



Driving University Performance in the Artificial Intelligence Era: Digital Skills, Creative Leadership, and Innovation under Vision 2030

Syed Afzal Moshadi Shah^{1*}, Aqil Waqar Khan², Noureen Fatima¹, Abdullah Hamoud Ali Seraj¹, Ilknur Ozturk³, Khalid Zaman⁴

¹Department of Management, College of Business Administration, King Faisal University, Eastern Province - AlAhsa Hofuf KSA, 31982, Saudi Arabia, ²University of Stirling, Ras Al Khaimah, United Arab Emirates, ³Faculty of Economics, Administrative and Social Sciences, Nisantasi University, Istanbul, Turkey, ⁴Department of Economics, University of Haripur, Haripur, Pakistan. *Email: sashah@kfu.edu.sa

Received: 02 January 2026

Accepted: 10 April 2026

DOI: <https://doi.org/10.32479/irmm.23656>

ABSTRACT

Universities in the digital era seek new methods to enhance faculty productivity, fulfill national strategic objectives, and stay competitive globally. This study examines how digital competency, organizational support for innovation, entrepreneurial mindset, organizational adoption of AI, and job performance affect Saudi academic and administrative staff in light of Vision 2030. Employee creativity and transformative leadership moderate the performance connection. The stratified random sample poll included 775 respondents from nine Saudi universities. The structural equation modeling with high fit indices validates the measurement model's validity and reliability. Digital proficiency, innovation support, job performance, and AI usage are positively connected with an entrepreneurial attitude. Digital proficiency, corporate support for innovation, entrepreneurial mentality, and AI usage all affect employee creativity and initiative. Moderate analysis shows that transformative leadership boosts corporate productivity and creativity. Creative performance is higher under powerful transformational leadership conditions than without leadership, as shown by the interaction effect. The bootstrapped resamples-based mediation approach links employee creativity to task performance. Creativity bridges organizational and technological behaviors, improving performance. Strategic higher education policy affects Vision 2030's innovation, global competitiveness, and institutional excellence goals.

Keywords: Artificial Intelligence Adoption, Entrepreneurial Orientation, Digital Competence, Employee Creativity, Transformational Leadership, Job Performance, Saudi Arabia

JEL Classifications: I23, M12, O33

1. INTRODUCTION

In this age of rapid technological change, globalization, and the knowledge-based economy, governments are reassessing their development frameworks to ensure long-term prosperity (Liang, 2025). Saudi Arabia's Vision 2030, one of the world's most significant national reforms, aims to diversify the economy, improve human capital, and promote innovation (Abubakar

et al., 2024). Universities are essential to change because they generate new knowledge, spread innovations, and train skilled workers. To make its higher education institutions (HEIs) globally competitive, the Kingdom is using advanced technology, encouraging entrepreneurial mindsets, and changing leadership (Arnout et al., 2024). AI, entrepreneurship, digital fluency, and organizational innovation support increasingly determine an institution's success. A study contributes to the literature by

studying how transformational leadership and employee creativity mediate organizational and individual attributes that improve job performance at Saudi HEIs in a changing environment. In the past 20 years, digital technology, globalization, and performance-based governance have transformed higher education (Narbaev et al., 2025). Universities must now do more than teach and research. They should also promote national innovation systems, entrepreneurial ecosystems, and modern business practices. This transformation has led numerous companies to rethink their HR practices to promote innovation, flexibility, and lifelong learning. Technical expertise, collaboration, digital adaptability, and creative problem-solving are all important for knowledge-intensive professionals (Azofeifa et al., 2024). This redefines work success as contributing to organizational objectives via innovation, adaptability, and value creation. Saudi Arabian and other developing nations' universities must embrace this high-performance culture to achieve Vision 2030's global competitiveness, inventive graduates, and influential research.

AI's fast ascent has transformed higher education with new analytics, decision-making help, and automation. AI enables personalized learning, quicker research administration, and improved policy decisions (Han et al., 2025). Faculty preparation, attitude, and innovation are as vital as technical infrastructure for introducing AI into academic institutions. According to the technology acceptance model (Davis, 1989) and the unified theory of acceptance and use of technology (Venkatesh et al., 2003), new technologies' compatibility, simplicity of use, and practicality affect their adoption and usage. Saudi HEIs may enhance operations using artificial intelligence (AI), but personnel must be trained to think digitally and understand algorithms. AI deployment's influence on organizational and psychological characteristics, including employee creativity and work performance, must be studied. If considered as a tool rather than a threat, AI may help workers uncover new ideas, streamline procedures, and provide better results (Ali et al., 2024). Strategic cultural and behavioral attributes like EO and technological preparedness boost institutional effectiveness. EO symbolizes a company's entrepreneurial spirit—innovative, risk-taking, and aggressive pursuit of possibilities (Feola et al., 2021). Universities should have an "entrepreneurial orientation" toward innovative ideas in the classroom, lab, and beyond. Then it describes how the corporation helps workers create lucrative enterprises. Everyone benefits when individuals feel comfortable trying new ideas and seizing possibilities at EO-focused institutions (Corrêa et al., 2022). EO training for university staff might make administrative tasks more interesting and increase Saudi Arabian performance. This is important since Vision 2030 emphasizes innovation and entrepreneurship as diversification accelerators. Without corporate backing for innovation and digital skills, EO may not be enough to bring entrepreneurial ideas into reality (Kraus et al., 2023).

Encouragement of innovation affects employee creativity and production. Aldabbas et al. (2023) state that when workers feel supported by their company, they feel appreciated and provided the tools, motivation, and a safe atmosphere to take chances. Higher education institutions support innovation and creativity via financing, innovation labs, and recognition. Junça Silva and

Pinto (2024) found that assisted workers are more organically motivated and more equipped to adapt to organizational and technological change. Support for innovation in Saudi HEIs is crucial because it translates governmental aims into practice. Even with tight innovation restrictions, many organizations still exhibit structural rigidity, top-down decision-making, and inadequate department communication (Guo et al., 2025). Thus, researching how perceived organizational support, AI adoption, and EO affect job performance may uncover institutional reform opportunities. Technology-dependent companies must train their staff digitally. Digital technology, data management, and online interaction need technical, cognitive, and ethical skills (Ciarli et al., 2021). AI-enhanced education requires digital competency to understand algorithmic findings, preserve data integrity, and adapt to technology. Huu (2023) predicts that people who are adept at digital jobs and integrate AI into their workflow would perform better and innovate. Lack of digital competence may hinder technology adoption and create change resistance, hampering performance goals. Saudi university faculty and staff must be tech-savvy to maximize financed campus initiatives and AI research centers. Vision 2030's university reform prioritizes digital competency via professional development, collaborative learning, and organizational support.

