International Journal of Computer Information Systems and Industrial Management Applications
ISSN 2150-7988 Volume 18(2) 2026 pp. 1834-1849
https://doi.org/10.70917/ijcisim-2026-5035
Article

The Impact of Technology Management on Teaching Informatization Management in Zhejiang Province's Education Industry Using Structural Equation Modeling

Weiwei Gao[1], Tongtang Tonglim[2], Chertchai Thurapaeng[3]

[1]Program of Industrial Technology Management, Faculty of Industrial Technology, Muban Chombueng Rajabhat University, Thailand.
[2]Program of Industrial Technology Management, Faculty of Industrial Technology, Muban Chombueng Rajabhat University, Thailand.
[3]Program of Industrial Technology Management, Faculty of Industrial Technology, Muban Chombueng Rajabhat University, Thailand.
*Corresponding Author's Email: cnr.tantiwat@gmail.com

Abstract: This study examines the impact of technology management on Teaching Management Informatization (TMI) in Zhejiang Province's education industry using structural equation modeling. The objectives were to identify key technology-management factors influencing TMI, develop and analyze a structural equation model, and verify the practical use of the model in Wenzhou Business School, Zhejiang, China. The study used a mixed-method design. Quantitative data were collected through questionnaires from 432 complete respondents, including university students, parents, administrators, and instructors. Qualitative and verification data were obtained from stakeholders for model utilization. The model included five independent constructs: Technical Resource Management, Technical Organization Management, Technical Quality Management, Technical Risk Management, and Technical Capacity. TMI was the dependent construct. The results showed that the modified SEM fit the empirical data well ($\chi^2/df = 1.347$, CFI = 1.215, GFI = 0.911, AGFI = 0.943, TLI = 1.001, RMSEA = 0.065, and RMR = 0.061). All five factors had positive and significant direct effects on TMI. Technical Risk Management had the strongest effect (0.733), followed by Technical Quality Management (0.653), Technical Resource Management (0.608), Technical Organization Management (0.534), and Technical Capacity (0.462). The final equation was $TMI = 0.608Tr + 0.534To + 0.653Tq + 0.733Tk + 0.462Tc$, with $R^2 = 0.704$. The model explained 70.4 percent of the variance in TMI. Verification results supported its suitability and practical possibility. The study confirms that teaching informatization depends on integrated technology management rather than isolated digital investment.
Keywords: Technology management; Teaching Management Informatization; structural equation modeling; Technical Risk Management; Zhejiang Province

1. Introduction

The rapid development of information technology has transformed higher education and university management. Universities are expected not only to deliver traditional classroom instruction but also to provide digital learning platforms, online resources, data-supported academic services, and flexible learning environments. In China, education informatization has become a key strategy for improving teaching quality, learning efficiency, educational equity, and institutional governance because information and communication technologies support learning resources, communication, administration, and institutional development (Fedorenko et al., 2019; Channuwong & Kantatian, 2012; Yan & Yang, 2021). However, the success of informatization depends on more than the availability of hardware, software, or online platforms. It depends on how well educational institutions manage technology as a strategic resource.

Technology management is therefore important in the education industry because it involves the planning, organization, coordination, implementation, control, and evaluation of technological resources and capabilities. In educational institutions, technology management helps align digital tools with teaching goals, student services, academic administration, and institutional strategy. It also supports the effective use of infrastructure, human resources, digital platforms, assessment systems, cybersecurity, and professional development (Ma et al., 2021; Bates, 2015; Igbokwe, 2023). Thus, technology management is not only a technical activity but also a managerial process that supports digital transformation in teaching and learning.

Zhejiang Province is an appropriate context for examining this issue because its private universities operate in a competitive and rapidly changing educational environment. These institutions must respond to higher education expansion, digital transformation, student expectations, and the demand for smart-campus services. Many institutions have adopted learning management systems, digital teaching tools, student information systems, and data platforms. Nevertheless, the effectiveness of these technologies differs across institutions, suggesting that technology management is a critical factor in determining the success of Teaching Management Informatization (TMI).

This study identified several practical problems in technology integration. Many schools lack comprehensive technology-management strategies, while some instructors lack training, confidence, and technical support. Limitations in ICT infrastructure, unequal access to digital resources, and uneven implementation across institutions further reduce the effectiveness of digital teaching and learning. These problems are consistent with prior studies showing that digital education requires not only technology access but also facilitating conditions, teacher competence, learning-system readiness, and organizational support (Alismaiel, 2021; Bervell et al., 2022; Hizam et al., 2021).

This study therefore uses structural equation modeling to analyze how five technology-management factors influence TMI in Zhejiang Province's education industry. Structural equation modeling is appropriate because technology management and TMI are latent constructs that require multiple observed indicators and simultaneous analysis of measurement and structural relationships (Schumacker & Lomax, 2010; Tabachnick & Fidell, 2013). The study contributes to technology management, information systems, and education management by providing an empirically tested model explaining the causal relationship between technology-management factors and teaching informatization. It also verifies the model for practical application in Wenzhou Business School.

1.1 Research Objectives

1. To identify the key factors of technology management that influence Teaching Management Informatization in Zhejiang Province's education industry.

2. To develop a structural equation model and analyze the relationship between technology management and Teaching Management Informatization.

3. To verify and utilize the SEM model in Wenzhou Business School, Zhejiang, China.

2. Literature Review

2.1 Technology Management in Education

Technology management refers to the planning, organization, coordination, implementation, control, and evaluation of technological resources and capabilities to achieve institutional goals. In higher education, technology management includes infrastructure development, human resource allocation, leadership and governance, curriculum quality, assessment systems, cybersecurity, digital competence, research and development, and continuous improvement. Effective technology management enables universities to align digital tools with teaching goals, administrative processes, student support, and institutional strategy (Ma et al., 2021; Phasuk et al., 2026; Bates, 2015; Igbokwe, 2023).

