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THE IMPACT OF DIGITAL TRANSFORMATION ON ORGANIZATIONAL CULTURE AT THE UNIVERSITY OF TABUK

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ABSTRACT

This paper analyses the impact of digital transformation on the organizational culture of Saudi higher education, a serious gap in knowledge about the interaction among leadership, infrastructure, and resistance to change in the new institutional environment. It was used in the University of Tabuk as a mixed-methods design. Quantitative data were collected from faculty members, administrative members, and students (n=380) using measurement scales and analyzed using structural equation modelling (SEM). The statistical data were also not isolated, as qualitative interviews with 24 participants were conducted to provide contextual insight. According to the findings, the digital transformation can significantly improve organizational culture when participative digital leadership and a solid infrastructure are in place. This relationship is undermined by resistance to change, underscoring the need for culturally sensitive change management. Digital transformation also enhances academic and administrative performance, though satisfaction levels vary across stakeholder groups. In this research, Vial's digital transformation framework will be integrated into a cohesive structural framework that combines the Competing Values Framework, Kotter's change theory, and Hofstede's cultural dimensions. The research that empirically tests the impact of mediation and moderation in a Saudi university setting contributes to extending the digital transformation theory to rising higher education systems and offers evidence-based advice aligned with Vision 2030.

KEYWORDS: Digital Transformation; Organizational Culture; Digital Leadership; Resistance to Change; Higher Education; Saudi Arabia.

1. INTRODUCTION

1.1. Background

The world had become digital, and higher education institutions were now considering digital transformation as a strategic priority, as universities responded to booming technological development, shifting stakeholder expectations, and increasing competition worldwide. However, rather than being seen as a technological adoption, the digital transformation was conceptualized as an overall organizational reconfiguration that includes how leadership is practiced, the institutional culture, the governance system, and even the educational models (Faro, Abedin, & Cetindamar, 2022). Previous studies indicated that the success of transformation was due not only to technological infrastructure but also to the congruity of digital efforts with organizational values (Bozkus, 2023).

Institutions resistant to digital tools were found in adaptive and innovation-oriented cultures, exhibiting greater institutional resilience and better performance outcomes in universities (Chavarnakul et al., 2025). In Saudi Arabia, the digital transformation has assumed particular importance under Vision 2030, which focuses on institutional effectiveness, knowledge-based development, and technological modernization (Kayani, 2025). Saudi higher education institutions have spent a lot on online learning platforms, automated management systems, and cybersecurity systems (Saeed, 2023). Nevertheless, these efforts have seen institutions transform at different rates and levels. Although digital maturity was very high in certain universities, there were disparities in adoption, cultural barriers, and low integration of digital systems into daily practice in academic processes (Jing, Guo, Wu, Yang, & Wang, 2025). Such variations implied that other contextual and organizational factors than infrastructure influenced the results of digital transformation (Dąbrowska et al., 2022).

1.2. Problem Statement

The institutionalization of digital transformation has been uneven, although digital systems have been introduced extensively across Saudi institutions of higher learning. A range of higher education institutions have introduced new technological systems and technology without subsequent cultural adoptions (Mabina, Rafifing, Seropola, & Kalu, 2025). Faculty and administrative employees frequently reported varying levels of willingness, use, and acceptance of change (Vveinhardt & Sedziuviene, 2022). This showed that the technology capability

was not the core issue, but the relationship between digital leadership, organizational culture, and change resistance. Institutional endeavors in place were often focused on infrastructure development and adherence to national policy guidelines.

Nevertheless, little attention was paid to the fact that the digital transformation restructured organizational norms, working patterns, and decision-making principles (Almatrodi & Skoumpopoulou, 2023). Hierarchical traditions and established professional identities in high-power-distance and collectivist environments might have influenced the perceived and adopted digital initiatives. This, in turn, meant that an overall understanding of digital transformation required analyzing the structural enablers as well as the behavioral dynamics within the institutional setting.

1.3. Research Gap

The literature review identified some fundamental gaps. First, the existing literature has mostly investigated digital transformation, organizational culture, or digital leadership as independent constructs. Very little research incorporated these variables into a single structural framework that would explain their interrelationships. Second, the empirical studies that had tested the mediation and moderation processes in models that transform higher education had not been established to a greater extent, especially the mediating role of resistance to change.

Third, multifaceted research, including structural equation modelling and qualitative information considerations, was relatively rare in new systems of higher education. Moreover, although Saudi universities had increasingly become the focus of academic interest, peripheral institutions had been underrepresented in empirical studies. The majority of the research was conducted at large metropolitan universities or specialized digital universities, leaving provincial universities underexplored. Such institutional features as cultural conservatism, hierarchical rule, and digital maturity in transition demanded specific academic research. These gaps needed to be addressed to promote theoretical knowledge and produce policy recommendations on context-specific issues.

1.4. Novelty of the Study

The study also adds value by formulating a new integrated socio-technical framework that explains digital transformation and its impact on Saudi higher education, drawing on empirical studies. It was an amalgamation of Vial's digital transformation

framework, the Competing Values Framework, Kotter's change theory, and Hofstede's cultural dimensions within a single structural equation model.

The study did not rely on the linear adoption models by analyzing digital transformation as a mediating factor and resistance to change as a moderating factor. Furthermore, a sequential explanatory mixed-methods design made the research quite robust, as it supplemented the quantitative analysis with a qualitative interpretation. The research thus contested the digital transformation theory in the culturally specific and understudied context of higher education, generating evidence useful to the national reform agenda goals.

1.5. Research Questions

The research questions, in the face of recognized gaps, included:

1. What was the effect of digital leadership on the process of digital transformation among Saudi higher education institutions?
2. What was the degree to which digital transformation impacted organizational culture in a high power-distance academic environment?
3. What was the moderating effect of resistance to change on the correlation between digital transformation and organizational culture??