The study is interested in Saudi Arabia's higher education system because it is an important aspect of Vision 2030's greater reform. Vision 2030 relies on micro-level psychological and behavioral elements, while past research has overlooked them for macro-level institutional and economic changes (Aldhobaib, 2025). The study addresses this requirement by identifying Saudi HEI variables, including transformational leadership, organizational support, creativity, digital competency, entrepreneurial attitude, and job performance. Human and technology systems must be optimized for efficiency, according to socio-technical systems theory (Herrmann and Pfeiffer, 2023). According to Makhoulfi et al. (2021), the resource-based paradigm emphasizes immaterial assets, including workers' inventive spirit, technical proficiency, and entrepreneurial spirit, for long-term market success. Transformational leaders influence innovation, technology, and employee performance. These perspectives are used to show how leadership mediates the synergistic effects of organizational culture and technology adoption on performance. This strategy accounts for modern organizations' complex, multi-level dynamics beyond cause-and-effect theories. Vision 2030 considers the digital revolution for humans. Even with modern digital infrastructure, investing in people, culture, and leadership yields better outcomes. Performance-driven yet creative cultures are emerging in higher education worldwide. University research and social and economic impact are assessed (Parker et al., 2023). Saudi Arabia needs transformational leaders to promote creative, critical, and technological thinking in its higher education institutions (HEIs) to achieve its 2030 knowledge-based economy goal.

Saudi Arabia's higher education system follows the trend toward intelligent, enterprising, and adaptive institutions. Transformational leadership increases impact by motivating and committing people. At the same time, an entrepreneurial orientation provides the strategic mindset for seizing opportunities,

organizational support provides resources and encouragement, digital competence enables effective technology use, and employee creativity transforms these factors into innovative performance (Aloulou et al., 2024). Understanding how human-centered digital transformation may achieve Vision 2030 requires studying these links in Saudi HEIs. This study expands the theoretical understanding of how technology improves academic performance and gives university administrators and legislators actionable steps to create digitally competitive, high-performing institutions that can compete globally.

1.1. Research Questions

The study has the following research questions, i.e., RQ1: Transformational leadership in Saudi Arabian universities' impact on entrepreneurial mentality and job performance? The study investigates whether university personnel with entrepreneurial orientation—a willingness to take risks, innovate, and take initiative—are better suited to academic and administrative jobs. Innovation and institutional adaptability are key to Saudi Vision 2030's national development goals. If colleges and universities understood this relationship and aligned leadership training with entrepreneurial initiatives, they might become more efficient and productive. RQ2: Whether employee creativity and AI adoption have an impact on job performance. AI-powered automated grading, predictive analytics, and customized learning systems have transformed higher education labor. Technology boosts creativity and performance, not just automation. This issue links cognitive engagement and technological advancement for institutional greatness. RQ3: How might innovative and tech-savvy enterprises help Saudi institutions' academic and administrative staff? This examines how creativity and digital skills affect productivity. An innovative workplace relies on technology, incentives, and managerial support. Digital competence includes technical knowledge, adaptability, and confidence using digital technologies. These characteristics are essential for Saudi Arabia's higher education sector to adjust rapidly to Vision 2030 and stay competitive. Technology-driven education affects employment via structural and human skills.

1.2. Research Objectives

The following are the study's objectives, i.e.,

- I. To examine the role of entrepreneurial and transformational leadership on staff productivity
- II. To analyze the impact of employee creativity that mediates AI adoption and work effectiveness
- III. To describe the effect of organizational support for innovation and digital competency on academic and administrative staff performance.

This study advances Saudi Arabia's Vision 2030 higher education system's technology transformation, entrepreneurial dynamism, and human capital development. Creative problem-solving, skilled management, and extensive research are expected from higher education institutions (HEIs) to help the Kingdom transition to a knowledge-based economy. This research is better comprehended due to its comprehensive approach, which includes technological, organizational, and behavioral factors. The study reveals that staff innovation and transformational leadership mediate the effects of

digital and psychological factors on institutional effectiveness. The outcomes would drive policy, HRD, and leadership to increase Saudi Arabia's university system's innovation and productivity. This work contributes to the worldwide academic discussion about digital transformation in higher education and may assist other developing nations in improving their institutions' performance and competitiveness via AI and entrepreneurship.

2. LITERATURE REVIEW

Modern universities are evolving due to innovation, human capital, and digital technology. Vision 2030 requires Saudi universities to promote economic variety, creativity, and innovation to boost competitiveness. Digital preparation, organizational culture, and innovation are now more crucial than talent and motivation for employee success, according to Bindel Sibassaha et al. (2025) and Odebo and Ogunbayo (2025). Understanding entrepreneurial mentality, digital competence, organizational support for innovation, AI adoption, creativity, and leadership improves employee performance and organizational success.

2.1. Entrepreneurial Orientation and Artificial Intelligence Adoption in Relation to Job Performance

Any business needs an entrepreneurial orientation (EO) to be successful since it reflects the company's commitment to innovation, proactiveness, and risk-taking. A university's EO may boost entrepreneurship, commercialize research, and rethink teaching (Abidi et al., 2024). Entrepreneurial firms outperform competitors due to their flexibility and inventiveness. Gyimah et al. (2025) found that entrepreneurial academics achieve institutional goals. These people start new projects, try new teaching methods, and seek collaborations. An entrepreneurial mindset is needed to adapt to changing education and technology. It develops initiative, problem-solving, and flexibility. According to a study (Ahmed et al., 2024), EO increases employee engagement and motivation, improving workplace performance. Saudi university staff may achieve organizational and personal success using EO. Vision 2030 promotes entrepreneurial universities globally. Cultural shift from bureaucratic to entrepreneurial higher education models fosters self-driven innovation and problem-solving. EO and AI boost knowledge economy employment. AI improves data accuracy, labour efficiency, and personalized engagement (Khan et al., 2025). AI has enabled intelligent instructors, automated grading, and predictive analytics for administrative decisions. AI improves employee performance by giving analytical insights, automating repetitive processes, and supporting evidence-based decision-making. AI simplifies administrative work at universities and gives academics strong new tools for cutting-edge research, individualized lectures, and real-time student performance data. AI improves academic labour efficiency by fostering knowledge and collaboration (Arya et al., 2025). Increase instructors' performance with AI-powered feedback. Track student progress and adapt classes in real time using these tools. AI deployments need readiness, digital literacy, and organizational support. AI success requires a can-do attitude and openness to new technologies. Al-Mamary (2025) shows that AI-powered task management and an entrepreneurial attitude may enhance creativity, adaptability, and productivity. Saudi Arabia's higher education industry is

undergoing an AI-driven digital transformation. Integration may change performance standards and boost institutional growth. This synthesis supports the study's first research hypothesis:

H₁: An entrepreneurial attitude and AI adoption improve Saudi university working conditions.