2.2 Teaching Management Informatization

Teaching Management Informatization refers to the use of information and communication technology to support teaching, learning, academic administration, and educational decision-making. In this study, TMI consists of three observed variables: technological integration in teaching, learning management systems, and data analytics for educational insights. These elements support classroom interactivity, resource access, assignment management, assessment, performance tracking, curriculum improvement, and data-informed decision-making. Education informatization has been discussed as an important condition for modern higher education because ICT can support learning resources, communication, and institutional development (Fedorenko et al., 2019; Yan & Yang, 2021).

2.3 Structural Equation Modeling

Structural equation modeling is suitable for this study because technology management and TMI are latent constructs that cannot be measured by a single direct indicator. SEM allows the researcher to test the measurement model and the causal relationships among constructs at the same time. It also provides model-fit indices such as χ^2/df, CFI, GFI, AGFI, TLI, RMSEA, and RMR to determine whether the proposed model is consistent with empirical data. Thus, SEM is appropriate for analyzing the multidimensional and causal structure of technology management in education (Schumacker & Lomax, 2010; Tabachnick & Fidell, 2013).

2.4 Conceptual Variables of the Study

The conceptual framework was developed from technology-management theory, education informatization concepts, related research, and expert consideration. The study grouped technology management into five independent latent constructs and TMI as one dependent construct. The observed variables are summarized in Table 1.

Table 1 Research Variables and Observed Indicators

Latent variable	Observed indicators	Role in the model
Technical Resource Management (Tr)	Human resource allocation (Tr1); infrastructure development (Tr2); technology integration (Tr3)	Independent variable
Technical Organization Management (To)	Leadership and governance (To1); communication and collaboration (To2); change management (To3)	Independent variable
Technical Quality Management (Tq)	Curriculum development and design (Tq1); assessment and evaluation practices (Tq2); continuous improvement (Tq3)	Independent variable
Technical Risk Management (Tk)	Risk identification and assessment (Tk1); mitigation strategies (Tk2); monitoring and control (Tk3)	Independent variable
Technical Capacity (Tc)	Skills and competencies (Tc1); research and development (Tc2); technological infrastructure (Tc3)	Independent variable
Teaching Management Informatization (TMI)	Technological integration in teaching (TMI1); learning management systems (TMI2); data analytics for educational insights (TMI3)	Dependent variable

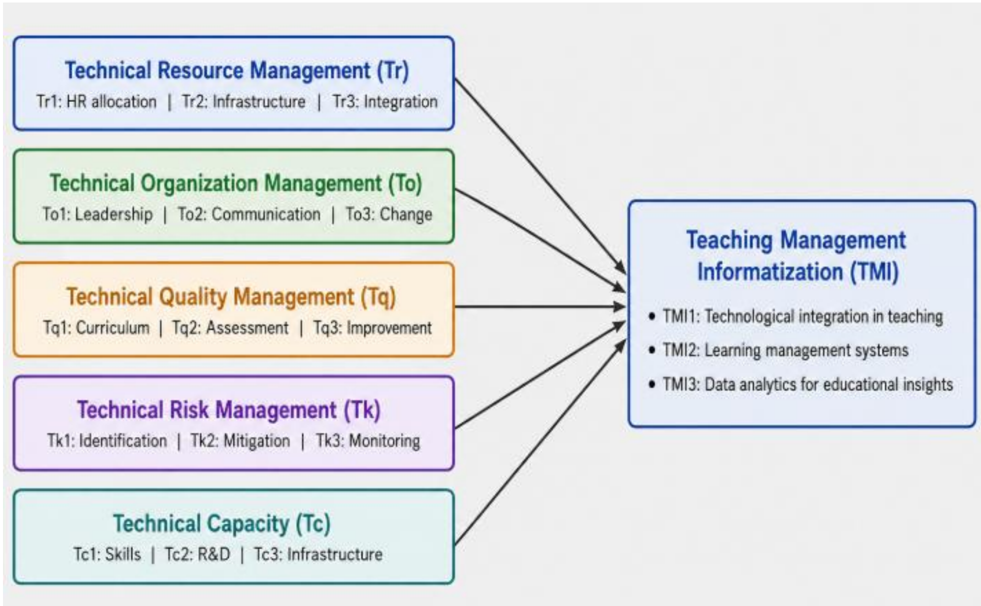

Figure 1 Conceptual Framework of Technology Management and TMI

The conceptual framework above shows that Teaching Management Informatization (TMI) is influenced by five technology-management factors: Technical Resource Management, Technical Organization Management, Technical Quality Management, Technical Risk Management, and Technical Capacity. Each factor includes three observed indicators. Technical Resource Management focuses on human resource allocation, infrastructure, and technology integration. Technical Organization Management covers leadership, communication, and change management. Technical Quality Management includes curriculum, assessment, and continuous improvement. Technical Risk Management involves risk identification, mitigation, and monitoring. Technical Capacity includes skills, research and development, and technological infrastructure. Overall, the figure explains that TMI depends on an integrated technology-management system rather than isolated digital tools.

3. Research Methodology

This study used a mixed-method approach. The quantitative phase used a structured questionnaire to collect data from university students, parents, administrators, and instructors in Zhejiang Province's education industry. The study reported 442 collected questionnaires, of which 432 complete responses were used for quantitative analysis. The sample size was considered suitable for SEM because the study contained multiple latent and observed variables and required sufficient cases for model estimation. This approach is consistent with SEM methodology, which requires adequate sample size and clear model specification before testing structural relationships among latent constructs (Schumacker & Lomax, 2010; Kock & Hadaya, 2018).

The questionnaire measured five independent technology-management constructs and one dependent TMI construct using observed indicators. The independent constructs were Technical Resource Management, Technical Organization Management, Technical Quality Management, Technical Risk Management, and Technical Capacity, while TMI was measured through technological integration in teaching, learning management systems, and data analytics for educational insights. Instrument quality was developed through literature review, expert review, content validity, and reliability consideration. This process reflected the principle that measurement items should represent their constructs clearly before SEM analysis is conducted (Brown & Moore, 2012; Fei et al., 2026; Tabachnick & Fidell, 2013).

