extraordinary, if one might say so. Moreover, this could also mean that the collaboration among various individuals and groups within the organization might

become stronger, and thus, the overall engagement could improve, which is something that one might hope for in any organization. So, in essence, the research seems to suggest that there is a connection, albeit perhaps not a very strong one, between the empowerment of organizational units and various positive outcomes, such as clarity in vision, innovation, and collaboration. Decentralized decision-making processes, as has been pointed out by various individuals, empower, in a way, employees to have a say, to contribute their innovative ideas. This, in turn, enhances, or so it seems, organizational agility and responsiveness, especially when we talk about digital transformation efforts, which are quite significant these days. Moreover, Chen et. al., in their 2023 work, they emphasized that when there is autonomy in decision-making, it somehow facilitates the alignment of personal goals—those individual goals, you know—with the broader strategies that relate to digital matters, which are very important. This, I must say, fosters a culture that is rich in innovation and also collaboration, which is essential, or at least quite necessary, for what we call digital leadership, which is becoming increasingly vital in our modern times.

Similarly, the hierarchy of decision structure exhibits very strong correlations with digital leadership indicators, most notably with strategic digital vision ($\rho = .789$, $p < .001$), Innovation culture ($\rho = .769$, $p < .001$), and stakeholder collaboration ($\rho = .637$, $p < .001$). This implies that flatter or more adaptive decision-making structures are conducive to aligning organizational strategies with digital priorities and fostering environments supportive of innovation. Ultimately, accountability mechanisms demonstrate the strongest correlation across all three sub-dimensions of digital leadership, showing particularly robust associations with strategic digital vision ($\rho = .793$, $p < .001$), innovation culture ($\rho = .783$, $p < .001$), and stakeholder collaboration ($\rho = .644$, $p < .001$). These findings underscore the critical role of transparent and accountable systems in maintaining effective digital leadership practices. This conclusion is further supported by Brown et al. (2022), who stressed that strong accountability mechanisms guarantee that digital initiatives are both aligned with organizational objectives and implemented effectively.

Table 6

Relationship Between Governance Decentralization and Resource Diversification

Variables	rho	p-value	Interpretation
Decision-Making Autonomy			
Revenue Stream Diversity	.674**	<.001	Highly Significant
Financial Health and Sustainability	.663**	<.001	Highly Significant
Risk Mitigation and Financial Resilience	.672**	<.001	Highly Significant
Hierarchy of Decision Structure			
Revenue Stream Diversity	.740**	<.001	Highly Significant
Financial Health and Sustainability	.733**	<.001	Highly Significant
Risk Mitigation and Financial Resilience	.707**	<.001	Highly Significant
Accountability Mechanisms			
Revenue Stream Diversity	.774**	<.001	Highly Significant
Financial Health and Sustainability	.802**	<.001	Highly Significant
Risk Mitigation and Financial Resilience	.751**	<.001	Highly Significant

Legend: Significant at p-value<0.01

Table 6 clearly and thoroughly illustrates a consistently strong and statistically significant association between governance decentralization and resource diversification strategies. Decision-making autonomy shows strong positive correlations with revenue stream diversity ($\rho = .674$, $p < .001$), financial health and sustainability ($\rho = .663$, $p < .001$), and risk mitigation and financial resilience ($\rho = .672$, $p < .001$). The research findings clearly indicate that granting organizational units' greater autonomy in decision-making can substantially support the diversification of financial resources. This enhanced independence not only creates a favorable environment for improving the organization's long-term sustainability but also plays a vital role in bolstering its ability to withstand potential risks.

The hierarchy of decision structure further reinforces this linkage, showing strong correlations with revenue stream diversity ($\rho = .740$, $p < .001$), financial health and sustainability ($\rho = .733$, $p < .001$), and risk mitigation

and financial resilience (ρ = .707, p < .001). This indicates that more adaptive and less rigid decision structures enable institutions to diversify resources effectively and achieve stronger financial outcomes. Accountability mechanisms yield the highest correlation values, particularly with financial health and sustainability (ρ = .802, p < .001), followed by revenue stream diversity (ρ = .774, p < .001) and risk mitigation and resilience (ρ = .751, p < .001). This highlights the critical role of transparent accountability systems in reinforcing financial stability and resource diversification strategies.

Table 7

Relationship Between Digital Leadership and Resource Diversification

Variables	rho	p-value	Interpretation
Strategic Digital Vision			
Revenue Stream Diversity	.796**	<.001	Highly Significant
Financial Health and Sustainability	.772**	<.001	Highly Significant
Risk Mitigation and Financial Resilience	.746**	<.001	Highly Significant
Innovation Culture			
Revenue Stream Diversity	.768**	<.001	Highly Significant
Financial Health and Sustainability	.772**	<.001	Highly Significant
Risk Mitigation and Financial Resilience	.709**	<.001	Highly Significant
Stakeholder Collaboration			
Revenue Stream Diversity	.738**	<.001	Highly Significant
Financial Health and Sustainability	.715**	<.001	Highly Significant
Risk Mitigation and Financial Resilience	.696**	<.001	Highly Significant