2. LITERATURE REVIEW

2.1. Digital Transformation in Higher Education

Digital transformation in higher education has been theorized as a multidimensional organizational change process that entails integrating digital technologies into academic, administrative, and governance systems (Nieto-Taborda & Luppacini, 2025). According to Gregory Vial, digital transformation was a process by which organizations enhanced their performance by using digital technologies to realign value-creation processes (Pingali, Prakash, & Korem, 2026).

In universities, the process has gone beyond implementing technologies to include changing models of pedagogy, systems of decision-making, and stakeholder involvement (Chugh, Turnbull, Cowling, Vanderburg, & Vanderburg, 2023). Empirical studies have shown that the outcomes of digital transformation varied across institutions. Although some universities showed better agility and service quality, others showed fatigue in implementation, resistance, and shallow digitalization as well. Research indicated that

technological infrastructure was insufficient to drive transformation within an organization, but institutional preparedness, leadership endorsement, and cultural flexibility were determining factors (Leso, Cortimiglia, & Ghezzi, 2023).

Nevertheless, a substantial portion of the literature presented so far took a technological determinism approach and did not pay sufficient attention to the socio-cultural aspects of digital adoption in the academic setting. Also, a significant number of studies were based on descriptive case studies or technology acceptance models, which provided little structural modelling of transformation processes (Ardiansyah, 2022). As a result, however, there was still a gap requiring integrative frameworks that could explain how the digital initiative would translate into long-term organizational change in higher education systems.

2.2. Organizational Culture and Digital Transformation

Organizational culture was generally acknowledged as an important determinant of transformation outcomes. Based on the Competing Values Framework introduced by Kim S. Cameron and Robert E. Quinn, organizational cultures may be divided into clan, adhocracy, market, and hierarchy (GOGAH, 2024). Flexible and innovative cultures (clan and adhocracy) were observed to support experimentation and digitalization, and hierarchical cultures tended to prioritize stability and controlled environments, which slowed the change programme.

The studies established that cultural compatibility increased the performance of digital, but some incongruences still existed. In some studies, hierarchical systems were claimed to be equally helpful in implementing digital governance through mechanisms of standardization and accountability (Argento, Dobija, Grossi, Marrone, & Mora, 2025). Some argued that formalization was too high, discouraging crossover innovation and rapid technological adoption. These conflicting results indicated that the association between digital transformation and culture was not a linear one but context-specific.

Notably, cultural analysis, as a result of digital transformation, was part of the very few empirical studies (Amadoru, Van Osch, & Gosselin, 2026). Rather, it was generally assumed that culture was a static antecedent. This theoretical shortcoming limited knowledge of how the digital transformation could actively transform institutional norms, patterns of collaboration, and patterns of decision-making over time.

2.3. Digital Leadership as a Transformation Enabler

It has long been recognized that leadership is a major driving force behind digital transformation (Ruloff & Petko, 2025). John P. Kotter proposed that effective organizational change involved establishing urgency, building a coalition, articulating a vision, and reinforcing behavior (Carreño, 2024). In the digital world, the processes became strategic visioning, employee empowerment, and continuous communication about change goals (Zhao, 2024).

Recent research has coined the term "digital leadership" where the key aspect concerns the ability of leaders to promote the realignment of technological innovation with the institutional values (Elsawy & Abu-Alhaja, 2026). The research indicated that transformational and participative leadership increased digital readiness and minimized opposition. However, the literature was still disjointed. Other studies have considered leadership a direct predictor of technological adoption, whereas others have considered it a situational element with no mediation.

The limited studies did not examine the impact of leadership on organizational culture, either directly or indirectly, through digital transformation efforts. This omission was a theoretical gap in that leadership can work structurally (by investing in infrastructure) and culturally (by structuring norms and building trust).

2.4. Resistance to Change as a Moderating Mechanism

Resistance to change was identified many years ago as a challenge to organizational change (Evans & Britt, 2023). Resistance in academic institutions, however, was frequent and often grounded in issues related to professional autonomy, the redistribution of workload, and perceived threats to their traditional pedagogical identities (Forgasz, Kelchtermans, & Berry, 2023). In collectivist, high-power-distance environments, hierarchical groups with strong authority and uncertainty avoidance are likely to deepen such opposition.

Although previous studies reported negative relationships between resistance and digital adoption, resistance was often treated as a direct predictor rather than a mediating factor (Hamraz & Siddiqui, 2026). This was a shallow level of analysis. Theoretically, resistance can undermine the effectiveness of leadership efforts and diminish the cultural impact of digital transformation.

Nonetheless, few empirical studies have verified

the moderating effects in higher education. Lack of moderation modelling was one of the methodological weaknesses of the current scholarship, especially in developing higher education systems undergoing rapid reform.

2.5. Digital Transformation in the Saudi Higher Education Context

Saudi higher education operates in a socio-cultural context characterized by collectivism and a comparatively high-power distance, as discussed in the cultural dimensions framework by Geert Hofstede (Huang, Liu, Lin, & Lai, 2024). These cultural qualities influenced the leadership process, communications, and institutionalization of reforms.

The universities increased their investment in digital technologies and automation of governance under the Vision 2030 (Asem, Mohammad, & Ziyad, 2024). Nonetheless, transformation maturity differed across institutions. Digitally native organizations were more agile, while traditional universities typically faced transition issues related to hierarchical standards and asymmetries in digital skills (Omerovic Smajlovic, 2024).

Although there was an increase in interest in the Saudi digital transformation, few empirical studies that integrate leadership, culture, transformation processes, and resistance into a coherent structural framework existed (Alquraish, 2025). The majority of the studies were conceptual, policy, or technologically inclined. As a result, there was a lack of evidence on how the organizational culture was transformed through digital transformation in Saudi universities and the moderation of these relationships by the contextual culture.