Quantitative data analysis included frequency, percentage, mean, standard deviation, normality testing, correlation testing, measurement validity, SEM model fit, direct effects, and hypothesis testing. Normality was examined using skewness and kurtosis, while correlation analysis was used to detect possible multicollinearity before SEM testing. These procedures followed statistical guidelines for assessing data distribution and model suitability (Kim, 2013; Schumacker & Lomax, 2010). The qualitative and verification phases were conducted with stakeholders in Wenzhou Business School to assess the practical suitability and possibility of model utilization. The verification process helped connect the statistical model with institutional application in teaching informatization management. The research process is summarized in Figure 2.

Figure 2 Research Process

The research process used in this study. The process consists of five main steps. The first step is to study and analyze data from concepts, theories, related research, and the research problem. The second step is to design the research by determining the methodology, population, sample group, and variables. The third step is to develop the research instruments and measure their quality through validity and reliability checking. The fourth step is to collect and analyze data using quantitative analysis and structural equation modeling. The final step is to publish and implement the model. Overall, the figure shows a systematic research process linking literature synthesis, instrument quality, SEM analysis, verification, and practical application.

4. Research Results

4.1 Respondent Profile and Implementation Problems

The study reported 432 complete quantitative responses. Most respondents were students, and the descriptive profile indicated that young university stakeholders formed the largest group of respondents. Table 2 summarizes the main respondent profile and technology-management problems used as the basis for SEM analysis.

Table 2 Respondent Profile and Technology-Management Problems (n = 432)

Category	Highest or key result	Number	Percentage
Gender	Male	305	70.6%
Age	19-23 years old	305	70.6%
Education level	Second year	119	27.5%
Status	Student	374	86.6%
Main aspect of TMI	Classroom interactivity	194	44.9%
Influence of technology management	Significantly improved education quality	212	49.0%
Primary challenge	Lack of technical expertise	167	38.7%
Second challenge	Budget constraints	146	33.8%

Table 2 presents the respondent profile and key technology-management problems in the study. The total number of complete respondents was 432. The largest group of respondents was male, with 305 persons or 70.6 percent. In terms of age, respondents aged 19–23 years old also represented the largest group, with 305 persons or 70.6 percent. This shows that most respondents were young university stakeholders. For education level, second-year students formed the largest group, with 119 persons or 27.5 percent. In terms of status, students were the majority, with 374 respondents or 86.6 percent. Regarding Teaching Management Informatization, classroom interactivity was the most recognized aspect, accounting for 194 respondents or 44.9 percent. Moreover, 212 respondents or 49.0 percent believed that technology management significantly improved educational quality. However, the main challenge was lack of technical expertise, reported by 167 respondents or 38.7 percent, followed by budget constraints at 33.8 percent.

4.2 Descriptive Results of Technology-Management Factors

The descriptive results showed that all technology-management factors and TMI were at a high level. Technical Capacity had the highest mean, while Technical Resource Management had the lowest mean, although it was still rated at a high level. The summary is presented in Table 3.

Table 3 Summary of Descriptive Results of Technology-Management Factors and TMI

Rank	Factor	Main observed variables	Mean	S.D.	Level
1	Technical Capacity (Tc)	Skills and competencies; research and development; technological infrastructure	3.87	1.09	High
2	Teaching Management Informatization (TMI)	Technological integration in teaching; LMS; data analytics	3.86	1.27	High
3	Technical Quality Management (Tq)	Curriculum development; assessment and evaluation; continuous improvement	3.83	1.12	High
4	Technical Risk Management (Tk)	Risk identification and assessment; mitigation strategies; monitoring and control	3.83	1.21	High
5	Technical Organization Management (To)	Leadership and governance; communication and collaboration; change management	3.81	1.11	High
6	Technical Resource Management (Tr)	Human resource allocation; infrastructure development; technology integration	3.80	1.10	High

Table 3 presents the summary of descriptive results of technology-management factors and Teaching Management Informatization (TMI). The results show that all factors were rated at a high level, indicating that respondents had positive perceptions of technology management and TMI in Zhejiang Province’s education industry. Technical Capacity ranked first, with a mean of 3.87 and a standard deviation of 1.09. This shows the importance of skills and competencies, research and development, and technological infrastructure in supporting sustainable digital transformation. Teaching Management Informatization ranked second, with a mean of 3.86 and a standard deviation of 1.27, showing that technological integration in teaching, learning management systems, and data analytics was positively perceived. Technical Quality Management and Technical Risk Management both had a mean of 3.83, reflecting the importance of curriculum, assessment, continuous improvement, risk control, and system monitoring. Technical Organization Management and Technical Resource Management were also at high levels, confirming their supporting roles in TMI.

4.3 Data Suitability for SEM

Before SEM analysis, the study examined normality and multicollinearity. The normality test used skewness and kurtosis. The absolute skewness and kurtosis values of all observed variables were within the acceptable criteria, indicating normal distribution. The relationship between variables was tested using Pearson correlation. The coefficients ranged from .352* to .799*, all below the .800 multicollinearity threshold and significant at the .05 level. Therefore, the data were suitable for SEM analysis.

4.4 Model Fit before and after Modification

The initial SEM did not fully meet the model-fit criteria. After model modification, all main fit indices met the required criteria, indicating that the model was consistent with empirical data. The before- and after modifications are shown in Figures 3 and 4, respectively.

