Article

Digital Leadership Competencies for College Administrators in China: Strategies for Faculty Development and Institutional Innovation

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Abstract

In contemporary times, the function of college administrators in steering institutional change has become increasingly vital. This study investigates the impact of Digital Leadership Competencies (DLC) among college administrators in China on faculty development and the advancement of Institutional Innovation (II), with particular attention to the mediating role of Faculty Digital Competence (FDC). Data were gathered from 368 faculty members representing multiple universities via a structured questionnaire. The relationships between DLC, FDC, Faculty Technology Behaviour (FTB), and II were analysed employing quantitative methods, including descriptive statistics, factor analysis, and Structural Equation Modelling (SEM). The findings indicate that administrators' DLC significantly enhances FDC, which in turn positively influences FTB and II outcomes. Moreover, FDC functions as a crucial mediator, reinforcing the connection between leadership capabilities and institutional progress. The study emphasises that targeted strategies, such as fostering a digital leadership culture, implementing ongoing digital training initiatives, and investing in advanced infrastructure, are essential for cultivating a digitally innovative academic setting. By prioritising leadership and competence development, universities in China can more effectively address technological challenges, encourage sustainable innovation, and strengthen their competitive position within the global education sector.

Keywords

Digital Leadership, Leadership Competencies, Faculty Development, Institutional Innovation, Structural Equation Modelling (SEM).

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Introduction

Leadership holds a pivotal role in higher education institutions, serving as the fundamental driver behind the successful enactment of educational reforms. The scope of effective leadership surpasses mere administrative duties, functioning as a crucial agent in steering universities toward the attainment of their strategic objectives (Jing et al., 2025). In the current context, leadership integrates elements such as self-awareness, expertise, educational objectives, student needs, institutional settings, regional factors, governmental policies, and the rapidly evolving global landscape. It is essential for cultivating skilled professionals capable of enabling colleges to navigate the complexities of the modern era (Laufer et al., 2021). Leaders are responsible for formulating strategies, setting goals, and establishing policies that direct higher education institutions towards their intended outcomes. The effectiveness of organisations is largely dependent on their leadership styles. Through diverse approaches, including the utilisation of digital technologies, leaders promote innovative work practices. This, however, necessitates a leadership framework tailored to address the emerging realities associated with DL. Proficient DL is critical for guiding institutions through digital transformation processes. College administrators must prioritise digital transformation by focusing on vision, strategic planning, delegation of authority, staffing, pedagogical methods, organisational culture, and technological assets supporting digital and hybrid operations (Karakose, Polat, & Papadakis, 2021).

DL entails embracing change, executing digital initiatives, and ensuring long-term sustainability within interconnected environments. Such leadership requires a cultural shift within academic institutions, engaging various stakeholders. Moreover, effective DL must incorporate ethical considerations including data privacy, accessibility, and responsible use of technology (Akour & Alenezi, 2022). Institutions that successfully implement DL strategies are better equipped to address forthcoming challenges and capitalise on opportunities in higher education. These institutions preserve competitive advantage by adopting a DL approach that emphasises continual learning and adaptation to fundamental transformations while maintaining organisational performance. Leaders need to possess essential attributes such as expertise and competencies necessary to manage supportive functions.

Digitalisation demands a distinct mindset oriented towards organisational advancement. The digital transformation journey requires leaders who initiate, oversee, and guide the process — specifically digital leaders. This leadership fosters digital transformation, enhances workforce productivity, and encourages the integration of advanced technologies in sectors including manufacturing, production, and services. DL is understood as a comprehensive approach encompassing both the implementation of digital transformation and its environmental impact, concentrating on the organisation as an integrated whole rather than exclusively on digital technologies. Successful digital transformation depends significantly on leadership capabilities alongside technological advancements (Witthöft, Burak, & Pietsch, 2024).

Nevertheless, in the absence of explicit authorisation, DL at executive levels must be characterised in broad terms. Complex organisational procedures frequently give rise to unreliable data-driven recommendations, impulsive decision-making, and increased costs. Inaccurate data often leads to imbalances within application processes, complicating the accurate analysis of performance metrics and equitable evaluation of personnel (Inamorato dos Santos et al., 2023). It is essential that employees maintain constant communication, with comprehensive data access granted to all relevant staff members. This research seeks to investigate the influence of DL competencies among college administrators in China on faculty development and II, emphasising the mediating role of FDC. It aims to identify critical pathways connecting leadership capabilities, FTB, and innovation outcomes, and to recommend strategies for cultivating a digitally advanced academic environment via quantitative methodologies.

Related Works

Pu, Dong and Jiang (2024) examined the impact of DL on organisational transformation within Chinese Higher Education Institutions (HEIs), focusing on knowledge-sharing behaviour through the lens of Institutional Theory of Leadership. A quantitative survey involving 607 participants was analysed using SEM, which demonstrated that information-sharing behaviour mediates the positive effect of DL on institutional change. The study's limitations include its cultural specificity. Niță and Guțu (2023) explored the effects of leadership styles on student engagement in digitally transformed higher education settings. Employing a qualitative approach combined with an online survey of 856 responses and SEM analysis, their results indicated that transactional

leadership was more effective than transformational leadership in digital environments, with quadratic effects enhancing engagement. The study was limited by reliance on self-reported data. The influence of technological leadership by university leaders on faculty members' Information and Communication Technology (ICT) proficiency was also investigated. Using a graphic-correlational design, quantitative data were collected from 298 Chinese university professors through a Likert-scale questionnaire and analysed with descriptive and inferential statistics. The findings revealed a significant positive effect of technological leadership on teachers' ICT capabilities. The study was constrained by context specificity and self-reported measures.