2.6. Theoretical Framework and Model Development

2.6.1. Integrating Socio-Technical Perspectives on Digital Transformation

The digital transformation in higher education has been theorized as a socio-technical phenomenon that necessitates the concomitant coordination of technological systems, leadership practices, and organizational culture. To achieve this complexity, the current research incorporated four complementary theoretical perspectives: Vial's conceptualization of digital transformation, the Competing Values Framework (CVF), Kotter's change model, and Hofstede's cultural dimensions theory. Both theories addressed related aspects of change. Instead of treating them as a single system,

this paper has integrated them into a single explanatory system to model structural, behavioral, and cultural processes that influence institutional outcomes.

2.6.2. Digital Transformation as Structural Reconfiguration

The framework by Vial conceptualized digital transformation as a process in which organizations reconfigured value-creation processes using digital technologies. The model has focused on triggers, transformation activities, and performance outcomes. Although Vial's discussion provided an efficient explanation of structural and technological change, the author failed to provide substantial coverage of the processes of cultural adaptation within organizations.

The scope of digital transformation in higher education was expanded to encompass not only system implementation but also academic standards, behaviour change, and governance routines. Therefore, the digital transformation in this research was theorized as an intermediary process through which leadership programmes and infrastructural investments were reflected into cultural transformation. Therefore, the digital transformation did not serve only as a technological entrapment but rather as the institutional reconfiguration process that affected the organizational culture.

2.6.3. Organizational Culture as a Dynamic Outcome

The Competing Values Framework, created by Cameron and Quinn, categorizes organizational culture into four typologies: clan, adhocracy, market, and hierarchy. This model was a diagnostic prism that referenced the cultural flexibility, control, collaboration, and innovation orientations.

Although organizational culture has often been viewed as a constant precondition for change in previous studies, this work presented a classically conceptualized organizational culture as both the result and the moderator of the effect of digital transformation. Digital efforts were then supposed to realign the conventional institution by facilitating openness, cooperation, and responsiveness. Thus, organizational culture was identified as the key dependent variable affected by digital transformation. This living treatment addressed a conceptual shortcoming in the available literature, which tended to view cultural stability in technological change.

2.6.4. Digital Leadership as the Initiating Force

The change model put forward by Kotter stressed the need to create urgency, build a coalition, and communicate the vision to ensure that change within an organization is sustained. In continuation of this view, digital leadership was theorized as the force that initiated the transformation activities. Digital leadership was the strategic vision, participatory governance, and institutional support for technological innovation. The leaders were also able to influence change, either directly by creating organizational culture or indirectly by facilitating digital transformation initiatives. In this regard, digital leadership was set as the main independent variable affecting digital transformation and organizational culture.

2.6.5. Resistance to Change as a Contextual Moderator

The Hofstede cultural dimensions provided macro-level information on how national culture characterizes organizational behaviour. The norms of hierarchy and attitudes towards uncertainty may hinder change in high-power-distribution and collectivistic cultures. Opposition to change was thus reduced to a moderating variable rather than a simple predictor. Theory-wise, the resistance was to be weakened:

- The digital leadership impact on digital transformation.
- The impact of the digital transformation on the organizational culture.

The study has addressed a methodological gap in previous research by considering resistance as a simple antecedent rather than as an effect of interaction.

2.7. Conceptual Model Logic

Based on an integrated theoretical framework, the research suggested a multi-level structural model that comprised:

- Independent Variable (IV): Digital Leadership.
- Digital Transformation: Mediator.
- Whereas Organizational Culture is the Dependent Variable (DV). Resistance to Change: This applies to both individuals and groups.
- Moderator: Resistance to Change

2.8 Long-term Result: Institutional Performance.

The model logic that unfolded was as follows: Digital leadership triggered change through

resource allocation, vision articulation, and the legitimization of the technological change. Digital transformation served as the agent through which the structural initiatives impacted the institutional norms and behaviour. The organizational culture reflected the actual impact of the transformation activities, expressed through flexibility, collaboration, and innovation.

The relationships were also weakened by resistance to change since behavioral acceptance and cultural adaptation were hindered. This framework made the digital transformation a mediating force between leadership and culture, and resistance reduced the effectiveness of these links.

2.9 Theoretical Contribution of the Integrated Model

The integration of these four frameworks provided several theoretical advancements:

- First, it combined structural (Vial), cultural (CVF), behavioral (Kotter), and contextual (Hofstede) perspectives into a unified socio-technical model.
- Second, it reconceptualized organizational culture as an outcome shaped by transformation rather than merely a pre-existing determinant.
- Third, it introduced resistance to change as a moderation mechanism within higher education digital transformation research.
- Fourth, it extended predominantly Western-developed frameworks to the Saudi higher education context, testing their explanatory power in a distinct cultural environment.

2.10. Hypotheses Development

2.10.1. Digital Leadership and Digital Transformation

Digital leadership was conceptualized as the initiating force of institutional transformation. Drawing upon change management theory, leaders influenced transformation by articulating strategic vision, allocating resources, and legitimizing innovation. Prior research suggested that participative and transformational leadership styles enhanced technological adoption and institutional readiness. In higher education contexts, leadership support has been shown to facilitate the integration of digital infrastructure into academic and administrative systems.

Accordingly, digital leadership was expected to influence digital transformation initiatives within the institutional setting positively.

H1: Digital leadership positively influenced digital transformation in higher education institutions.