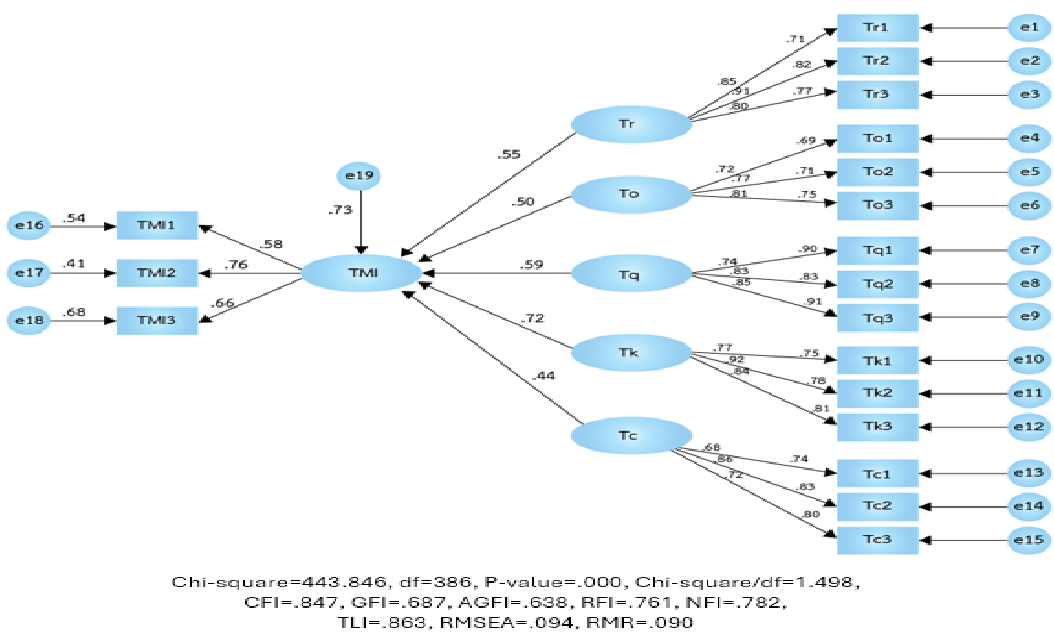

Figure 3 A before-modification of the structural equation model of factors of teaching management affecting teaching informatization management in Zhejiang-Province’s education industry

The before-modification structural equation model of technology-management factors affecting Teaching Management Informatization (TMI) in Zhejiang Province’s education industry. The model includes five independent latent variables: Technical Resource Management (Tr), Technical Organization Management (To), Technical Quality Management (Tq), Technical Risk Management (Tk), and Technical Capacity (Tc). Each latent variable is measured by three observed variables. TMI is the dependent latent variable and is measured by three observed variables: technological integration in teaching, learning management systems, and data analytics for educational insights. The arrows from the five technology-management factors to TMI show the hypothesized causal relationships in the SEM model. However, the model-fit results indicate that the first model was not fully consistent with the empirical data. Although the chi-square/df value was acceptable, other indices such as CFI, GFI, AGFI, TLI, RMSEA, and RMR did not fully meet the required criteria. Therefore, the before-modification model needed improvement before it could be accepted as the final model.

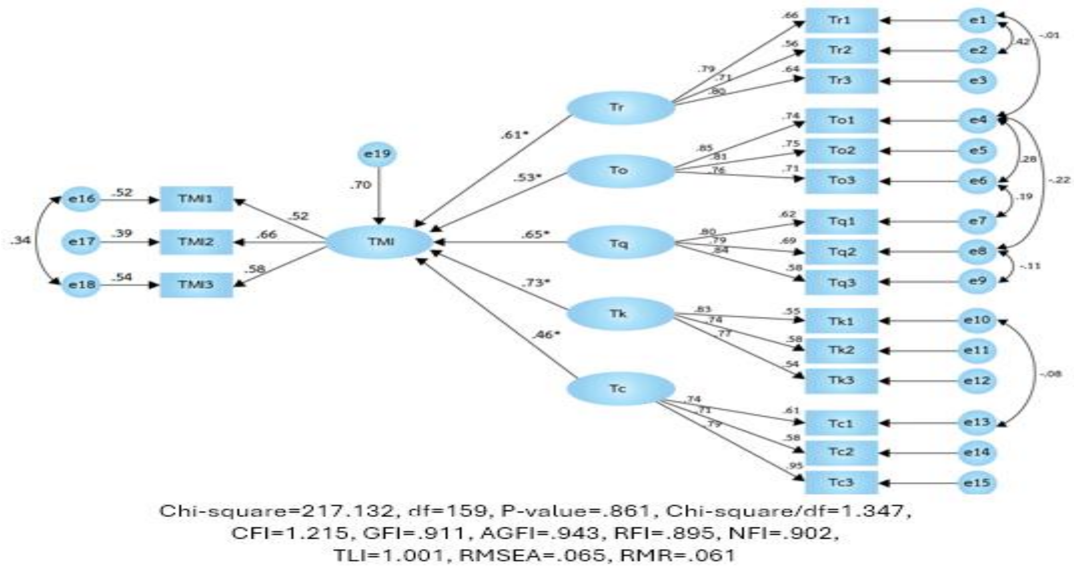

Figure 4 An After-modification of the structural equation model of factors of teaching management affecting teaching informatization management in Zhejiang-Province's education industry

This model keeps the same theoretical structure as the original model, with five technology-management factors influencing Teaching Management Informatization (TMI). However, the model was improved by adjusting relationships among some error terms based on statistical results and theoretical suitability. After modification, the fit indices improved clearly. The chi-square/df value decreased to 1.347, while GFI, AGFI, TLI, RMSEA, and RMR reached acceptable levels. These results indicate that the modified model was more consistent with the empirical data than the first model. The figure also shows that all five factors remained positively related to TMI, confirming that teaching informatization is influenced by an integrated system of technology management. Therefore, Figure 4 became the accepted SEM model for this study. It provides the basis for interpreting the direct effects, hypothesis testing, and final equation explaining how technology management supports TMI in Zhejiang Province's education industry. The comparison is shown in Table 4.

Table 4 Model Fit Indices before and after Modification

Fit index	Criterion	Before modification	After modification	Result after modification
χ^2/df	< 3.00	1.50	1.35	Passed
CFI	≥ 0.95	0.85	1.21	Passed
GFI	≥ 0.90	0.69	0.91	Passed
AGFI	≥ 0.90	0.64	0.94	Passed
TLI	≥ 0.90	0.86	1.00	Passed

RMSEA	< 0.08	0.09	0.07	Passed
RMR	< 0.08	0.09	0.06	Passed
Overall interpretation	-	Not harmonized with empirical data	Harmonized with empirical data	Final model accepted

Table 4 presents the model-fit indices before and after modification of the structural equation model. The results show that the before-modification model was not fully harmonized with empirical data. Although the chi-square/df value was acceptable at 1.50, several important indices did not meet the required criteria, including CFI at 0.85, GFI at 0.69, AGFI at 0.64, TLI at 0.86, RMSEA at 0.09, and RMR at 0.09. After model modification, the fit indices improved clearly. The chi-square/df decreased to 1.35, while GFI at 0.91, AGFI at 0.94, TLI at 1.00, RMSEA at 0.07, and RMR at 0.06 reached acceptable levels. CFI also increased to 1.21, exceeding the stated criterion. Therefore, Table 4 provides evidence that the after-modification SEM model should be accepted for interpreting the relationship between technology management and Teaching Management Informatization.