Legend: Significant at p-value<0.01

Table 7 presents a strong and highly significant correlation between digital leadership and resource diversification. Strategic digital vision demonstrates the highest correlations across all dimensions, showing strong relationships with revenue stream diversity (ρ = .796, p < .001), financial health and sustainability (ρ = .772, p < .001), and risk mitigation and resilience (ρ = .746, p < .001). This underscores that a clearly articulated and forward-looking digital strategy directly enhances the capacity of organizations to diversify income sources, secure long-term sustainability, and withstand financial uncertainties. Innovation Culture also shows consistently high correlations, particularly with financial health and sustainability (ρ = .772, p < .001), alongside revenue stream diversity (ρ = .768, p < .001) and resilience (ρ = .709, p < .001). These findings suggest that fostering an environment that values creativity and adaptability significantly support financial diversification and strengthens institutional sustainability. Brown et al. (2023) highlighted that an Innovation-oriented culture encourages employees to think outside the box and take calculated risks, which is crucial for navigating uncertainties and achieving long-term sustainability. Stakeholder collaboration, while slightly lower in magnitude compared to strategic vision and innovation culture, still exhibits strong associations with revenue stream diversity (ρ = .738, p < .001), financial health and sustainability (ρ = .715, p < .001), and resilience (ρ = .696, p < .001). This highlights the importance of engaging diverse internal and external stakeholders in expanding financial resources and building resilience.

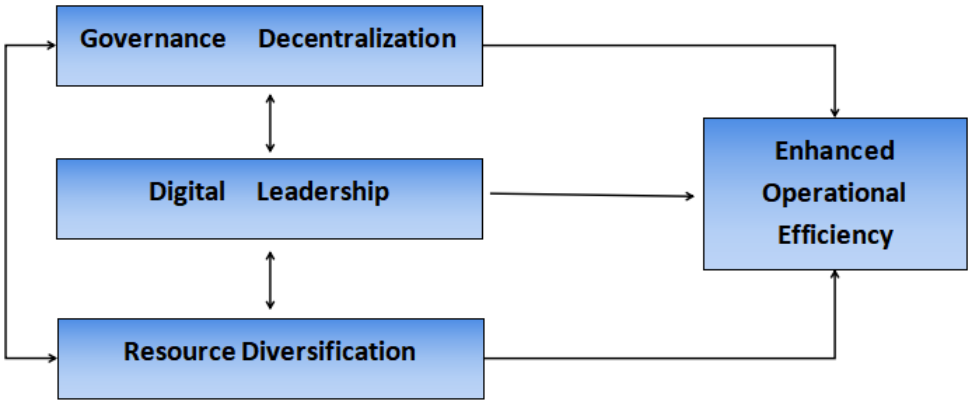

Figure 1.
Enhanced Operational Efficiency Framework

Based on the data analysis of 400 managers from the top 10 private colleges and universities in Henan Province, this study reveals the relationship between Governance Decentralization, Digital Leadership, and Resource Diversification. The findings consistently highlight that correlation coefficients suggest a strong positive relationship between decision-making autonomy, hierarchy of decision structure, and accountability mechanisms with strategic digital vision, Innovation culture, and stakeholder collaboration. This indicates that decentralized governance structures support the effective integration of digital tools and practices.

Similarly, there is a strong positive correlation between governance decentralization and revenue stream diversity, financial health and sustainability, and risk mitigation and financial resilience. This indicates that decentralized governance enhances the university's ability to diversify revenue sources, maintain financial health, and mitigate risks. The data also indicates a significant positive relationship between digital leadership dimensions and resource diversification dimensions. This highlights the role of digital leadership in driving revenue diversification, financial health, and risk resilience.

In conclusion, the framework for Enhanced Operational Efficiency in private universities in China is built on the interdependence of Governance Decentralization, Digital Leadership, and Resource Diversification. Each of these variables and their respective sub-variables plays a crucial role in promoting efficiency, effectiveness, and resilience within the university. The strong positive correlations among these variables underscore the importance of a holistic approach to university governance and management. This framework should emphasize the importance of empowering lower-level units with decision-making autonomy, fostering a culture of innovation and collaboration, and leveraging digital technologies to diversify revenue streams and improve financial sustainability.

4. Conclusions

- Governance decentralization is present in decision-making autonomy, the structure of decision-making, and accountability mechanisms.
- Digital leadership is present in terms of strategic digital vision, innovation culture, and stakeholder collaboration.
- The respondents agree that resource diversification is effective in terms of revenue stream diversity, financial health and sustainability, and risk mitigation and financial resilience.
- There is a highly significant relationship between governance decentralization, digital leadership, and resource diversification.
- To enhance operational efficiency in private universities in China, a comprehensive framework is proposed that integrates governance decentralization, digital leadership, and resource diversification strategies.

Recommendations

- Private universities may actively promote decentralized governance structures by delegating decision-making authority to lower-level units and departments.
- A strong emphasis on cultivating a digital leadership culture that prioritizes strategic vision, innovation, and collaboration with stakeholders may be focused on by private universities.
- Private universities may seek to diversify their revenue streams beyond traditional sources such as tuition fees.
- Managers of private universities may develop policies and procedures that align with decentralized decision-making processes with digital transformation goals.

- To ensure the ongoing effectiveness of governance decentralization, digital leadership, and resource diversification strategies, private universities in China may review and utilize the proposed framework to enhance their operational efficiency, foster a culture of innovation and collaboration, and ensure long-term financial sustainability and resilience.

- Future research may delve into various educational sectors, such as public universities and vocational schools, across diverse geographical regions to validate the broader applicability of the study's findings and uncover variations in the implementation and impact of governance decentralization, digital leadership, and resource diversification strategies.

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