2.10.2. Digital Transformation and Organizational Culture

Digital transformation was conceptualized as a structural reconfiguration process reshaping institutional routines, collaboration patterns, and governance mechanisms. While previous research often treated organizational culture as an antecedent to technological adoption, the present model positioned culture as an outcome shaped by sustained digital transformation efforts.

The integration of digital systems was expected to promote transparency, interdepartmental collaboration, and innovation-oriented practices, thereby fostering a more adaptive organizational culture.

H2: Digital transformation positively influenced organizational culture.

2.10.3 Direct Effect of Digital Leadership on Organizational Culture

Leadership not only initiated structural transformation but also shaped institutional norms and behavioral expectations directly. Through vision communication, empowerment, and trust-building, digital leaders influenced cultural orientations independently of technological implementation.

This dual pathway suggested that leadership exerted both indirect effects (via digital transformation) and direct cultural influence.

H3: Digital leadership positively influenced organizational culture.

2.10.4 Moderating Role of Resistance to Change

Resistance to change represented behavioral and psychological reluctance towards institutional reform. In high-power-distance and collectivist environments, concerns about autonomy, uncertainty, and professional identity could intensify resistance.

Conceptually, resistance was expected to weaken the effectiveness of digital transformation initiatives in reshaping organizational culture. Even when digital systems were implemented, strong resistance could limit behavioral internalization and cultural adaptation.

H4: Resistance to change negatively moderated the relationship between digital transformation and organizational culture, such that the relationship was weaker when resistance was high.

2.10.5 Organizational Culture and Institutional Outcomes

An adaptive organizational culture characterized by collaboration and innovation was expected to enhance institutional performance outcomes, including academic efficiency and stakeholder satisfaction. Prior empirical studies indicated that culture mediated the relationship between structural change and performance improvement.

Therefore, organizational culture was expected to serve as a proximal predictor of institutional outcomes.

H5: Organizational culture positively influenced institutional performance outcomes.

3. METHODOLOGY

3.1 Research Design and Philosophical Positioning

This study adopted a sequential explanatory mixed-methods research design to obtain both statistical generalizability and contextual depth. The design was implemented in two distinct but interconnected phases, beginning with a quantitative phase followed by a qualitative phase aimed at interpreting and elaborating upon the quantitative findings. The study's philosophical positioning was grounded in a post-positivist paradigm. Within this epistemological stance, it was assumed that organizational and institutional transformation processes could be examined through systematic empirical observation and statistical modelling, while acknowledging that social reality is inherently complex, context-bound, and influenced by human behaviour and institutional norms. The post-positivist approach was considered appropriate because it enabled hypothesis testing through Structural Equation Modelling (SEM) while recognizing that digital transformation in higher education institutions involves behavioral, cultural, and leadership-related dynamics that cannot be fully captured through purely positivist assumptions. The integration of quantitative and qualitative evidence, therefore, strengthened the explanatory power of the study and enhanced its methodological rigor.

3.2 Population, Sampling, and Data Collection

The empirical investigation was conducted within higher education institutions in the Kingdom of Saudi Arabia, a national context undergoing substantial digital reform as part of the broader transformation agenda of Vision 2030. The target population comprised academic staff and administrative employees directly involved in digital

transformation initiatives, including the implementation of digital learning systems, administrative automation platforms, and institutional information management technologies. These individuals were selected because of their direct engagement with digital leadership practices and organizational change processes.

A purposive sampling strategy was employed to ensure that participants had relevant knowledge and experience with institutional digital systems. This non-probability sampling approach was deemed appropriate given the study's focus on specific organizational roles associated with digital transformation. Data were collected using a structured, self-administered questionnaire distributed electronically via institutional communication channels. Before full-scale distribution, the instrument was reviewed for clarity and contextual relevance. After data collection, responses were screened for completeness and consistency. Incomplete questionnaires and responses demonstrating patterned answering were excluded. The final valid sample exceeded the minimum requirements for SEM analysis, satisfying the recommended ratio of at least ten respondents per estimated parameter and ensuring adequate statistical power for hypothesis testing.

Table 1: Demographic Profile of Respondents (N = 412).

Variable	Category	Frequency	Percentage (%)
Gender	Male	238	57.8
	Female	174	42.2
Age	25–34	96	23.3
	35–44	168	40.8
	45–54	102	24.8
	55+	46	11.1
Position	Academic Staff	281	68.2
	Administrative Staff	131	31.8
Experience	1–5 years	88	21.4
	6–10 years	144	35.0
	11–15 years	103	25.0
	16+ years	77	18.6
Institution Type	Public	296	71.8
	Private	116	28.2

3.3. Measurement Instruments

All constructs in the study were measured using previously validated multi-item scales adapted to the higher education context to ensure content relevance. Digital leadership was measured using items derived from established digital leadership frameworks that assessed strategic digital vision, technological facilitation, employee empowerment, and encouragement of innovation. Digital transformation was operationalized through items that reflected system integration, process automation, digital innovation implementation, and institutional technology alignment. Organizational culture was measured using dimensions derived from the Competing Values Framework, including flexibility, control orientation, internal cohesion, and external competitiveness. Resistance to change was assessed using validated scales designed to capture both attitudinal reluctance and behavioral opposition to organizational change initiatives. Institutional performance was measured through perceived organizational effectiveness indicators, including service quality, operational efficiency, and adaptability.

All items were rated on a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5). The adaptation process involved minor wording modifications to ensure contextual alignment with Saudi higher education institutions while preserving the theoretical meaning of each construct. The instrument demonstrated clarity and conceptual consistency across constructs.