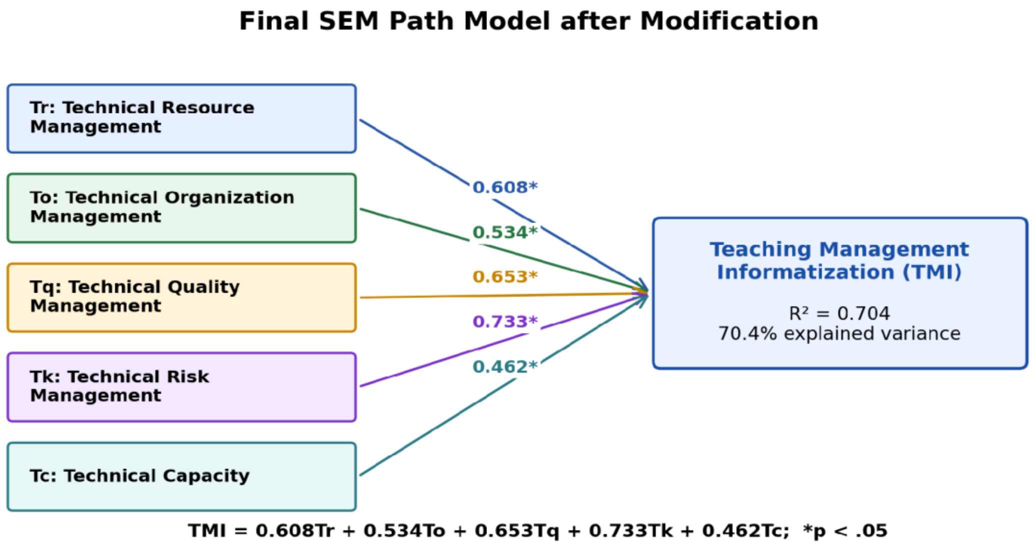

Figure 5 Final SEM Path Model after Modification

The final structural equation model after modification. The figure shows how five technology-management factors directly influence Teaching Management Informatization (TMI) in Zhejiang Province's education industry. The five independent variables are Technical Resource Management (Tr), Technical Organization Management (To), Technical Quality Management (Tq), Technical Risk Management (Tk), and Technical Capacity (Tc). The dependent variable is Teaching Management Informatization (TMI). The arrows from each independent variable to TMI represent the standardized direct effects after the model was modified and accepted.

The final equation of the model is:

TMI = 0.608Tr + 0.534To + 0.653Tq + 0.733Tk + 0.462Tc; R^2 = 0.704

This equation means that all five technology-management factors have positive effects on TMI. Technical Risk Management has the strongest effect on TMI, with a coefficient of 0.733. This indicates that risk identification, mitigation strategies, monitoring, and control are the most important factors for supporting teaching informatization. Technical Quality Management has the second strongest effect, with a coefficient of 0.653, showing the importance of curriculum development, assessment, and continuous improvement. Technical Resource Management also has a strong effect, with a coefficient of 0.608, confirming the importance of human resources, infrastructure, and technology integration.

Technical Organization Management has a coefficient of 0.534, showing that leadership, communication, collaboration, and change management also support TMI. Technical Capacity has the lowest coefficient at 0.462, but it still has a positive and significant effect. The R^2 value of 0.704 means that the model explains 70.4 percent of the variance in TMI. Therefore, Figure 5 confirms that teaching informatization depends on an integrated system of technology management rather than only digital tools or infrastructure.

4.5 Measurement Model Validity

The measurement model was examined through factor loading, construct reliability, and average variance extracted. The study reported that all factor loadings were statistically significant at the .05 level, and all constructs passed the criteria for construct reliability and convergent validity. Table 5 summarizes the measurement model results.

Table 5 Measurement Model Validity after Modification

Latent factor	Observed factors	Standardized loading range	Construct reliability (ρc)	AVE (ρv)	Interpretation
Tr	Tr1, Tr2, Tr3	0.712-0.803	0.924	0.865	Valid
To	To1, To2, To3	0.757-0.852	0.951	0.802	Valid
Tq	Tq1, Tq2, Tq3	0.794-0.837	0.901	0.814	Valid
Tk	Tk1, Tk2, Tk3	0.744-0.832	0.942	0.771	Valid
Tc	Tc1, Tc2, Tc3	0.709-0.792	0.956	0.806	Valid
TMI	TMI1, TMI2, TMI3	0.524-0.662	0.954	0.816	Valid

Table 5 presents the measurement model validity after modification. The table shows that all latent factors were valid according to standardized factor loading, construct reliability, and average variance extracted. Technical Resource Management had standardized loadings between 0.712 and 0.803, with construct reliability of 0.924 and AVE of 0.865. Technical Organization Management showed loadings from 0.757 to 0.852, with reliability of 0.951 and AVE of 0.802. Technical Quality Management, Technical Risk Management, and Technical Capacity also showed acceptable loading ranges and high reliability values. Teaching Management Informatization had loadings from 0.524 to 0.662, with reliability of 0.954 and AVE of 0.816. Therefore, the results confirm that all observed variables appropriately measured their latent constructs in the SEM model.

4.6 Direct Effects on Teaching Management Informatization

The final structural model showed that all five causal variables had positive and significant direct effects on TMI. Technical Risk Management had the highest direct effect, followed by Technical Quality Management, Technical Resource Management, Technical Organization Management, and Technical Capacity. Table 6 and Figure 6 present the direct effects.

Table 6 Direct and Total Effects of Technology-Management Factors on TMI

Rank	Causal variable	Direct effect (DE)	Total effect (TE)	Interpretation
1	Technical Risk Management (Tk)	0.733*	0.733*	Strongest effect; risk identification, mitigation, monitoring, and control are critical for TMI.