2.2. Innovation, Digital Competence, and Job Performance Support

Organizational support for innovation is shown by a corporation or organization that encourages innovation, risk-taking, and idea sharing. Organizational support infrastructure (OSI) at universities gives staff the resources, incentives, and rewards to try new ideas (Gegenhuber and Mair, 2024). Academic and administrative staff are more committed to doing a good job when they feel their institutions value innovation. Modernization and globalization are strategic objectives; hence, OSI must change the Saudi institution culture. Universities that encourage innovation are more likely to attract top talent, improve academic and administrative performance, and implement improvements (AlQhtani, 2025). When management supports novel teaching methods or research trials, employees perform better in creativity, autonomy, and collaborative problem-solving. OSI stimulates individuals to behave in ways that promote the institution's innovation and performance objectives. Digital competence (DC), closely related to organizational social intelligence (OSI), is now considered crucial for success in today's digital workplace. Digital competency (DC) is the ability to use digital technologies with certainty, critical thinking, and safety in the workplace (Prasetyo et al., 2024). It includes information literacy, technological skills, and digital technology adaptability. Data analytics, learning management systems, and AI platforms may assist higher education personnel in enhancing teaching, administration, and decision-making (Suryanarayana et al., 2024). DC boosts technical confidence and reduces workplace technology resistance, according to an Asian and European study. Vision 2030 emphasizes digital transformation; therefore, Alrashedi (2025) says digital competency is essential for academic success and institutional efficiency in Saudi Arabia. AI, data-driven research, and digital innovation initiatives are easier for a digitally aware workforce. Lou et al. (2024) found that innovative companies provide employees opportunities to improve their digital competence, which enhances productivity. OSI and DC collaborate to build a solid understanding of how structural and individual capabilities affect higher education job success. For continued performance improvement and competitiveness, institutions must promote innovation and train workers in digital skills. Thus, the study's second research hypothesis is as follows:

H₂: Organizational support for innovation and digital competency improves the working circumstances of Saudi academics and administrators.

2.3. Transformational Leadership and Employee Creativity in Moderation

Performance models may benefit from including employee creativity (EC) and transformational leadership (TL) to better understand how organizational and individual factors drive excellence. Creative people come up with new, practical solutions to remedy problems or improve procedures (Sreenivasan and

Suresh, 2024). University creativity encompasses new teaching, research, and administrative methods as well as creative expression. Studies have shown that creativity mediates the relationship between innovation atmosphere, digital adoption, and organizational success (Liang et al., 2025; Gazi et al., 2024). Workers may reuse AI and institutional support to boost efficiency and production if they apply their ideas. Giving employees the flexibility to try new ideas and express their opinions improves job performance and organizational citizenship (Kamil et al., 2025). Creativity links technical innovation and human adaptability in Saudi higher education. Creative staff involvement determines how successfully universities integrate AI and digital technologies to increase productivity and education quality (Lin and Chen, 2024). Therefore, employee innovation helps digital transformation activities become quantifiable performance outcomes. In contrast, transformative leadership strengthens the links between entrepreneurialism, innovation, and workplace productivity. Transformational leaders (TL) inspire innovation and creativity by giving their workforce a vision, intellectual stimulation, and individualized attention. Many studies suggest that transformational leadership promotes employee engagement, motivation, and performance by helping people align their goals with the firm's (Kwarteng et al., 2024; Mphaluwa et al., 2025). Transformational leaders who can guide departments through technological changes, encourage innovation, and build community benefit academic institutions. Transformational leadership is much more important at Saudi universities due to cultural and institutional factors that affect change adoption. Iram et al. (2025) suggests that leaders communicate Vision 2030 objectives and model creativity to boost performance. This will reduce resistance to AI and entrepreneurial developments. TL also boosts performance by encouraging employees to share ideas without fear of repercussions. Based on the cited literature, the study's final research hypothesis is as follows:

H₃: Employee creativity and transformational leadership moderate the relationship between job performance and technological and organizational factors in Saudi Arabia's higher education institutions.

2.4. Research Gaps

The literature on organizational performance, innovation, and technology adaptation in higher education has helped to understand how universities adapt to the digital revolution and globalization. Despite growing research on entrepreneurial attitude, AI adoption, and organizational innovation support, many crucial concerns remain unanswered. There is little research on using entrepreneurial attitude and AI integration in higher education, especially in impoverished countries like Saudi Arabia (Elmonshid and Sayed, 2024; Asad et al., 2025). Most research on these themes focuses on business, namely profit-driven outcomes and organizational competitiveness. Thus, little is known about how entrepreneurial orientation affects public university academic and administrative personnel performance. Public universities value national development and education above short-term profits. Although Western research has proven that entrepreneurial activity improves individual and organizational outcomes, there is currently a paucity of theoretical work on how to adapt these findings to culturally and structurally varied educational

institutions. Due to this gap, a more detailed examination of entrepreneurial orientation at Saudi institutions under Vision 2030 must include institutional and socio-cultural settings. Having no clear understanding of how AI adoption impacts academic staff productivity creates a second information vacuum. Despite the wealth of research on AI's capacity to automate administrative tasks and improve learning efficiency, few empirical studies have examined how AI in ordinary academic and managerial operations improves performance (Neiroukh et al., 2024; Zong and Guan, 2025). The empirical evidence on AI is scarce and focuses exclusively on technology, neglecting human and organizational factors. Leadership, innovation, and other mediating factors affect AI's long-term effectiveness. Previous research has focused more on institutional technological preparation or infrastructure than on human behavioral response to AI integration (Wong et al., 2024; Urbani et al., 2024). Thus, the goal is to adequately describe the link between AI deployment in higher education and worker creativity and leadership-driven motivation.