Alabdali et al. (2024) investigated the relationships between Green Digital (GD) Transformational Leadership, GD Mindset, and GD Transformation, with Organisational GD Culture as a mediator. A Partial Least Squares SEM (PLS-SEM) study of 240 LinkedIn respondents indicated significant direct, indirect, and moderated effects, supported by Stimulus-Organism-Response and transformational leadership theories. However, the generalisability of results is limited due to self-reported data. Xiufan and Yunqiao (2024) applied theories of leadership, dynamic capability, and cognitive motivation to assess how Chief Information Officer (CIO) leadership promotes modern capabilities and green innovation. The model was tested on 395 business samples, revealing that transactional, transformational, and principled leadership all positively support green innovation, with organisational agility and culture serving as moderators. Limitations included the scope of contextual generalisability. They further analysed DL's role in fostering sustainable development in China's Information Technology sector by emphasising green innovation and business sustainability. Utilising Organisational Learning and Dynamic Capabilities Theories, their study demonstrated that DL positively influences green innovation, with top management innovation amplifying these effects. A time-lagged data approach enhanced the reliability of the analysis. Potential limits on generalisability were acknowledged.

Du, Grigorescu and Aivaz (2023) examined how digital technologies contribute to sustainability within green university projects. Employing a qualitative case study approach centred on four dimensions (green education, research, campus, and living), the research demonstrated that digitisation enhances green initiatives. Limitations included a narrow case scope and restricted generalisability. Zhuge et al. (2023) applied the knowledge creation spiral theory to investigate how digital capabilities influence green knowledge production and sustainable growth in start-ups. The study surveyed 316 new Chinese enterprises, revealing that digital capabilities positively affect sustainability, mediated by green knowledge production and moderated by green pressure. Sample limitations were noted. Further, the study examined the impact of green innovation on sustainability, emphasising the moderating role of GD learning orientation and its three-way interaction with big data analytics. Results showed enhanced sustainability outcomes, particularly when the green learning focus was high. Limitations included reliance on self-reported data from Iraqi management.

Other research has considered digital transformation's effect on long-term business success within Turkey's manufacturing sector. Surveying 332 managers and employing quantitative methods, findings suggested that digital transformation improves sustainability through green knowledge acquisition and innovation; however, inadequate leadership capabilities hinder these effects. Future research should address leadership disparities. DL represents an emerging interdisciplinary subfield integrating educational knowledge, leadership, business, and data science, building upon prior work in e-leadership and networked knowledge organisation and management. Nonetheless, there remains a need for a comprehensive definition of DL at the executive level due to lack of consensus. Complex procedures can lead to higher costs, impulsive decisions, and suboptimal data-driven recommendations. Inaccurate data contributes to imbalance in application processes, complicating performance measurement and fair employee evaluation. Continuous communication among employees is essential, with universal data accessibility required across organisations.

Hypothesis Development

In the context of rapid technological advancement, higher education institutions face increasing demands to evolve and foster innovation. DL has emerged as a crucial capability for college administrators aiming to guide their organisations through the challenges of digital transformation. FDC constitutes a vital component of this process, reflecting faculty members' ability to effectively utilise digital tools and pedagogical methods. Moreover, FTB and II depend substantially on the strategic support and vision provided by leadership. Building on these insights, this study proposes a series of hypotheses to examine both the direct and indirect relationships among DL competencies, FDC, FTB, and II within Chinese higher education institutions.

Digital Leadership Competencies (DLC) and Faculty Digital Competence (FDC)

DLC encompasses the skills and abilities of college administrators to drive digital transformation within academic institutions. These competencies involve establishing a clear vision, advocating the use of digital tools, managing change, and supporting digital literacy. Administrators exhibiting strong digital leadership encourage faculty members to enhance their technological skills by providing necessary resources, motivation, and fostering a digital-centric mindset. Faculty depend on institutional leadership to cultivate an environment that prioritises and sustains digital skill development. The ability of leaders to align digital initiatives with institutional objectives directly affects faculty motivation to acquire digital competencies. In the absence of effective digital leadership, educators face difficulties adapting to rapidly evolving educational technologies. Consequently, digital leadership serves as a vital catalyst in equipping faculty with the requisite digital tools and expertise for success. Therefore, the following hypothesis is proposed:

H1: DLC of college administrators has a positive effect on FDC.