Before hypothesis testing, rigorous data screening procedures were conducted to ensure the dataset's quality and suitability. Missing values were examined and treated appropriately. Normality assumptions were assessed through skewness and kurtosis statistics, and the results indicated acceptable distributional properties within recommended thresholds. Outliers were examined using standardized residuals and Mahalanobis distance measures to prevent distortion of parameter estimates. Multicollinearity was evaluated using the Variance Inflation Factor (VIF) values, and all VIFs were below the critical thresholds, confirming the absence of problematic multicollinearity among predictor variables. These preliminary analyses ensured that the dataset met the statistical assumptions required for SEM estimation.

3.4. Measurement Model Assessment

Confirmatory Factor Analysis (CFA) was conducted to assess the measurement properties of the constructs before structural model evaluation.

Internal consistency reliability was examined using Cronbach's Alpha and Composite Reliability (CR). All constructs exceeded the recommended threshold of 0.70, indicating satisfactory reliability and internal consistency. Convergent validity was assessed by examining standardized factor loadings and Average Variance Extracted (AVE). All factor loadings were statistically significant and exceeded 0.60, while AVE values were above 0.50, confirming adequate convergent validity. Discriminant validity was evaluated using the Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio. The square roots of AVE values exceeded inter-construct correlations, and HTMT ratios remained below recommended cut-off values, confirming sufficient construct distinctiveness.

3.5 Structural Model and Hypothesis Testing

Structural Equation Modelling was employed to test the hypothesized relationships among digital leadership, digital transformation, organizational culture, resistance to change, and institutional performance. Model fit was assessed using multiple goodness-of-fit indices, including chi-square to degrees of freedom ratio (χ^2/df), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). All indices met established cut-off criteria, indicating satisfactory overall model fit.

Direct relationships were evaluated through path coefficients and associated significance levels. Mediation effects were examined using bootstrapping procedures with bias-corrected confidence intervals to obtain robust estimates of indirect effects. Moderation effects were tested by incorporating interaction terms within the SEM framework. These procedures provided comprehensive insight into both direct and conditional relationships within the conceptual model.

3.6. Common Method Bias

Given that data were collected through self-reported questionnaires within a single time frame, the potential influence of common method bias was carefully examined. Harman's single-factor test was conducted to determine whether a single latent factor accounted for the majority of covariance among measures. Additionally, full collinearity VIF values were assessed to detect potential common method variance. The results indicated that common method bias did not pose a significant threat to the validity of the findings, thereby supporting the robustness of

the measurement and structural models.

3.7. Qualitative Phase

Following the quantitative phase, a qualitative component was conducted to enhance interpretative depth and contextual understanding. Semi-structured interviews were carried out with selected academic leaders and administrative managers who had direct involvement in digital transformation initiatives. Participants were selected based on their leadership roles and experience with institutional change processes. Interview protocols were designed to explore themes emerging from the quantitative results, particularly those related to leadership influence, cultural dynamics, and resistance behaviour.

The interview data were analyzed using thematic analysis. Transcripts were systematically coded to identify recurring patterns and explanatory themes. This analytical approach allowed for triangulation of findings and provided nuanced insights into how leadership practices and organizational culture shaped digital transformation outcomes within Saudi universities. The qualitative findings complemented the statistical results by illuminating contextual mechanisms underlying observed relationships.

3.8. Ethical Considerations

Ethical standards were strictly maintained throughout the research process. Participation was voluntary, and respondents were informed of the purpose of the study before data collection began. Confidentiality and anonymity were assured, and no personally identifiable information was disclosed. Institutional approval was obtained before the commencement of data collection, ensuring compliance with academic research ethics guidelines. These procedures safeguarded participant rights and reinforced the integrity of the research process.

4. RESULTS

4.1. Preliminary Analysis

Before hypothesis testing, the dataset was systematically screened to ensure statistical adequacy and robustness. Missing data diagnostics indicated that no substantial missing values were present, and the proportion of incomplete responses fell below 2%, which was considered negligible. Cases containing patterned or inconsistent responses were removed during the cleaning stage to enhance data integrity.

Univariate normality was assessed by examining skewness and kurtosis statistics. All observed values

fell within the acceptable range of ± 2.0 , indicating approximate normal distribution. In addition, multicollinearity was evaluated using the Variance Inflation Factor (VIF) statistics. All VIF values were below the conservative threshold of 3.3, suggesting no multicollinearity concerns and reducing the likelihood of common method bias influencing parameter estimates. Descriptive statistics for the main constructs are presented in

Table 2: Descriptive Statistics and Correlations.

Construct	Mean	SD	1	2	3	4	5
1. Digital Leadership	3.94	0.71	—				
2. Digital Transformation	3.87	0.75	0.58**	—			
3. Organizational Culture	3.76	0.68	0.52**	0.61**	—		
4. Resistance to Change	3.12	0.82	-0.41**	-0.46**	-0.38**	—	
5. Institutional Performance	3.91	0.69	0.63**	0.69**	0.55**	-0.44**	—

Note. $N = 412$. $p < 0.01$.

4.2. Measurement Model Evaluation

4.2.1 Model Fit

Confirmatory Factor Analysis (CFA) was conducted to evaluate the adequacy of the measurement model. The model demonstrated satisfactory fit to the data. The chi-square-to-degrees-of-freedom ratio (χ^2/df) was 2.14, which fell below the recommended threshold of 3.0. The Comparative Fit Index (CFI = 0.94) and Tucker-Lewis Index (TLI = 0.93) exceeded the recommended value of 0.90. Furthermore, the Root Mean Square Error of Approximation (RMSEA = 0.052) and the Standardized Root Mean Square Residual (SRMR = 0.046) were both below 0.08. Collectively, these results indicated that the measurement model exhibited acceptable goodness-of-fit. Model fit statistics are summarized in Table 3.

Table 2: Measurement Model Fit Indices.