2	Technical Quality Management (Tq)	0.653*	0.653*	Shows the importance of curriculum, assessment, and continuous improvement.
3	Technical Resource Management (Tr)	0.608*	0.608*	Shows the role of human resources, infrastructure, and technology integration.
4	Technical Organization Management (To)	0.534*	0.534*	Shows the role of leadership, communication, collaboration, and change management.
5	Technical Capacity (Tc)	0.462*	0.462*	Shows the contribution of skills, R&D, and technological infrastructure.
Model equation	TMI = 0.608Tr + 0.534To + 0.653Tq + 0.733Tk + 0.462Tc	$R^2 = 0.704$	-	The model explains 70.4% of the variance in TMI.

The results in Table 6 show that all five causal variables had positive effects on TMI. Technical Risk Management had the strongest effect, with a direct and total effect of 0.733. This means that risk identification, mitigation strategies, monitoring, and control are the most important factors in supporting TMI. Technical Quality Management ranked second, with an effect of 0.653, showing the importance of curriculum development, assessment, and continuous improvement. Technical Resource Management had an effect of 0.608, followed by Technical Organization Management at 0.534 and Technical Capacity at 0.462. The final model equation was TMI = 0.608Tr + 0.534To + 0.653Tq + 0.733Tk + 0.462Tc, with $R^2 = 0.704$.

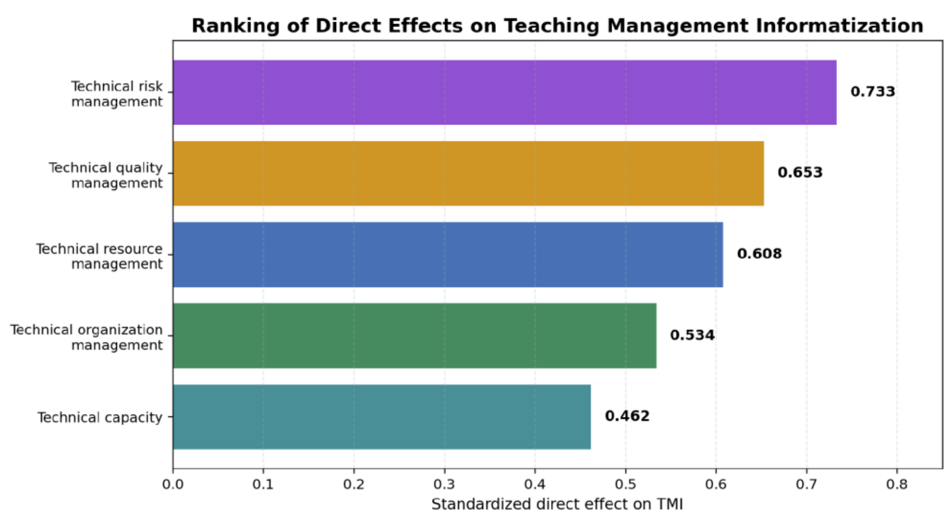

Figure 6 Ranking of Direct Effects on TMI

4.7 Hypothesis Testing

The SEM results supported all research hypotheses as shown in Table 7.

Table 7 Summary of Hypothesis Testing

Hypothesis	Main evidence	Decision
H1: The five technology-management factors are positively related to TMI.	All direct effects were positive and significant at the .05 level.	Accepted
H2: TMI performance results from a combination of multiple factors.	Five factors jointly explained TMI with $R^2 = 0.704$.	Accepted
H3: Different reasons contribute to TMI performance.	Different coefficient magnitudes show different levels of influence: 0.733, 0.653, 0.608, 0.534, and 0.462.	Accepted
H4: TMI performance requires mutual technical capability and technical management elements.	Technical Capacity and the four technical management factors all contributed positively to TMI.	Accepted

Hypothesis 1 was accepted because all five technology-management factors had positive and significant direct effects on Teaching Management Informatization (TMI) at the .05 level. Hypothesis 2 was accepted because the five factors jointly explained TMI, with an R^2 value of 0.704, meaning that the model explained 70.4 percent of the variance in TMI. Hypothesis 3 was accepted because the different coefficient values showed that each factor contributed to TMI at a different level. Hypothesis 4 was also accepted because both Technical Capacity and the four technical management factors positively supported TMI. Therefore, it confirms the validity of the proposed SEM model.

4.8 Verification and Practical Application in Wenzhou Business School

After the SEM model was developed, the study verified the suitability and possibility of its application with stakeholders in Wenzhou Business School. The verification results showed that stakeholders generally agreed that all components were suitable for practical application. Table 8 summarizes the verification results.

Table 8 Summary of Stakeholder Verification Results

Model component	Agreement level	Practical emphasis
Technical Resource Management	99.6% agree	Human resources, infrastructure, and technology integration should be strengthened.
Technical Organization Management	90.0% agree	Leadership, communication, collaboration, and change management should be coordinated.
Technical Quality Management	100.0% agree	Curriculum design, assessment, and continuous improvement should support digital teaching.
Technical Risk Management	86.7% agree	Risk assessment, data protection, system monitoring, and mitigation should be prioritized.

Technical Capacity	100.0% agree	Digital skills, R&D, and technological infrastructure should be developed.
Teaching Management Informatization	100.0% agree	Digital teaching, LMS, and data analytics should be implemented as a connected system.

The qualitative interview results also supported the SEM findings. Parents and administrators emphasized the need for better staff training, stronger infrastructure, leadership teams, data-driven assessment tools, data privacy protection, cross-department collaboration, continuous review of learning platforms, R&D investment, and teacher digital-skills development. These qualitative insights confirm that TMI requires an integrated management system rather than isolated technology adoption.

5. Discussion

The results confirm that technology management has a positive and significant impact on Teaching Management Informatization (TMI) in Zhejiang Province's education industry. The final SEM model explained 70.4 percent of the variance in TMI, indicating strong explanatory power for an education-management model. This finding supports the view that teaching informatization is not produced by digital tools alone but depends on an integrated system of resource readiness, organizational management, quality assurance, risk governance, and technical capability. It is relevant to Fedorenko et al. (2019), who emphasized that education informatization is essential for the existence and development of modern higher education, and to Yan and Yang (2021), who explained that China's Education Informatization 2.0 requires information literacy, intelligent learning environments, and innovation-driven governance.