FDC and FTB

FDC refers to educators' ability to effectively utilise digital technologies in teaching, research, and administrative tasks. High levels of digital competence enable faculty to confidently integrate new technologies into their instructional practices, administrative duties, and academic communication. Faculty possessing strong digital skills are more inclined to adopt innovative educational technologies, develop online courses, and employ data analytics for student assessment. Conversely, insufficient digital competence often results in reluctance to embrace new technologies. This relationship is significant, as FTB encompasses the acceptance, utilisation, and integration of digital tools, directly influencing student engagement and institutional productivity. Therefore, strengthening faculty digital competence is essential to fostering proactive and effective ICT practices within higher education institutions.

H2: FDC has a positive effect on FTB.

FDC and II

II refers to the introduction and application of novel ideas, methods, or technologies that enhance an organisation's performance and competitive advantage. Faculty digital competence plays a pivotal role in the innovation process by enabling educators to contribute innovative teaching approaches, engage in research and development activities, and foster interdisciplinary collaboration. Institutions with digitally proficient faculty are better equipped to respond to external pressures, such as technological disruptions, demands for flexible learning, and global competition. Faculty competence enhances an institution's capacity for organisational learning and strategic transformation, particularly within the digital context. Consequently, faculty digital competence is regarded as a fundamental driver of II. Hence, the following hypothesis is proposed:

H3: FDC has a positive effect on II.

DLC and II

Digital leadership competencies among college administrators are essential in steering institutions towards innovation and digital advancement. Administrators equipped with digital vision, adaptability, and strategic insight are instrumental in facilitating organisational changes that integrate technological progress. This form of leadership promotes the deployment of digital infrastructure, formulates innovation-supportive policies, and cultivates a culture that encourages experimentation and continuous improvement. Institutions led by digitally competent administrators are more inclined to implement forward-looking initiatives such as intelligent campuses, technology-integrated learning ecosystems, and AI-supported administrative processes. Therefore, leadership within the digital domain is a critical determinant of an institution's capacity for innovation and sustained competitive advantage. Based on this rationale, the following hypothesis is proposed:

H4: DLC of college administrators has a positive effect on II.

Mediating FDC

Faculty digital competence serves as a pivotal mechanism through which digital leadership influences faculty technological behaviour. While administrators may introduce digital strategies and advocate for the adoption of technological tools, significant behavioural change among faculty members is unlikely unless they possess the requisite digital skills to utilise these resources effectively. Digital leadership fosters the development of such competencies by providing appropriate training, ongoing support, and motivational incentives, thereby encouraging constructive technological engagement. This intermediary role is essential, as it highlights that leadership exerts its influence on behaviour not directly, but by enhancing faculty capability. Without adequate digital proficiency, even the most well-conceived leadership efforts are unlikely to lead to authentic technological adoption or educational innovation among faculty members.

H5: FDC mediates the connection among DLC and FTB.

Faculty digital competence similarly serves as a crucial intermediary linking digital leadership with institutional innovation. Although visionary leaders may articulate strategic goals for digital advancement, the actualisation of innovation relies heavily on the faculty's capacity to adopt and apply digital technologies across teaching, research, and administrative functions. While leadership initiates the momentum for change, it is ultimately the faculty's digital proficiency and preparedness that transform strategic intent into innovative academic practices. In the absence of digitally capable educators, the aspirations of digital leadership are unlikely to result in meaningful institutional innovation. Therefore, faculty digital competence holds a vital mediating role in translating leadership-driven digital strategies into substantive enhancements within the higher education environment. Based on this rationale, the following hypothesis is proposed:

H6: FDC mediates the association among DLC and II.

Methodology

Data were collected from a total of 368 faculty members across multiple universities through a combination of purposive and random sampling techniques, ensuring broad and representative inclusion. Participants were selected based on their technological engagement, teaching experience, and relevance to the study objectives. A structured questionnaire, developed in accordance with a predefined conceptual framework, was employed to measure key variables. The analysis was conducted using SPSS to validate the constructs and explore relationships among the variables. An overview of the methodological process is illustrated in Figure 1.
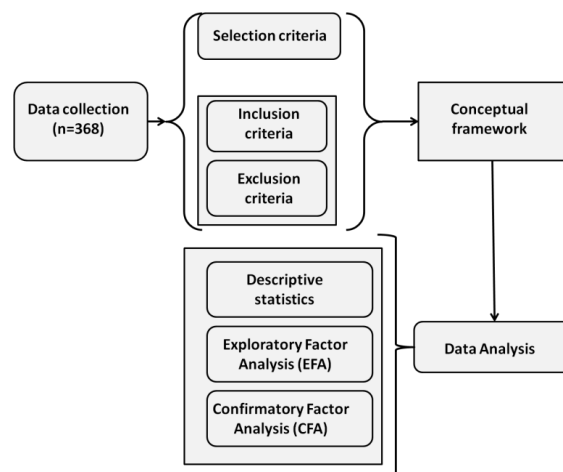

Figure 1: *Overview of Research Methodology and Data Analysis Procedure.*

Data Collection

Data were collected from 368 respondents representing a range of universities, using a structured questionnaire. A combination of purposive and random sampling methods was employed to ensure diverse

representation across academic ranks, disciplinary backgrounds, and institutional types. To maximise accessibility and encourage higher response rates, the questionnaire was administered both online and through face-to-face distribution. The survey instrument included five items to evaluate digital leadership competencies, four items to measure FDC, four items to assess FTB, and four items to examine Institutional Innovation (II). Each set of items was specifically designed to capture the interrelationships among the studied variables.