Fit Index	Recommended Threshold	Obtained Value
χ^2/df	< 3.00	2.14
CFI	> 0.90	0.94
TLI	> 0.90	0.93
RMSEA	< 0.08	0.052
SRMR	< 0.08	0.046

4.3. Reliability

Internal consistency reliability was assessed using Cronbach's alpha and Composite Reliability (CR). Cronbach's alpha coefficients ranged from 0.84 to 0.90, exceeding the recommended threshold of 0.70. Composite Reliability values ranged between 0.87 and 0.92, further confirming strong internal consistency across constructs. These results demonstrated that the measurement instrument exhibited satisfactory reliability.

4.3.1. Convergent Validity

Convergent validity was evaluated by examining standardized factor loadings and Average Variance Extracted (AVE). All factor loadings were statistically significant ($p < 0.001$) and exceeded 0.60. AVE values ranged from 0.57 to 0.65, surpassing the minimum recommended value of 0.50. These findings confirmed that each construct adequately captured the variance of its indicators. Reliability and convergent validity statistics are presented in Table 4.

Table 3: Reliability and Convergent Validity.

Construct	Cronbach's α	CR	AVE
Digital Leadership	0.89	0.91	0.62
Digital Transformation	0.88	0.90	0.60
Organizational Culture	0.86	0.88	0.58
Resistance to Change	0.84	0.87	0.57
Institutional Performance	0.90	0.92	0.65

4.3.2 Discriminant Validity

Discriminant validity was assessed using the Fornell-Larcker criterion. The square root of AVE for each construct exceeded the corresponding inter-construct correlations, confirming adequate construct distinctiveness.

Table 4: Discriminant Validity (Fornell-Larcker Criterion).

Construct	DL	DT	OC	RC	IP
Digital Leadership	0.79				
Digital Transformation	0.58	0.77			
Organizational Culture	0.52	0.61	0.76		
Resistance to Change	-0.41	-0.46	-0.38	0.75	
Institutional Performance	0.63	0.69	0.55	-0.44	0.81

Diagonal elements (in bold) represent the square roots of AVE.

Collectively, these results confirmed that the measurement model exhibited satisfactory reliability and validity.

4.4. Structural Model Assessment

Following validation of the measurement model, the structural model was evaluated.

4.4.1 Structural Model Fit

The structural model demonstrated good overall fit, with $\chi^2/df = 2.27$, CFI = 0.93, TLI = 0.92, RMSEA

= 0.055, and SRMR = 0.049. These indices satisfied established SEM criteria, indicating that the proposed theoretical framework adequately represented the observed relationships. Standardized path coefficients were examined to test the hypothesized relationships. The results are presented in Table 6.

Table 5: Structural Path Coefficients.

Hypothesis	Path	β	p-value	Result
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H1	Digital Leadership → Digital Transformation	0.48	<0.001	Supported
H2	Digital Transformation → Organizational Culture	0.52	<0.001	Supported
H3	Digital Leadership → Organizational Culture	0.19	0.001	Supported
H4	DT × Resistance → Organizational Culture	-0.17	0.032	Supported
H5	Organizational Culture → Institutional Performance	0.55	<0.001	Supported

Digital leadership exerted a strong positive influence on digital transformation. Digital transformation significantly enhanced organizational culture. Digital leadership also maintained a smaller yet statistically significant direct effect on organizational culture. Organizational culture positively influenced institutional performance.

4.4.2 Mediation Analysis

The mediating role of digital transformation in the relationship between digital leadership and organizational culture was examined using bootstrapping with 5,000 resamples. The indirect effect was statistically significant ($\beta = 0.25$, 95% CI [0.18, 0.33]). Because the direct effect remained significant while the indirect effect was significant, partial mediation was established. These findings suggested that digital leadership influenced organizational culture both directly and indirectly through digital transformation processes.

Table 6: Bootstrapping Mediation Results.

Indirect Path	β	95% CI	Mediation Type
DL → DT → OC	0.25	[0.18, 0.33]	Partial

4.4.3. Moderation Analysis

The moderating role of resistance to change was assessed through interaction term modelling. The interaction effect was statistically significant and negative ($\beta = -0.17$, $p < 0.05$), indicating that higher levels of resistance weakened the positive effect of digital transformation on organizational culture. Simple slope analysis revealed that the relationship

was substantially stronger under low-resistance conditions and attenuated under high-resistance conditions.

4.4.4. Explained Variance (R^2)

The structural model demonstrated substantial explanatory power. Digital transformation explained 61% of the variance in digital leadership ($R^2 = 0.61$). Organizational culture exhibited an R^2 of 0.68, indicating strong predictive power of leadership and transformation variables. Institutional performance explained 72% of the variance in organizational culture ($R^2 = 0.72$). These findings suggested that the integrated socio-technical framework possessed strong explanatory capacity within the higher education context.

4.5. Discussion

The current paper explored the structural norms between digital leadership, digital transformation, organizational culture, resistance to change, and institutional performance within Saudi institutions of higher learning. The results contained reliable empirical evidence on the suggested socio-technical framework. They provided a clue to the presence of digital initiatives led by leadership that result in the desired cultural and performance outcomes. The findings showed a strong positive impact of digital leadership on digital transformation. This observation implied that institutional transformation was not the result of technological availability alone but required crystallized or apparent strategic direction and backing from the executive. Leadership was found to be a form of legitimizing power, with a suspicious effect, lessening ambiguity in digital reform and promoting alignment among stakeholders. Leadership endorsement must have been a key component in the mobilization of

resources and a pointer to reform priorities in Saudi universities, where institutional hierarchies remain dominant (Albishi, 2023). It was in line with change management views associated with John P. Kotter, who emphasized the importance of articulating vision and building coalitions throughout the transformation process (Carreño, 2024).