Technical Risk Management had the strongest direct effect on TMI. This result indicates that digital education depends heavily on safe, reliable, and well-controlled technological systems. Universities increasingly use learning management systems, data platforms, online communication, and student information systems; therefore, risks related to privacy, cybersecurity, platform instability, and data misuse can strongly affect stakeholder trust. This finding is consistent with technology-management literature stating that organizations must manage technological resources, risks, and operational processes in order to achieve institutional objectives (Ma et al., 2021; Tang et al., 2023). It is also consistent with Igbokwe (2023), who noted that AI and digital systems can improve educational management but require careful attention to ethical issues, workforce readiness, and possible limitations.

Technical Quality Management was the second strongest factor. This shows that TMI must be connected to curriculum development, assessment practices, and continuous improvement. Digital tools should not be used only for convenience or administrative modernization; they should improve teaching quality, feedback, learning support, and curriculum relevance. This result is relevant to Alismaiel (2021), who found that task-technology fit, student engagement, facilitating conditions, and ease of use affected the sustainability of online learning systems. It also relates to Garcia (2024), who showed that usefulness, ease of use, facilitating conditions, and self-efficacy influenced teachers' intention to adopt productivity software applications. Therefore, quality management is necessary to ensure that technology supports actual educational improvement.

Technical Resource Management and Technical Organization Management also had strong positive effects. Human resources, infrastructure, technology integration, leadership, governance, communication, collaboration, and change management remain necessary conditions for digital transformation. Without appropriate technical personnel, infrastructure, leadership, and coordination, TMI may become fragmented. These findings are supported by Bervell et al. (2022), who found that prior technology experience and technology self-efficacy affected learning management system use behavior, and by Hizam et al. (2021), who found that educators' digital competency influenced task-technology fit and performance in virtual learning environments. They are also relevant to Jatmoko et al. (2023), who found that teacher readiness and infrastructure were important for digital literacy practice. Although Technical

Capacity had the smallest direct effect, it remained significant, confirming that skills, research and development, and technological infrastructure are still necessary for sustaining long-term teaching informatization.

6. Recommendations

First, universities in Zhejiang Province should manage teaching informatization as an integrated technology-management system rather than as a technology-purchasing project. Institutional strategies should connect resources, organization, quality, risk, and capacity.

Second, universities should prioritize Technical Risk Management because it had the strongest effect on TMI. Data security, privacy protection, system monitoring, risk identification, and mitigation strategies should be formalized in university policy.

Third, universities should strengthen Technical Quality Management by linking technology use with curriculum development, teaching evaluation, student assessment, and continuous improvement. Digital tools should be used to improve educational quality and learning outcomes.

Fourth, universities should improve Technical Resource Management and Technical Organization Management by allocating skilled personnel, upgrading infrastructure, establishing leadership teams, and developing cross-department communication mechanisms.

Fifth, universities should enhance Technical Capacity through regular teacher training, administrator training, R&D investment, and technological infrastructure development. Wenzhou Business School can use the SEM model as a practical checklist for planning, evaluating, and improving TMI implementation.

7. New Knowledge

The new knowledge of this study is the SEM-Based Integrated Technology Management Model for Teaching Management Informatization. The model demonstrates that TMI is a measurable and predictable outcome of five technology-management factors. The strongest factor is Technical Risk Management, followed by Technical Quality Management, Technical Resource Management, Technical Organization Management, and Technical Capacity. Therefore, digital education should be governed through a complete management system that connects security, quality, resources, organization, and capability.

This model provides both theoretical and practical value. Theoretically, it explains how multiple latent constructs jointly influence TMI. Practically, it can be used by university administrators as a diagnostic and planning tool. The equation allows institutions to identify priority areas for improvement and to forecast TMI performance. The model is especially useful for private universities seeking to strengthen digital transformation, protect stakeholder trust, and improve teaching quality through evidence-based technology management.