Selection Criteria

The sampling criteria were designed to ensure that the selected participants were appropriately aligned with the objectives of the study. This involved the application of both inclusion and exclusion parameters to determine eligibility.

Inclusion Criteria

• Only faculty members currently employed at accredited universities were considered eligible.
• A minimum of one year of teaching experience was required for participation.
• Eligibility extended to those who actively utilise digital technologies for academic instruction or administrative tasks.
• Participants needed sufficient proficiency in English to comprehend and respond accurately to the questionnaire items.
• Faculty from both public and private higher education institutions were included in the sample.
• Part-time academic staff were excluded from the study.
• Individuals on extended leave during the period of data collection were not included.
• Faculty who had recently participated in related studies on digital competence were excluded to minimise the risk of response bias.

Conceptual Framework

This conceptual framework examines the interconnections among DLC, FDC, FTB, and II, as depicted in Figure 2. It hypothesises that the digital leadership abilities of university administrators positively influence FDC, which subsequently enhances FTB and II. FDC is also conceptualised as a mediating variable that transmits the effects of DLC on both FTB and II. Administrators with well-developed DLC are more likely to foster institutional environments that support the advancement of digital skills among faculty, thereby promoting more extensive use and integration of digital technologies across academic functions. Furthermore, faculty members with advanced FDC are better positioned to support II by incorporating digital technologies into teaching, research, and administrative processes. The proposed framework highlights the intertwined roles of leadership, faculty competency, and digital engagement in cultivating innovation within higher education institutions. Figure 2 illustrates the proposed relationships involving DLC among university administrators.
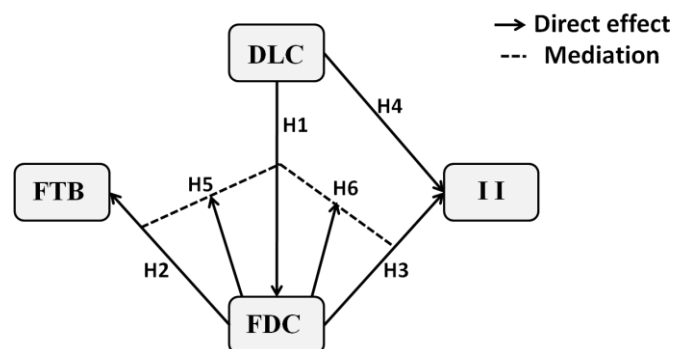

Figure 2: *Relationship Between the Variables.*

Statistical Analysis

This research employs SPSS to analyse the relationships among DLC, FDC, FTB, and II through descriptive statistics, EFA, CFA, and SEM. Descriptive statistics summarise variables and assess data normality. EFA identifies underlying constructs linked to the variables, while CFA validates the factor structure generated by EFA. SEM examines direct and mediated relationships among the factors.

Result and Discussion

This section presents the research outcomes aimed at examining the influence of DLC on FDC, FTB, and II. It explores the relationships among the key dimensions using a systematic approach encompassing demographic profiling, descriptive statistics, EFA, CFA, and SEM.

Demographic Analysis

This section analyses various characteristics of the participants, offering valuable insights into their profiles. Table 1 presents an analysis of the demographic features, while Figure 3 illustrates the demographic and disciplinary distribution of the survey respondents. The demographic distribution of the 368 respondents is balanced Figure 3, comprising 48.1% female and 51.9% male participants. Most respondents (39.9%) are aged between 35 and 44 years, holding either a master's degree (50.8%) or a doctoral degree (49.2%). A substantial proportion have over 10 years of experience (44%) and are employed at public institutions (63.3%). The disciplines represented are diverse, with sciences (34.5%) and engineering (30.4%) being the most common fields.

Table 1: *Respondents Demographic Profile.*

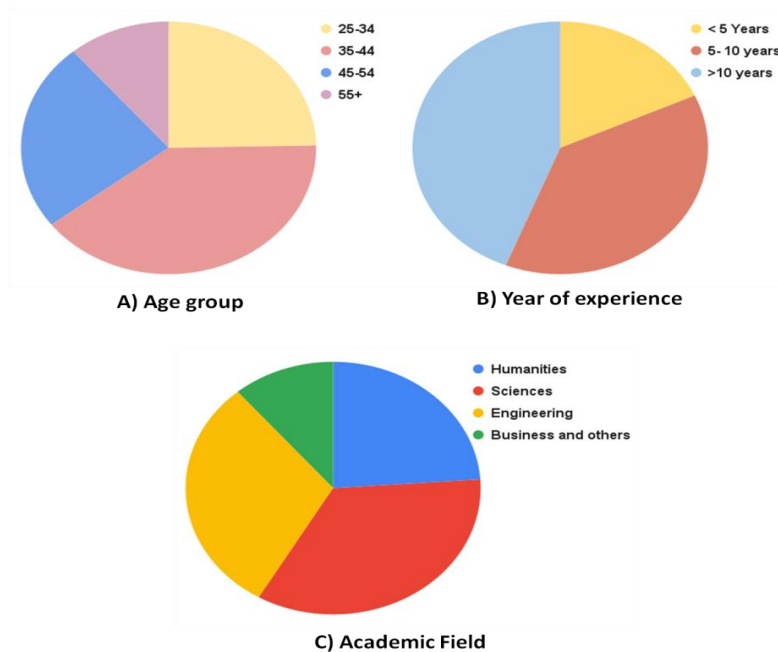| Categories		Frequency (n= 368)	Percentage (%)
Gender	Male	191	51.9
	Female	177	48.1
Age Group	25-34	91	24.7
	35-44	147	39.9
	45-54	89	24.2
	55+	41	11.2
Educational Level	Master's Degree	187	50.8
	Doctoral Degree	181	49.2
Year of Experience	< 5 Years	67	18.2
	5- 10 Years	139	37.8
	>10 Years	162	44
Type of Institution	Public	233	63.3
	Private	135	36.7
Academic Field	Humanities	88	23.9
	Sciences	127	34.5
	Engineering	112	30.4
	Business and Others	41	11.2