Another key gap is the understudied link between organizational innovation support and digital competence as job performance enhancers. Innovation support is recognized to boost employee engagement and creativity, but research on how it interacts with digital competence to affect academic achievement in fast-changing technological environments is scarce (Luthra et al., 2025; Citraresmi et al., 2025). Most research has examined organizational innovation climates and workers' digital skills and adaptation independently. This compartmentalization obscures the interdependence between innovation-supporting institutional structures and their implementation skills. There is also a shortage of empirical research in Saudi Arabia on how universities and colleges encourage digital competence among professors and staff to meet Vision 2030's digital transformation objectives. Universities are adopting technology-heavy operational models; therefore, it is crucial to research how organizational innovation initiatives combine with workers' digital literacy to boost job performance. How to properly integrate mediating and moderating elements in job performance models is similarly understudied. Few studies have examined how employee creativity and transformational leadership affect entrepreneurial attitude, innovation support, and AI uptake in diverse corporate environments (Abositta et al., 2024; Ibrahim et al., 2024). In favor of creativity as an aim, the mediating process that links technical and organizational factors to performance gains is often disregarded. While transformative leadership is typically considered a direct predictor of performance, its moderating influence on innovation-related characteristics and work outcomes has gotten less attention (Zhang and Huang, 2024). Emerging higher education systems show that leaders who inspire intellectual curiosity and present a vision for the future boost staff creativity and performance. It lacks empirical research on university performance improvement strategies that integrate creativity as a mediator and transformational leadership as a moderator.

Methodological shortcomings remain in the literature. Most research uses non-generalizable approaches, including conceptual lectures, small-scale surveys, and qualitative insights. Few quantitative studies have examined the effectiveness of multi-

dimensional models that include organizational, technological, and psychological factors in college and university operations (Reddick et al., 2025; Yu et al., 2025). Most research has just examined one time point, which does not account for institutional development or employee behavior. In Saudi Arabia, few studies compare universities or institutions that lack an entrepreneurial mindset, AI adoption, and innovation support, which vary by maturity, purpose, or technology infrastructure (Iram et al., 2025; Felemban et al., 2024). Solving these methodological issues improves academic performance studies in digitally changing university systems' theoretical soundness and practical usefulness.

2.5. Contribution of the Study

Current research is filling these gaps and contributing to academic literature and institutional practice. Employee creativity and transformational leadership provide a framework that links digital competency, organizational innovation support, entrepreneurial mentality, and AI adoption to job performance. This study supports academic performance models by showing how human, technological, and organizational factors affect institutional results. Focusing on Saudi Arabia's Vision 2030 elevates the study. Innovative institutional and personnel behaviors enabled localized national transformation efforts. The rigorous quantitative design that incorporates technological, organizational, and human elements of this study contributes to the methodology. This study quantifies complex interrelationships better than prior disconnected studies. The study employed a broad and diverse sample from multiple Saudi universities to establish external validity and generalizability in higher education. AI and an entrepreneurial perspective have helped academic institutions, which were previously dominated by administrative and pedagogical paradigms. The interdisciplinary study of how digital transformation and entrepreneurial thinking enhance institutional performance may assist educational management and entrepreneurship literature. Finally, policymakers, academic administrators, and leaders may benefit from the findings. It suggests fostering entrepreneurship, investing in AI, and gaining digital skills to boost performance. Human factors influence technological and institutional change via innovation and transformative leadership, research shows. This research enhances our knowledge and informs Saudi Arabia's higher education strategy by aligning institutional practices with innovation-driven growth and sustainable excellence.

3. THEORETICAL FRAMEWORK

The study uses organizational and behavioral theories to explain university workers' digital competency, organizational support for innovation, entrepreneurial mindset, and job performance. The theoretical framework includes dynamic capabilities theory, resource-based view (RBV), and transformational leadership theory. Leadership and intangible characteristics are crucial to college success, as these theories demonstrate. The resource-based view states that firms must produce, acquire, and use valuable, rare, distinctive, and irreplaceable resources to succeed (Barney et al., 2001). Universities require digital proficiency, entrepreneurial spirit, and AI-driven platforms to innovate, adapt, and improve employment outcomes. Entrepreneurial academics

and administrators address issues creatively, experiment, and produce new ideas, which boosts productivity (H_1). AI technology improves institutional procedures, decision-making efficiency, and information quality, giving staff greater flexibility to undertake complex academic and administrative tasks.

According to Teece et al. (1997) dynamic capabilities theory, firms must integrate, expand, and reconfigure their internal and external capabilities to solve today's fast-changing issues. Staff in Saudi Arabian institutions can exploit new technology, collaborate across digital platforms, and adapt to changing administrative and academic demands due to organizational support for innovation and digital competency. When they provide resources, acknowledge and promote personnel, and allow them to try new things, institutions encourage creativity. Staff feels comfortable thinking outside the box, which promotes creativity and productivity (H_2). Digital competence, together with technical competency, gives workers the knowledge, attitude, and practice to utilize digital technology effectively, improving productivity, accuracy, and collaboration. Digital competence boosts employees' AI tool utilization, creativity, and academic adaptability.

Employee creativity as a mediator is based on Amabile's (2011) componential theory of creativity, which posits that creativity requires internal motivation, issue knowledge, and creativity-specific processes. Worker creativity is the psychological and behavioral link between institutional enablers and performance results (H_3). Increasing intrinsic motivation and skill levels, an entrepreneurial attitude, artificial intelligence, organizational support, and digital proficiency create a more creative workplace. Staff who can think creatively may improve academic achievement and institutional competitiveness by developing innovative administrative solutions, instructional methods, and technology-driven academic interventions. Creativity helps organizational and individual aspects produce quantifiable performance outcomes, emphasizing the necessity of innovation and adaptability in academic settings. Figure 1 shows the theoretical framework of the study.

Transformational leadership moderates the theory, adding relational and behavioral elements. According to the transformational leadership theory, motivating, challenging, and considering subordinates may enhance performance more than an organization or individual can alone (Bass and Avolio, 1995). Transformational leaders catalyze higher education's mission and inspire teachers and

staff to excel. Their activities boost the benefits of an entrepreneurial attitude, digital competence, and AI adoption by empowering workers psychologically and aligning their goals with institutional goals. Transformational leadership encourages risk-taking, rewards innovation, and mitigates failures, which boosts employee creativity and success. Leaders who fail to motivate their staff may let workers' creative ideas languish owing to institutional inertia and a lack of direction, rather than improving performance. For academic and administrative staff at Saudi institutions, an entrepreneurial attitude and AI adoption (H_1) and organizational support for innovation and digital competence (H_2) improve job performance. Transformational leadership moderates these relationships and employee creativity mediates them (H_3), suggesting that innovative capacities affect performance through creativity as a psychological mechanism and that transformational leadership strengthens the link between creativity and work outcomes.

4. METHODOLOGY

4.1. Research Design and Philosophical Foundation

This quantitative, cross-sectional study is based on positivist epistemology, which emphasizes empirical measurement, objective observation, and hypothesis testing. Research that examined and verified complex variable interactions affected this design. To examine assertions in earlier research and theories of innovation using structural equation modeling (SEM), the philosophical approach is deductive. Inferring causal patterns instead of discrete links ensures statistical generalizability and theoretical robustness.