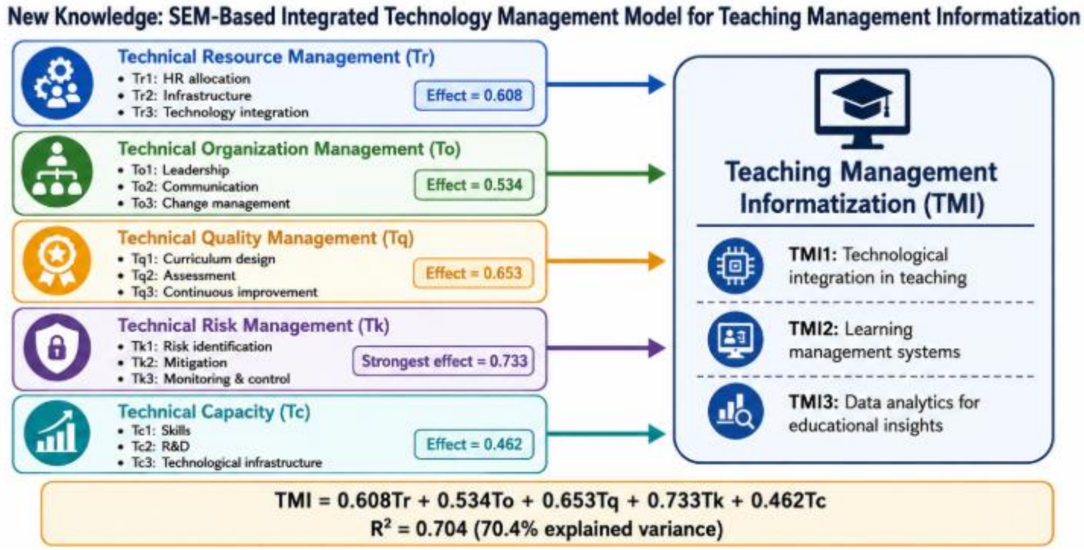

Figure 7 New Knowledge of the study

The figure above presents the new knowledge generated from the study as an SEM-based integrated technology management model for Teaching Management Informatization (TMI). The model explains that TMI is not the result of isolated digital tools, but the combined outcome of five interrelated management dimensions. Technical Risk Management has the strongest influence, revealing that privacy, cybersecurity, system reliability, and continuous monitoring are necessary for successful digital education. Technical Quality Management ranks second, indicating that curriculum design, assessment, and continuous improvement must be aligned with technology use. Technical Resource Management emphasizes the importance of human resources, infrastructure, and technology integration. Technical Organization Management also emphasizes leadership, communication, collaboration, and change management as conditions that support implementation. Although Technical Capacity is the smallest effect, it remains important because digital skills, research and development, and technological infrastructure sustain innovation over time. However, all five dimensions explain 70.4 percent of the variance in TMI. Therefore, the model provides new knowledge by showing that universities should manage teaching informatization through an integrated system. That system should connect risk protection, academic quality, resource readiness, organizational coordination, and long-term technological capability.

8. Conclusion

This study confirms that technology management significantly influences Teaching Management Informatization in Zhejiang Province's education industry. The final SEM model showed that Technical Risk Management, Technical Quality Management, Technical Resource Management, Technical Organization Management, and Technical Capacity all had positive direct effects on TMI. The model explained 70.4 percent of the variance and was verified as suitable for Wenzhou Business School. Universities should therefore manage digital transformation through integrated resources, leadership, quality, risk protection, and capacity development.

REFERENCES

1. Alismaiel, O. A. (2021). Using structural equation modeling to assess online learning systems' educational sustainability for university students. Sustainability, 13(24), Article 13565. https://doi.org/10.3390/su132413565
2. Bates, A. W. (2015). Teaching in a digital age: Guidelines for designing teaching and learning. Tony Bates Associates Ltd.
3. Bervell, B., Umar, I. N., Segbenya, M., Armah, J. K., Somuah, B. A., & Twum, R. (2022). Utilizing learning management system technology: Modelling the tripartite relationships among previous technology use experience, technology self-efficacy, and use behavior. Online Journal of Communication and Media Technologies, 12(4), Article e202240. https://doi.org/10.30935/ojcmt/12530

4. Brown, T. A., & Moore, M. T. (2012). Confirmatory factor analysis. In R. H. Hoyle (Ed.), Handbook of structural equation modeling (pp. 361–379). The Guilford Press.
5. Channuwong, S., & Kantatian, W. (2012). The causes of stress and strategies for managing stress: A case study of Thai university staff and lecturers. European Journal of Scientific Research, 79(4), 592-606.
6. Fedorenko, E. H., Velychko, V. Y., Stopkin, A. V., Chorna, A. V., & Soloviev, V. N. (2019). Informatization of education as a pledge of the existence and development of a modern higher education. CTE Workshop Proceedings, 6, 20–32. https://doi.org/10.55056/cte.366
7. Fei, Z., Channuwong, S., Bangbon, P., Siripap, P., & Jia, Y. (2026). Socioeconomic
8. and adaptive determinants of sustainable agricultural development (SDG 2) in
9. Thailand. Natural and Engineering Sciences, 11(2), 140-152.
10. https://doi.org/10.28978/nesciences.262012
11. Garcia, M. B. (2024). Factors affecting adoption intention of productivity software applications among teachers: A structural equation modeling investigation. International Journal of Human–Computer Interaction, 40(10), 2546–2559. https://doi.org/10.1080/10447318.2022.2163565
12. Hizam, S. M., Akter, H., Sentosa, I., & Ahmed, W. (2021). Digital competency of educators in the virtual learning environment: A structural equation modeling analysis. IOP Conference Series: Earth and Environmental Science, 704(1), Article 012023. https://doi.org/10.1088/1755-1315/704/1/012023
13. Igbokwe, I. C. (2023). Application of artificial intelligence (AI) in educational management. International Journal of Scientific and Research Publications, 13(3), 300–307. https://doi.org/10.29322/IJSRP.13.03.2023.p13536
14. Jatmoko, D., Suyitno, S., Rasul, M. S., Nurtanto, M., Kholifah, N., Masek, A., & Nur, H. R. (2023). The factors influencing digital literacy practice in vocational education: A structural equation modeling approach. European Journal of Educational Research, 12(2), 1109–1121. https://doi.org/10.12973/eu-jer.12.2.1109
15. Kim, H.-Y. (2013). Statistical notes for clinical researchers: Assessing normal distribution (2) using skewness and kurtosis. Restorative Dentistry & Endodontics, 38(1), 52–54. https://doi.org/10.5395/rde.2013.38.1.52
16. Kock, N., & Hadaya, P. (2018). Minimum sample size estimation in PLS-SEM: The inverse square root and gamma-exponential methods. Information Systems Journal, 28(1), 227–261. https://doi.org/10.1111/isj.12131
17. Ma, Q., Miao, W., Liu, L., & Wang, L. (2021). The fit between technology management and technological capability and its impact on new product development performance. Sustainability, 13(19), Article 10956. https://doi.org/10.3390/su131910956
18. Phasuk, N., Bangbon, P., Channuwong, S., Jia, Y., Nindya Saraswati, N. (2026). Risk
19. management effectiveness and sustainable development in the insurance industry: Decent
20. work and economic growth (SDG 8). Acta Innovations, 61, 707-723.
21. Schumacker, R. E., & Lomax, R. G. (2010). A beginner's guide to structural equation modeling (3rd ed.). Routledge.
22. Tabachnick, B. G., & Fidell, L. S. (2013). Using multivariate statistics (6th ed.). Pearson.
23. Tang, X., Yuan, Z., Deng, X., & Xiang, L. (2023). Predicting secondary school mathematics teachers' digital teaching behavior using partial least squares structural equation modeling. Electronic Research Archive, 31(10), 6274–6302. https://doi.org/10.3934/era.2023318
24. Yan, S., & Yang, Y. (2021). Education Informatization 2.0 in China: Motivation, framework, and vision. ECNU Review of Education, 4(2), 410–428. https://doi.org/10.1177/2096531120944929