Figure 3: *Demographic and Disciplinary Distribution of Survey Respondents by A) Age, B) Experience, and C) Academic Field.*

Descriptive Statistics

Descriptive statistics involve the use of numerical and graphical methods to summarise and characterise a dataset. This approach facilitates understanding of data distribution, central tendency, and variability. It is employed to emphasise the principal features of variables such as DLC, FDC, FTB, and II. Table 2 presents the descriptive statistics for these key variables, while Figure 4 illustrates the comparison of their means and standard deviations. The descriptive data indicate that faculty members reported elevated levels of DLC (M = 3.85), FDC (M = 4.10), and II (M = 4.00), alongside relatively high FTB (M = 3.70). The low skewness and kurtosis values for all variables suggest approximate normal distributions. The variation in responses is modest, reflecting consistent evaluations across all assessed dimensions Figure 4.

Table 2: *Descriptive Statistics for Key Variables Related to DL and Innovation.*

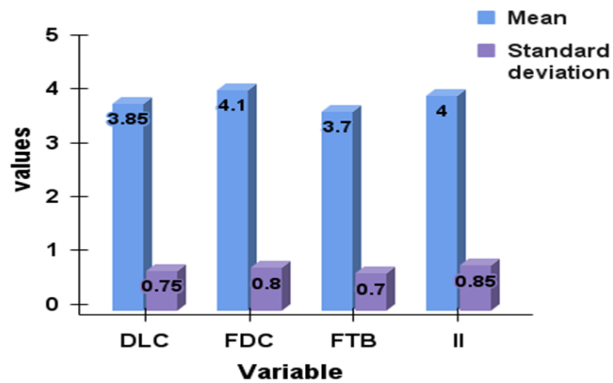| Variable	Standard deviation	Mean	Minimum	Maximum	Kurtosis	Skewness
DLC	0.75	3.85	1.50	5.00	0.15	-0.25
FDC	0.80	4.10	1.00	5.00	0.25	-0.50
FTB	0.70	3.70	2.00	5.00	-0.10	-0.10
II	0.85	4.00	1.50	5.00	0.10	0.00

Figure 4: *Comparison of Mean and Standard Deviation for Key Variables.*

Exploratory Factor Analysis (EFA)

Table 3: *Analysis of Constructs Associated with Variables.*

Variable	Questionnaire	Factor Loading	Standard Error	Percentage of Variance
	DLC 1	0.81	0.04	
	DLC 2	0.79	0.05	
DLC	DLC 3	0.77	0.05	26%
	DLC 4	0.80	0.04	
	DLC 5	0.78	0.05	
	FDC 1	0.84	0.03	
FDC	FDC2	0.82	0.04	24%
	FDC3	0.79	0.05	
	FDC4	0.81	0.04	
	FTB 1	0.76	0.05	
FTB	FTB 2	0.78	0.04	25%
	FTB 3	0.80	0.04	
	FTB 4	0.77	0.05	
	II 1	0.83	0.03	
II	II 2	0.81	0.04	25%
	II 3	0.79	0.05	
	II 4	0.82	0.04	

EFA is utilised to identify the fundamental interactions among measured variables and to reveal latent constructs that explain observed data patterns. It is applied to establish the factor structure linked to variables associated with DLC. Table 3 presents the relationships among these features and DLC and II. The results support the robustness of the measurement model, as all factor loadings exceed the acceptable threshold of 0.70, with standard errors between 0.03 and 0.06, indicating high item reliability and internal consistency. The four constructs (DLC, FDC, FTB, and II) explain 26%, 24%, 25%, and 25% of the variance, respectively, demonstrating satisfactory construct validity. These outcomes confirm that the selected items adequately represent their corresponding latent variables and are suitable for subsequent SEM analysis and hypothesis testing.