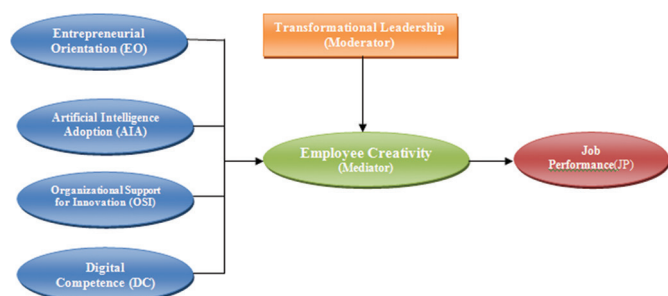
4.2. Population, Sampling Technique, and Sample Size

The study targeted Saudi University's administrative, academic, and innovation staff. Vision 2030 requires substantial digital and organizational changes in the surveyed universities. The sample frame includes public and private universities to illustrate diverse institutional governance systems. A stratified random sample was utilized to choose individuals by demographic criteria such as institutional type (public vs. private) and employment position (academic, administrative, or leadership). Riyadh, Jeddah, Dhahran, Thuwal, and Abha universities were randomly selected to produce 900 responses. Out of 775 questions, 86.1% were answered. This method highlighted university behavioral and structural variables, reducing sample bias and increasing heterogeneity. The sample size exceeded the SEM minimum threshold, ensuring strong model estimation and stable parameters.

4.3. Variable Specification and Research Population

The study examines how organizational, technical, and leadership variables affect Saudi university academic performance using multidimensional analysis. The dependent variable is academic and administrative staff job performance, which measures how well they fulfill their jobs and align with the institution's aims and vision. The study examines digital competence, organizational support for innovation, artificial intelligence adoption, and entrepreneurial mentality as enablers of institutional flexibility and innovation-driven productivity. The methodology also measures employee creativity, which measures how inventive responses to challenges and ideas reduce performance effects. Transformational

Figure 1: Theoretical framework



Source: Author's illustrate

leadership provides a single vision, intellectual stimulation, and driving synergy in academic settings, which moderates employee creativity and job performance. Empirical studies target academics, administrators, technologists, innovators, and leaders. About nine hundred Saudi respondents from top institutions took the poll. Saudi Arabia's universities include in the sample, i.e., King Saud University, King Abdulaziz University, King Fahd University of Petroleum and Minerals, King Abdullah University of Science and Technology, Prince Sultan University, King Khalid University, Imam Mohammad ibn Saud Islamic University, Riyadh University of Arts (new initiative), and Al Yamamah University. Based on this demographic, 775 responses were statistically significant, diverse, and representative of academic and administrative occupations. The sample includes persons from different departments, levels, and vocations, making the findings more credible and valuable.

4.4. Data Collection Procedure

The study sent a standardized, self-administered questionnaire via institutional email groups and professional networks for this investigation. A detailed cover letter explained the survey's aims, ethical assurances, and voluntary participation. The survey was prepared in English and translated into Arabic. It was back-translated for cultural and semantic accuracy. Before data collection, 50 people were given a pilot test to check construct intelligibility, reliability, and relevance. Based on pilot feedback, some phrasing and item layout modifications were made to make it more understandable and uniform. Three months of data collection yielded 86.1% valid responses, suitable for institutional surveys.

4.5. Measurement of Constructs

Validated multi-item scales operationalized each conceptual framework's latent construct using five-point Likert scales, with 1 indicating strong disagreement and 5 representing strong agreement. Modified from Covin and Slevin (1989), the entrepreneurial orientation (EO) scale evaluates proactivity, innovation, and risk-taking. Venkatesh et al. (2012) AI adoption elements focused on perceived benefit, integration ease, and technical readiness. A modified Scott and Bruce (1994) innovation support measure was used to assess OSI. Operationalizing digital competence (DC) utilizing EC DigComp 2.0 indicators. Zhou and George's (2001) creativity scale's ideation and problem-solving components assessed employee creativity. The multifactor

leadership questionnaire (MLQ-5X) by Bass and Avolio (1995) measured transformational leadership. Finally, job performance (JP) was assessed using a two-pronged technique based on task and contextual performance, derived from Williams and Anderson (1991) (Table 1). To confirm its authenticity, five academics and three industry specialists analyzed the questionnaire. Their input was vital to updating and conceptually aligning the topics with Saudi Arabia's higher education changes.

4.6. Data Screening and Preliminary Diagnostics

SPSS 27.0 analyzed the dataset before hypothesis testing. It handled missing data using expectation-maximization (EM) and detected multivariate outliers using Mahalanobis distance criteria. Due to low skewness and kurtosis, descriptive statistics met multivariate normality. Since the multicollinearity VIFs were <5.0, the predictor variables are not collinear.

4.7. Reliability and Validity Assessment

The assessment model was verified using AMOS 26.0's confirmatory factor analysis to confirm psychometric soundness. Both composite reliability (CR) and Cronbach's alpha (α) measures exceeded the proposed limit of 0.70 for assessing internal consistency. It is checked for factor loadings above 0.60 and AVE values over 0.50 to validate convergent validity. According to Fornell-Larcker, the square root of each construct's AVE indicated discriminant validity by surpassing inter-construct correlations. To confirm construct uniqueness, we examined the Heterotrait-Monotrait ratio (HTMT), which was below 0.85 for all constructions.

4.8. Common Method Bias and Ethical Considerations

Due to self-reported data, statistical and procedural remedies addressed common method bias (CMB). Anonymity and random item arrangement reduced evaluation anxiety and consistency issues. The common latent factor (CLF) approach and Harman's single-factor test showed that no one factor explained most of the variance, relieving CMB concerns. The study was ethically performed according to the university's institutional review board. All participants knew their rights to anonymity, withdrawal, and voluntary participation. All answers were pooled for analysis, and no personal identities were maintained to guarantee ethical human subject research.