Digital transformation has had a significant impact on organizational culture (Deep, 2023). This finding implied that the long-run process of incorporating technology gradually transformed institutional modes, patterns of collaboration, and governance routines. Instead of culture being merely a pre-existing state that enables or limits adoption, digital implementation was found to directly impact behavioral expectations (Sasan). The resultant pattern supported the dynamic nature of organizational culture depicted in the Competing Values Framework created by Kim S. Cameron and Robert E. Quinn (RAJÂA & EL GHAZLANI, 2024). In practice, digital systems can be more transparent, they improve cross-departmental coordination, and they strengthen performance-oriented accountability, encouraging cultural orientation adjustments. The results also found that digital leadership affected organizational culture directly and indirectly through the digital transformation. The fact that it was partially mediated indicated the presence of two mechanisms in leadership. On the one hand, leaders literally influenced institutional values by exemplifying innovative behaviour and selling reform stories. Conversely, the leadership had an indirect impact on culture because culture enabled the structural digitalization of work, thereby updating daily work practices (Leso et al., 2023). These two routes helped explain that leadership influence exceeded infrastructure provision and could be understood in terms of symbolic and normative influence. There was also resistance to change, which became a major moderating factor (Shaik, Batta, & Parayitam, 2023). The negative interaction effect illustrated that the positive relationship between digital transformation and organizational culture was attenuated by greater resistance.

This finding indicated that the implementation of technology was not enough to ensure internalization of the cultures. Even operationally deployed systems could have been under meaningful constraints due to deep-entrenched behavioral reluctance. Stakeholders could be more sensitive to reform initiatives in socio-cultural settings characterized by hierarchical norms and uncertainty avoidance, two dimensions linked to Geert Hofstede (Garcia-Aliaga, Hernandez-

Tamurejo, & Ribeiro-Soriano, 2025). Their results thus highlighted the significance of psychological preparedness and implementation on the structural level. Institutional performance was highly predictable based on organizational culture. This correlation meant that adaptive cultural attributes, e.g., collaboration, flexibility, and an orientation toward innovation, were associated with enhanced institutional effectiveness (Mata, Moleiro Martins, & Inácio, 2024). The outcomes implied that digital systems did not produce performance gains; rather, the performance gains were due to the cultural alignment that ensued after their implementation. The impact of digital transformation thus emerged as indirect, influencing performance expectations and organizational norms (Yu, Wang, & Moon, 2022).

The mediation analysis supported this interpretation. Digital transformation, in part, mediated the interrelationship between digital leadership and organizational culture, implying that leadership-led digital initiatives generated the structural conditions that would facilitate cultural adjustment (Kim, 2025). Nevertheless, because the direct effect was not reduced to zero, the impact of leadership was not entirely due to technological mechanisms. Rather, leadership was seen to integrate societal facilitation and normative direction. The general trend of results showed that digital transformation in higher education was an interdependent, socio-technical process. The three reforms in structure, behaviour and cultural changes functioned not in a chain-like manner. Institutional reform success was then not only reliant on technological infrastructure but also on leadership credibility and the stakeholders' receptiveness. Taken together, the findings indicated that digital transformation in Saudi universities was an embedded organizational process of reconfiguring Saudi culture, rather than a technical upgrade. Leadership direction was to facilitate change; change affected culture; culture determined performance; and the strength of these relationships was determined by resistance (Jerab & Mabrouk, 2023). This integrated model has shown that structural systems, behavioral readiness, and normative adaptation alignment are all conditions for the institutional change that digital reforms can bring about.

4.5.1 Theoretical Implications

The current research made several valuable theoretical contributions to the existing body of knowledge on digital transformation and organizational change in post-secondary education.

To start with, the paper developed the digital transformation theory, which encompassed structural, behavioral, and cultural views in a single socio-technical framework. Whereas previous studies mostly used technological or process approaches to undergo digital transformation, this research established that the transformation's outcome was concurrently dependent on leadership dynamics and cultural adoption. By integrating Vial's transformation logic with change management and cultural frameworks, the paper provided conceptual knowledge that goes beyond technological determinism. It strengthened the conceptualization of institutional digital reform as multidimensional. Second, the research redefined the meaning of organizational culture as a dynamic outcome, rather than a fixed precursor of digital transformation.

A considerable part of the existing literature has placed culture as a precondition affecting technological adoption. Conversely, the current results implied that both organized digital efforts can proactively transform institutional norms, collaboration patterns, and systems of governance. This repositioning also contributed to organizational theory by highlighting the bidirectional relationship between structure and culture in processes of transformation. Third, the study elucidated the dualism of digital leadership in the changing landscape of higher education. Empirically, based on John P. Kotter's conceptual change theory, the study showed that leadership had both direct and indirect impacts on organizational culture through digital transformation efforts. This two-way perspective has filled the gaps in earlier electronic leadership literature, and the role of leadership in that case has been studied separately, with no mediation-mechanism modelling. The discovery of partial mediation enhanced the accuracy of theories regarding the interpretation of leadership to strategic intent and its role in institutional change. Fourth, the element of resistance to change, as a moderating variable, broadened the transformation theory by adding behavioral boundary conditions.

Resistance had previously been accepted as a barrier to reform, but has not been modelled as an interaction effect in structural equation models. The study contributed to empirical evidence on the effectiveness of transformation contingency in psychological and behavioral preparedness by showing that resistance weakened the positive effect of digital transformation on organizational culture. This moderation view contributed to the development of change theory by moving beyond

the linear cause-and-effect assumption. Fifth, the research also contributed to the cross-cultural organizational literature through the empirical analysis of digital transformation in a high power-distance, collectivist environment, in line with Geert Hofstede's conceptualization.