Confirmatory Factor Analysis (CFA)

It is used to verify the structure of variables, identify latent constructs, and evaluate the relationships between variables. Table 4 presents the model fit indices used to validate the measurement constructs influencing DLC. Moreover, the findings in the Table 4 demonstrate an excellent fit between the proposed model and the data across all variables (DLC, FDC, FTB, and II). The t-values for each questionnaire item are significant, confirming that each item reliably contributes to its respective construct. Additionally, the TLI and CFI values remain consistently high, indicating an adequate model fit. Overall, the results confirm that the measurement model is both reliable and valid, with all constructs well represented by the data. This confirms that DLC, FDC, FTB, and II are accurately measured and suitable for further analysis in subsequent stages of the research.

**Table 4:** *Evaluation of Measurement Model.*

Variables	Questionnaires	Chi-Square	Degree of Freedom	P Value	T-Value	Tucker-Lewis Index (TLI)	Comparative Fit Index (CFI)
	DLC 1	15.25	8	0.052	4.23	0.98	0.97
	DLC 2	18.67	9	0.065	4.08	0.97	0.96
DLC	DLC 3	20.35	7	0.081	3.92	0.96	0.95
	DLC 4	17.45	10	0.032	4.50	0.98	0.97
	DLC 5	19.80	8	0.027	4.13	0.97	0.96
	FDC 1	14.50	6	0.075	4.35	0.98	0.97
FDC	FDC2	18.00	9	0.049	4.12	0.97	0.96
	FDC3	16.40	7	0.066	4.30	0.98	0.97
	FDC4	17.75	8	0.030	4.50	0.97	0.96
	FTB 1	13.50	7	0.058	4.10	0.96	0.95
FTB	FTB 2	15.30	8	0.041	4.20	0.97	0.96
	FTB 3	16.90	7	0.037	4.15	0.98	0.97
	FTB 4	14.00	6	0.072	4.25	0.97	0.96
	II 1	19.10	10	0.045	4.05	0.98	0.97
II	II 2	18.30	9	0.050	4.12	0.97	0.96
	II 3	21.20	8	0.038	4.18	0.98	0.97
	II 4	19.70	9	0.043	4.22	0.97	0.96

Structural Equation Modelling (SEM)

SEM is used to evaluate complex relationships among variables and to examine the associations related to DLC. Figure 5 illustrates the path analysis of the hypotheses using SEM, while Table 5 presents the direct and mediated path relationships. The SEM analysis validates all hypotheses by revealing significant relationships among the variables. DLC positively affects FDC, which subsequently influences FTB and II. DLC also exerts a direct influence on II. The indirect effects of DLC on FTB and II mediated by FDC are substantial, underscoring the critical role of digital leadership in enhancing faculty competence and fostering institutional innovation. These findings affirm the importance of DLC in promoting faculty behaviours and creativity (see Figure 5).

Table 5: *Hypothesis Testing Results for Direct and Mediated Path Relationships.*

Hypothesis	Path	Standard Error	Path Coefficient (β)	P-Value	T-Value	Significance
H1	DLC- FDC	0.05	0.72	0.000	13.56	Significant
H2	FDC- FTB	0.04	0.65	0.000	14.56	Significant
H3	FDC- II	0.06	0.58	0.002	9.67	Significant
H4	DLC-II	0.05	0.71	0.000	14.12	Significant
H5	DLC-FDC-FTB	0.07	0.45	0.000	8.72	Significant
H6	DLC-FDC-II	0.08	0.50	0.001	10.23	Significant
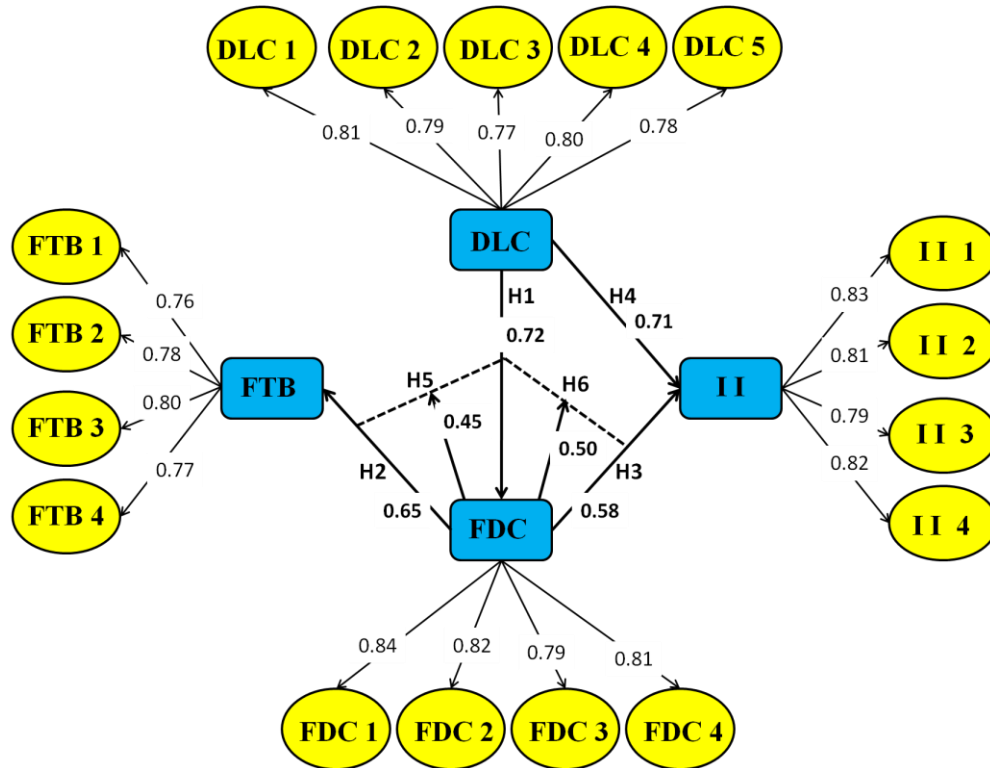
Figure 5: *Visualization of Hypothesis Testing Results for Direct and Indirect Pathways.*