Table 1: List of variables, scale, sample items, and literature support

Variables	Construct scale	Sample item	Literature support
Job performance (JP)	Job performance scale	"I consistently meet or exceed the performance objectives set for my role."	Williams and Anderson (1991).
Entrepreneurial orientation (EO)	EO scale	"Staff are encouraged to take calculated risks to pursue innovative ideas."	Covin and Slevin (1989) and Lumpkin and Dess (1996).
Artificial intelligence adoption (AIA)	Technology acceptance model (TAM)	"I believe AI adoption has improved the efficiency and effectiveness of my work."	Davis (1989) and Venkatesh et al. (2003)
Organizational support for innovation (OSI)	Survey of perceived organizational support (SPOS)	"The university provides sufficient resources (time, funding, infrastructure) to pursue innovative projects."	Eisenberger et al. (1986) and Scott and Bruce (1994)
Digital competence (DC)	European Digital Competence Framework — <i>DigComp</i>	"I have the necessary technical skills to use advanced digital and AI tools required for my role."	Vuorikari et al. (2022; 2025)
Employee creativity (EC) (Mediator)	Employee creativity scale	"I frequently generate novel ideas or approaches to teaching, research, or administration."	Zhou and George (2001).
Transformational leadership (TL) (Moderator)	Multifactor leadership questionnaire	"My immediate supervisor articulates a clear and inspiring vision for our unit's future."	Bass and Avolio (1995).

4.9. Analytical Strategy

Structural equation modeling (SEM) was utilized to analyze direct, indirect, and moderating construct relationships after measurement model validity and reliability were validated. It is more accurate than regression models and can capture complex interdependencies while accounting for measurement error. Stages one and two checked the model's fit with CFI, TLI, RMSEA, and SRMR; stage three estimated the direct paths between the study variables; and stage four tested transformational leadership's mediating effects through interaction term modeling. This study employed bootstrapped confidence intervals and 5,000 resamples for estimation.

5. RESULTS AND DISCUSSION

Table 2 shows that the leading Saudi institutions' respondents were diversified in demographics and vocations. The survey's gender distribution of 61.3% men and 38.7% women matches

Table 2: Demographic survey of the respondents

Factors	Category	Frequency	Percentage
Gender	Male	475	61.3
	Female	300	38.7
Age group	≤35 years	210	27.1
	36-50 years	380	49
	>50 years	185	23.9
Primary role	Academic staff	420	54.2
	Administrative/tech and innovation staff	200	25.8
	Middle/Senior leaders	155	20
Highest qualification	Bachelor's degree	120	15.5
	Master's degree	300	38.7
	PhD/Professional doctorate	355	45.8
Years of experience	<5 years	150	19.4
	5-15 years	380	49
	> 15 years	245	31.6
University affiliation	King Saud University (Riyadh)	125	16.1
	King Abdulaziz University (Jeddah)	100	12.9
	KFUPM (Dhahran)	95	12.3
	KAUST (Thuwal)	70	9
	Imam Mohammad ibn Saud (Riyadh)	110	14.2
	Prince Sultan University (Riyadh)	60	7.7
	King Khalid University	70	9
	Riyadh University of Arts	60	7.7
	Al Yamamah University (Riyadh)	85	11

Saudi university employment statistics, where males outnumber women in leadership and technical positions. The high percentage of female answers suggests that women are finding more academic and administrative possibilities, which is in accordance with Saudi Vision 2030's gender equality and worker empowerment aims. 49.1% of responders are 36-50, 27.1% are 35-34, and 23.9% are 50+. People who execute policies, welcome innovations, and reform institutions are usually middle-aged, experienced professionals. Middle and senior leadership made up 20%, academics 54.2%, and administration or innovation and technology 25.8%. This distribution ensures that academic and managerial opinions on how factors improve work performance are adequately represented. Innovation and administrative staff support the study's emphasis on technology-driven projects and operational transformation, while leadership illuminates strategic decision-making and policy facilitation. Only 15.5% had a bachelor's degree, 45.8% a master's, and 38.7% a PhD. This educational profile shows that individuals can critically analyze abstract concepts like academic AI adoption, entrepreneurship, and digital competency. As diverse as the responses, 49% have 5-15 years of professional experience, 31.6% have more than 15, and 19.4% have 2-5 years. The personnel seem to be equipped to respond to the changing digital world and corporate advances. Long-tenured responders have institutional memory and contextual knowledge, whereas shorter-tenured responders have new ideas and technical agility. These factors are crucial for assessing colleges and institutions' modernization under Vision 2030. King Saud University (16.1%) and Imam Mohammad ibn Saud Islamic University (14.2%) have the highest participation percentages due to their size and academic importance. In addition to other top universities, KFUPM (12.3%), King Abdulaziz (12.9%), and Al Yamamah (11%) contributed. The new Riyadh University of Arts, Prince Sultan University, King Khalid University, and KAUST played little but essential roles and contributed distinct perspectives.

Table 3 presents descriptive data, internal consistency, composite reliability, and convergent validity for each study hypothesis. The 5-point Likert scale indicated considerable agreement and variance for all dimensions, with mean values from 1.98 to 2.22 and standard deviations from 0.68 to 0.76. Cronbach's alpha >0.80 indicates good internal consistency in all dimensions. Digital competence scores 0.83, and transformative leadership 0.92. Internal consistency of measurement signals was confirmed by composite reliability (CR) values over 0.70 for each construct, ranging from 0.85 to 0.92. The average variance extracted (AVE) ranged from 0.50 to 0.62, suggesting convergent validity over the

Table 3: Descriptive statistics, internal consistency (Cronbach's α), KMO, and Bartlett's test

Constructs	Items (n)	Mean (1-5)	SD	Cronbach's α	Composite reliability (CR)	AVE
Job performance (JP)	5	2.05	0.7	0.89	0.9	---
Entrepreneurial orientation (EO)	5	2.08	0.71	0.86	0.87	0.53
Artificial intelligence adoption (AI)	5	2.15	0.74	0.88	0.89	0.57
Organizational support for innovation (OSI)	5	2.22	0.76	0.84	0.86	0.51
Digital competence (DC)	5	2.01	0.69	0.83	0.85	0.50
Employee creativity (creativity)	5	1.98	0.68	0.9	0.91	0.60
Transformational leadership (TL)	5	2.1	0.72	0.92	0.92	0.62

0.50 threshold. Latent variables explain over half of their indicator variance. These assessments reveal that structural equation modeling and confirmatory factor analysis psychometrics are conceptually sound and statistically reliable. The data are adequate to evaluate the predicted links between AI, entrepreneurial attitude, transformational leadership, and job performance due to the measuring model’s validity and consistency.

The CFA results are in Table 4. The recommended measuring paradigm was confirmed. Model fit indices show that the projected latent structure matches the data. Statistical significance is anticipated in large samples with a χ^2 value of 1,135.2 and 601 degrees of freedom. However, relative and incremental indices may assess fit quality. With a CFI of 0.967 and a TLI of 0.959, both above 0.95, the model fits the data well and helps develop connections. Models with RMSEA values <0.06 accurately describe population covariance. The standardized root mean square residual (SRMR) of 0.029 is significantly below the acceptable maximum limit of 0.08, assuming minimal residuals between anticipated and observed correlations. These indications show a strong measurement model, accurate latent construct indicators, and high factorial validity. This lets us design a statistically valid measurement framework for hypothesis testing, causal channel estimation, and structural model analysis.