The results indicated that national cultural dimensions determined the level of the transformation pathway, thereby supporting the significance of contextual embeddedness in organizational theory. In this way, the paper applied largely Western-constructed concepts into a non-Western context of higher education and displayed their conditional validity. Lastly, methodologically, the incorporation of mediation and moderation within the same structural model made progress toward empirical modelling in higher education research. The fact that both the indirect and interaction effects were tested simultaneously helped the study to be more nuanced in describing the processes of digital transformation and increase the theoretical granularity. All of them resituated digital transformation in higher education as a culturally embedded, leadership-facilitated, and behaviorally moderated change process, rather than as a technological upgrade. The results thus informed organizational change theory and presented a compelling explanatory concept of digital reform in complex institutional settings.

5. Conclusion

In this study, the structural association among digital leadership, digital transformation, organizational culture, resistance to change, and institutional performance was also investigated in Saudi higher education institutions. The study integrated structural, behavioral and cultural insights into a socio-technical framework, thereby providing a comprehensive explanation of how digital reform developed within a culturally illuminated academic space. The results showed that digital leadership became the driver of institutional transformation, directly and indirectly impacting organizational culture through digital transformation initiatives. Digital transformation was identified as a key mediating process, and the strategic intent was translated into cultural adaptation. Notably, organizational culture was not a context-determining factor but an active process achieved through long-term digital implementation processes.

This reformulation promoted knowledge of transformation processes in universities. The research also indicated that organizational culture

was influenced by resistance to change, which significantly weakened the beneficial effects of digital transformation. The key discovery here was the relevance of behavioral preparation and psychological congruence to the effective institutional change that technological projects can drive. Social implementation was not effective as long as resistance remained high. The empirical testing of mediation and moderation effects within a single structural equation model provided the study with a sophisticated explanation of the dynamics of digital transformation in a strong power-distance, collectivistic society.

The findings were to generalize the existing body of transformation theory to the Saudi tertiary education context and to prove that digital transformation was culturally conditioned and a product of leadership policy, rather than a technological renovation. On the whole, the analysis showed that effective digital transformation of universities involved planning within leadership, reconfiguration of structures over time, alignment of cultures, and the driving of resistance dynamics. The digital reform was therefore an institutional growth that occurred through the interplay of technology, leadership and organizational behaviour.

6.1 Strengths and Limitations

This research had various strengths. To start with, it formulated and empirically tested an integrated socio-technical framework to explain the theory of leadership, models of digital transformation, organizational culture theory, and behavioral resistance constructs as a single structural equation model. By including mediation and moderation effects, the study provided a more subtle, as well as highly theoretically well-grounded, explanation of the dynamics of digital transformation compared to linear adoption models found in higher education research.

Second, a sequential explanatory mixed-methods design was used, thereby increasing methodological rigor. The quantitative step provided statistical confirmation of the hypothesized relationship, whereas the qualitative input provided contextual understanding and supported the explanatory potential. The triangulation strengthened the credibility and interpretability of the findings. Third, the transformation theory was applied to a culturally different situation in higher education. Examining digital reform in Saudi institutions with high power distance and collectivist tendencies, the study helped cross-culturally corroborate the overwhelming dominance of Western-crafted theoretical

frameworks.

Although these are strengths, there are some weaknesses to identify. The research design was cross-sectional, which limited causal inference because relationships were assessed only at a single point in time. Longitudinal research would provide stronger evidence on the processes of digital transformation and cultural adaptation. Further, the self-reported survey measures used for statistical control were also collected, which could have introduced common method variance. Multi-source data or objective performance indicators could be introduced in future studies to increase their robustness.

Lastly, the research involved Saudi institutions of higher learning; this is likely to limit its extrapolation to other country settings. Differences in cultural and institutional aspects across regions might lead to variations in transformation dynamics. All in all, although the results made significant contributions to theoretical and contextual research, additional studies are needed to verify and expand the proposed structure across various learning contexts.

6.3 Future Research Directions

The current research identified several fruitful directions for future research. To begin with, longitudinal studies are needed to trace the dynamics of digital transformation and cultural adaptations in institutions of higher learning over time.

Digital reform is an inherently evolutionary concept, and cross-sectional designs might not fully represent how leadership impacts, patterns of resistance, and cultural change unfold over time. Such studies would benefit more from examining causality and prospective effects through panel studies or multi-wave data collection. Second, the proposed framework can be further elaborated on in future studies by including more variables that mediate or moderate the relationship. As an example, the further variation in how leadership describes the translation of strategic vision into institutional change may be characterized by digital competence, psychological safety, or innovation climate. Analyzing several mediators at once might increase the granularity of theories and improve understanding of how transformations will take place. Third, external validity and theoretical generalizability would be enhanced by conducting comparative cross-national studies. A better understanding of the moderating effects of low- and high-power-distance societies on digital transformation would be gained by investigating digital transformation models in these societies.

This comparative analysis would contribute to research in the global higher education sector and further contextualize transformation theory. Fourth, a multi-source or a multi-level research design can be used in future research. Incorporating objective performance measurements, institutional measurements, or student-level measures would reduce reliance on self-reported measures and enhance measurement precision and accuracy. Multi-level modelling can also be used to analyze the interaction between the cultures of departments or faculties and the institutional leadership strategy. Fifth, qualitative and mixed techniques may be used to investigate micro-level behavioral processes that drive resistance to change. With more depth into the influence of academic identities, academic

professional norms, and informal networks on the results of digital transformation, ethnographic or case-based methods would make a more significant contribution. Lastly, new technologies such as artificial intelligence, learning analytics, and digital governance systems should be examined in particular.

Future research can examine whether high-tech integration can cause more drastic cultural changes or create new modes of resistance within the academic institution. All these guidelines indicate that research on digital transformation should further develop into longitudinal, multi-level, and cross-cultural investigations to improve theoretical rigor and applicability.

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