This study employs a comprehensive SEM approach to examine the impact of DLC on FDC, FTB, and II. The demographic profile of 368 participants reveals a balanced gender distribution (51.9% male, 48.1% female), with the majority aged between 35 and 44 years (39.9%), predominantly holding a master's degree (50.8%) or doctoral degree (49.2%). A substantial proportion have over 10 years of professional experience (44%), are employed in public institutions (63.3%), and represent disciplines such as sciences (34.5%) and engineering (30.4%). Descriptive statistics indicate high mean scores across all variables: FDC (M = 4.10), II (M = 4.00), DLC (M = 3.85), and FTB (M = 3.70), with skewness and kurtosis values demonstrating near-normal distributions and consistent responses among participants. EFA confirmed strong factor loadings exceeding 0.70 and acceptable standard errors, supporting the construct validity of all variables. The variances explained by DLC, FDC, FTB, and II were 26%, 24%, 25%, and 25%, respectively. CFA indicated excellent model fit across all dimensions, with significant t-values and high indices for TLI (≥0.96) and CFI (≥0.95), thereby affirming the model's validity and reliability. SEM results corroborate all hypotheses, demonstrating significant direct effects of DLC on FDC (β = 0.72), FDC on FTB (β = 0.65), FDC on II (β = 0.58), and DLC on II (β = 0.71), alongside notable indirect effects of DLC on FTB (β = 0.45) and II (β = 0.50) via FDC. These results highlight the pivotal role of digital leadership in enhancing faculty competence, shaping technological behaviours, and fostering institutional innovation.

The swiftly evolving technological and educational context in higher education compels college administrators in China to reassess their leadership competencies. Contemporary digital leadership extends

beyond mere IT expertise; it entails steering institutional transformation, fostering faculty development, and strategic planning. The alignment of faculty development initiatives with digital leadership objectives significantly influences institutional transformation. Farakish, Cherches and Zou (2022) emphasise that structured onboarding and initiatives such as the Faculty Success Initiative are critical for faculty integration and career success. Consequently, Chinese digital leaders in higher education should prioritise equipping faculty with the necessary skills and support for lifelong learning. Furthermore, institutional innovation is facilitated through strategic development. Adachi (2024) advocates that innovation strategies, particularly in digital and medical education, are most effective when developed via team-based approaches, enabling institutions to adapt more efficiently. Hence, Chinese college administrators are expected to collaborate closely with faculty and key stakeholders to formulate innovation strategies embedded within broader institutional plans. In the knowledge economy, utilising intellectual capital through process optimisation and strategic innovation is essential for robust institutional performance. Rehman et al. (2024) explain that strategic innovation strengthens intellectual capital initiatives within HEIs. Incorporating these perspectives allows Chinese administrators to develop valuable skills that drive digital transformation and enhance institutional outcomes via their human resources.

Moreover, the application of open innovation aligns with achieving the educational quality targets established by the Sustainable Development Goals (SDGs), including SDG-4. Khan et al. (2022) recommend adopting open innovation in higher education to foster learning environments that are sustainable and inclusive. Digital leaders should thus prepare to support and encourage collaboration among groups that traditionally operate independently. Recognising innovation among faculty members also constitutes a key responsibility for digital leadership. The authors argue that tenure and promotion criteria should incorporate faculty contributions to entrepreneurship and innovation. Emphasising leadership skills that highlight achievement may enable Chinese administrators to cultivate a more creative and motivated faculty. Cilliers and Tekian (2016) suggest that faculty development programmes should consider the distinctive characteristics of each institution and how acquired skills can be effectively transferred to practice. This underscores the necessity for digital leaders to align their competencies with institutional values and routines. The development of skills that promote innovation should be implemented comprehensively across the academic workforce. According to Grgasović and Šoštarić (2022), formalised skill development is essential for enhancing innovation within universities.

As Chinese higher education increasingly adopts technological integration, college administrators are expected to strengthen their digital leadership capacities to guide institutional modernisation and faculty development. Digital leadership, conceived as a dynamic concept, transcends technical expertise to include goal setting, adaptability, and championing an innovative culture on campus (Tigre, Henriques, & Curado, 2025). Literature reviews reveal that effective digital leaders integrate digital technologies into their practices and guide institutions through adaptation processes (López-Figueroa, Ochoa-Jiménez, Palafox-Soto, & Sujey Hernandez Munoz, 2025). This aligns with statements from Chinese university leaders who emphasise the critical role of digital academic leadership in steering digital transformation within their institutions (Jing et al., 2025). Such leaders must demonstrate digital proficiency and provide faculty support through policies, training, and resource provision.