Table 5 shows the Fornell-Larcker (F-L) criterion results for measuring model construct discriminant validity. Discriminant validity requires that the model’s constructs be empirically distinct and that construct indicators not be highly correlated. Entries outside the diagonal show inter-construct correlations, whereas the diagonal shows the square root of the average variance extracted (AVE) in boldface. Discriminant validity requires each construct to have a diagonal value greater than the total of its correlations with all other constructs in the same row and column. Since all diagonal values are larger than off-diagonal correlations, each latent construct is distinct and conceptually distinct. Entrepreneurial orientation (EO) has an AVE of 0.73, which is higher than its connections with artificial intelligence adoption (0.43) and organizational support for innovation (0.40%), indicating it measures a different notion. Since it exceeds the highest correlation of 0.49 with JP, AI Adoption’s diagonal value

of 0.75 indicates discriminant validity. This model treats creativity as a distinct mediating construct since employee creativity (EC) has a diagonal value of 0.77 and is more unique than EO (0.39), AI (0.42), and TL (0.56). Job performance (JP) (0.76) and transformational leadership (TL) (0.79) show high discriminant validity, indicating no confounding between leadership style and performance outcomes and other latent factors.

Table 6 shows that the structural equation modeling (SEM) is accurate since all relationships are statistically significant. Accepting entrepreneurial features such as being proactive, imaginative, and taking managed risks may considerably boost university staff performance ($\beta = 0.24, t = 4.8$). In dynamic higher education, problem-solving and adaptability are vital for institutional goals, according to Bais et al. (2025). This supports the hypothesis that entrepreneurship promotes these attributes. It also reveals that entrepreneurial, administrative, and academic staff are happier and accomplish more. AI greatly affects job performance. This shows how AI has improved academic productivity, data-driven decision-making, and administrative efficiency. AI improves institutional performance by automating monotonous tasks, streamlining administration, and improving education (Khairullah et al., 2025). This highlights the role of digital change in Saudi academic achievement.

The link between OSI and work performance ($\beta = 0.18, t = 3.60$) suggests that universities foster creativity, innovation, and risk-taking, leading to increased job success. Liu et al. (2025) state that performance-driven societies cannot operate without even small-scale institutional support mechanisms like research funding, innovation prizes, and leadership encouragement. Leadership and culture are as crucial as technology for institutional innovation (Laufer et al., 2025). Digital competence (DC) enhances staff productivity and job performance ($\beta = 0.15, t = 3.75$). This implies that digital literacy, resource proficiency, and technology management all contribute to DC. Digitally adept faculty perform better in academic and administrative responsibilities in today’s universities, as evidenced by the positive coefficient. Knowledge-based economic growth and adaptability need institutional digital preparedness (Mele et al., 2024). The relationship emphasizes this tendency and digital literacy. The model shows that employee creativity significantly impacts job performance ($\beta = 0.30,$

Table 4: Confirmatory factor analysis (CFA) fit indices

Model	χ^2 (df)	CFI	TLI	RMSEA (90% CI)	SRMR
CFA fit indices model	1,135.2 (df=601)	0.967	0.959	0.038 (0.035-0.041)	0.029

Table 5: Fornell–Larcker (F-L) criterion (square root of AVE on diagonal) — Discriminant validity

Constructs	EO	AI	OSI	DC	Creativity	TL	JP
EO	0.73						
AI	0.43	0.75					
OSI	0.4	0.46	0.71				
DC	0.37	0.45	0.51	0.71			
EC	0.39	0.42	0.46	0.48	0.77		
TL	0.35	0.38	0.44	0.39	0.56	0.79	
JP	0.44	0.49	0.47	0.46	0.58	0.51	0.76

Table 6: SEM results

Path	Standardized β	SE	t-value	P-value
EO → Job Performance	0.24	0.05	4.80	0.000
AI Adoption → Job Performance	0.28	0.04	7.01	0.000
OSI → Job Performance	0.18	0.05	3.60	0.001
Digital Competence → Job Performance	0.15	0.04	3.75	0.000
Employee Creativity → Job Performance	0.30	0.05	6.10	0.000
EO → Employee Creativity	0.21	0.04	5.25	0.000
AI Adoption → Employee Creativity	0.25	0.05	5.01	0.000
OSI → Employee Creativity	0.20	0.04	5.10	0.000
Digital Competence → Employee Creativity	0.18	0.04	4.50	0.000

t = 6.10). According to this research, workers' productivity is affected by their creativity, problem-solving skills, and adaptability. The study showed that creative thinking and creativity boost organizational and technical performance, supporting the premise that they are essential to any institution's success (Ojha et al., 2025). Employee creativity and invention are boosted in entrepreneurial settings due to entrepreneurial orientation (EO) ($\beta = 0.21, t = 5.25$). Entrepreneurial personnel experiment, take initiative, and take risks to innovate (AlMunthiri et al., 2024).

Technology adoption increases productivity and creativity, as seen by the association between AI use and employee creativity ($\beta = 0.25, t = 5.01$). AI can help academics and administrators improve research, teaching, and administration. AI in education boosts productivity and creativity by combining technology and imagination (Ocen et al., 2025). Research indicates that institutional support for innovation (OSI) positively impacts employee creativity ($\beta = 0.20, t = 5.00$). Innovation labs, mentoring, and cross-functional communication boost university staff creativity and confidence (Tan et al., 2024). Finally, digital competence (DC) significantly enhances employee creativity via digital skills ($\beta = 0.18, t = 4.5$). This shows that digital efficiency and innovation depend on more than technical skills. When digitally savvy personnel solve academic and administrative problems, Lo (2024) claims that digital literacy and creativity increase. The integrated model's entrepreneurial, technical, organizational, and individual creative attributes may affect job performance, according to structural equation modeling (SEM). The results show that entrepreneurial attitude, AI, innovative ideas, and digital competency improve individual and organizational performance.

Table 7 shows how transformative leadership (TL) affected employee creativity and performance. Research indicates that transformative leadership has a strong moderating effect on the relationship between creativity and job performance ($P < 0.001$). Employee creativity was shown to substantially improve employment outcomes ($\beta = 0.28, t = 5.6, P < 0.001$). Creative thinking may help firms innovate in administration, research, and education (AlSaied and Alkhoraif, 2024). Academic and administrative personnel's job performance is significantly impacted by transformative leadership ($\beta = 0.18, t = 4.5, P < 0.001$). This includes providing customized attention, sparking

ideas, and encouraging others. Leaders who excite their teams, provide a shared vision, and empower employees to make choices improve job performance and institutional commitment (Ibrahim et al., 2024).