Research indicates that robust digital leadership enhances motivation and engagement among students and staff, as well as institutional productivity. Niță and Guțu (2023) found that such engagement in China requires familiarity with the local academic context, governance structures, and patterns of technology use among students. Digital leadership affects individual creativity and varies across age groups, suggesting that leadership strategies should accommodate these differences (Öngel et al., 2023). Faculty development should include evaluations of digital skills, as many faculty members face challenges in technology use for teaching, often due to limited institutional support for skill enhancement. Bridging this gap is critical, with administrators facilitating this through training initiatives and incentives for digital adoption. Studies show that digitally competent university staff exhibit higher levels of innovative work behaviour, confirming the role of digital skills in institutional advancement (Carvalho et al., 2023). Leaders are therefore expected to provide access to digital tools and guide teams in exploration and experiential learning.

Ensuring the psychological wellbeing of staff represents a crucial aspect of effective digital leadership. Leaders with technological understanding can alleviate stress by clarifying digital expectations and addressing technical requirements. This is particularly important in Chinese universities, where rapid technological advances may outpace educators' familiarity. Ghamrawi and M. Tamim (2023) propose a classification of digital leadership

behaviours that can assist Chinese administrators in recognising their leadership style and adapting accordingly. Their findings, derived from widespread mobile technology use on campuses, indicate that personalised leadership accounting for each institution's unique technological and pedagogical context is essential. Inamorato dos Santos et al. (2023) note the variability in academics' digital skills, with many only beginning to integrate technology into their work.

Given the ongoing digital transformation in higher education, college administrators must exhibit resilience and flexibility. As China's education system rapidly evolves, digital leadership competencies facilitate change management and support for educational personnel. Modern leaders should prioritise enhancing administrative processes and the effective application of digital methods (Macfarlane, Bolden, & Watermeyer, 2024). The study identifies three leadership approaches—traditionalist, reformist, and pragmatist—that inform responses to digital transformation. Chinese administrators could benefit from adopting reformist or pragmatist approaches, emphasising innovation and flexibility in technology utilisation. Ehlers (2020) argues that it is insufficient for higher education leaders merely to employ digital technologies; they must cultivate a vision where digital thinking permeates the organisational culture. Accordingly, administrators are encouraged to adopt a transformational leadership style, fostering rapid innovation and strategic digital planning. Salamzadeh, Vardarlier and Teoh (2023) highlight the importance of competencies, organisational structures, and leadership styles crucial for effective digital leadership. This is particularly relevant for Chinese institutions striving for success both domestically and globally. Digital leadership has undergone significant evolution, with current trends emphasising teamwork, evidence-based decision-making, and faculty development. Consequently, Chinese administrators must perceive digital leadership as a dynamic function responsive to both global standards and local needs.

A fundamental element of digital leadership involves ensuring faculty members acquire digital competencies. Research mapping the digital skills of university educators reveals various gaps that must be addressed through formal professional development programmes. Thus, Chinese college leaders engaged in technology should commit to ongoing learning and establish mechanisms to encourage faculty adoption of educational technologies. While much research focuses on the educational sector, lessons from other domains, such as the public sector, offer valuable insights. Branderhorst and Ruijer (2024) demonstrated that digital leadership drives public innovation within Dutch local government. Higher education leaders in China can incorporate principles such as transparency, agility, and stakeholder engagement, which are prevalent in Fortune 500 companies. Digital leadership capabilities are increasingly standard prerequisites in recruitment processes. Gilli, Nippa and Knappstein (2023) observed that job advertisements are more likely to prioritise digital leadership, especially for transformation-related roles. Consequently, leadership development and recruitment practices within Chinese higher education institutions may require revision to meet these emerging demands.

In conclusion, to address the challenges posed by the current digital environment, Chinese colleges should integrate strategic vision, empower faculty, and maintain institutional agility. Successful development of digital competence necessitates concurrent attention to both organisational culture and structure, while leaders must remain adaptable. Concentrating on these competencies allows administrators to sustain institutional growth and provide meaningful professional development opportunities for academic staff.

Conclusion

Investigating DLC among Chinese college administrators was vital for promoting digital transformation within HE. DLC facilitates the effective adoption of technology, enhances FDC, and aligns institutional strategies with national objectives, thereby fostering innovation, reducing digital disparities, and strengthening global competitiveness amid the evolving educational environment. This study primarily aimed to determine the effects of DLC on FDC, FTB, and II in HE. A structured survey was administered to 368 faculty members chosen through purposive and random sampling techniques. The collected data were analysed using SPSS through descriptive statistics, EFA, CFA, and SEM to validate the proposed framework. Findings indicated that DLC substantially enhances FDC and FTB, which subsequently increase II. Future studies should employ longitudinal methodologies and include larger, more diverse geographic populations to validate and extend these results, while also investigating additional mediating variables or contextual influences that affect digital transformation in academia.

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