A strong relationship exists between employee creativity and transformative leadership ($\beta = 0.12, P < 0.001$), indicating that greater levels of leadership impact job performance more. Teams think beyond the box under innovative, motivating, and intellectually demanding leaders. It seems that leadership style moderates staff innovation leverage. According to Bass and Avolio (1985), transformational leaders motivate their people to choose company success above their own. The moderating tendency is more apparent when slopes are examined. Lack of transformational leadership may negatively affect employee creativity and work performance, especially in environments without inspirational or supportive leadership (-1 SD). A positive connection is found with $\beta = 0.16$ and $P = 0.010$. Such situations may impede innovation from improving performance due to a lack of support, acknowledgment, or institutional barriers. At the mean level of transformative leadership, followers who are inspired and intellectually challenged perform better ($\beta = 0.28, P < 0.001$). Research indicates that transformational leadership, defined by vision and facilitation, significantly improves employee creativity and work performance (+1 SD) ($\beta = 0.40, P < 0.001$). This leadership style helps implement creative ideas by reducing organizational barriers and coordinating staff activities to meet institutional goals. Transformational leaders inspire creativity, psychological support, and a clear future vision, according to Chen et al. (2024). These results support the idea that transformative leadership maximizes creativity and performance. Creativity drives innovation and problem-solving, but it only thrives in leaders who promote, coach, and reward it. This shows the dynamic interplay between leadership-driven corporate cultures and individual-level innovation in achieving high performance. Universities that want their staff to work harder should support innovation and assist academics and administrators in becoming transformational leaders. Creative talent and transformative leadership are needed for higher education to grow, innovate, and stay competitive.

Table 8 reveals that employee creativity mediates all paths significantly. Since the bootstrapped 95% confidence intervals for indirect effects are not zero, mediation effects are robust. Results show that entrepreneurial orientation (EO) significantly impacts job performance ($\beta = 0.18, P < 0.001$). A significant indirect impact is shown via employee creativity ($\beta = 0.063, CI [0.038, 0.092]$), resulting in a total effect of 0.243. This suggests that EO improves organizational performance by encouraging people to be more daring, proactive, and innovation-driven and by offering them more creative possibilities (Qasim et al., 2025). That is, university employees in entrepreneurially oriented contexts are more inclined to solve administrative and academic issues creatively, which boosts productivity. The relevance of creativity as a mediator between creative thinking and work achievements supports the idea that an entrepreneurial mindset increases risk-taking and opportunity-spotting.

Table 7: Moderation analysis — transformational leadership (TL) moderates employee creativity→job performance

Term	β (standardized)	SE	t	P-value
Creativity (main effect)	0.28	0.05	5.6	0.000
TL (main effect)	0.18	0.04	4.5	0.000
EC×TL (interaction)	0.12	0.03	4.0	0.000
Simple slopes (predicted job performance from creativity at ± 1 SD of TL)				
TL level	Creativity → job performance (slope β)	t	P-value	
Low TL (-1 SD)	0.16	3.2	0.010	
Mean TL	0.28	5.6	0.000	
High TL (+1 SD)	0.40	7.2	0.000	

Table 8: Mediation analysis — bootstrapped indirect effects (5,000 resamples)

IV → DV (via employee creativity)	Direct effect (β)	Indirect effect (β)	Bootstrapped 95% CI for indirect	Total effect (β)
EO → Job Performance	Direct=0.18 (SE=0.05, P<0.001)	Indirect=0.063	(0.038, 0.092)	0.243
AI → Job Performance	Direct=0.22 (SE=0.04, P<0.001)	Indirect=0.075	(0.046, 0.108)	0.295
OSI → Job Performance	Direct=0.12 (SE=0.05, P=0.010)	Indirect=0.060	(0.033, 0.090)	0.18
DC → Job Performance	Direct=0.10 (SE=0.04, P=0.015)	Indirect=0.054	(0.028, 0.083)	0.154

AI adoption has a substantial direct impact on job performance ($\beta = 0.22$, $P < 0.001$) and an indirect influence on employee creativity ($\beta = 0.075$, CI [0.046, 0.108]), resulting in a total effect of 0.295. This shows that AI technologies ease decision-making and operations and allow people to be creative with digital service delivery, new teaching, and problem-solving (Alshahrani et al., 2024). Saudi Arabian university teachers and administrators may automate routine tasks, rethink long-standing practices, and perform data-driven experiments using AI, encouraging creativity and new ideas. Thus, creativity is linked to AI-driven transformation and job performance, demonstrating that technology-driven innovation is crucial to institutional success. Organizational support for innovation (OSI) mediation results support employee creativity. Adding the indirect effect ($\beta = 0.060$, CI [0.033, 0.090]) to the direct effect ($\beta = 0.12$, SE = 0.05, $P = 0.010$), the total impact of OSI on task performance is 0.18. When organizations support innovation with capital, praise, and risk-free conditions, employees are more likely to attempt new ideas (Marampa et al., 2025). When workers try new management, training, and research methods in an innovative workplace, productivity grows. Therefore, institutional support is vital for academic career development since it may stimulate originality. The combination of direct ($\beta = 0.10$, $P = 0.015$) and indirect ($\beta = 0.054$, CI [0.028, 0.083]) impacts of digital competence (DC) on work performance results in a total impact of 0.154. Digital competence promotes innovation, which raises efficiency and flexibility. Kabakus et al. (2025) revealed that tech-savvy and digitally literate employees are more inclined to try new digital technologies, online learning platforms, and data analytics systems, which enhance productivity and creativity. For Vision 2030 institutions, digital competency is essential for excellence in performance and creative engagement in technologically advanced academic contexts.

6. CONCLUSION AND POLICY RECOMMENDATION

This study illuminates the complicated relationship between digital competency, organizational innovation support, entrepreneurial mentality, and AI on Saudi university staff creativity and productivity. The results show that employee creativity is the intellectual and behavioral conduit via which technological and organizational inputs produce performance outputs. This is done by moderated-mediation analysis and structural equation modeling. Leadership that enhances these linkages may turn innovation into excellent institutional performance. Human potential and innovation are described as a dynamic ecosystem with leadership and creativity. The study shows that digital intelligence, leadership vision, and creativity are needed to succeed. This trio is essential

for Saudi Vision 2030 and institutional change, not only technology acquisition.

The following findings inform the study's policy recommendations. Higher education policymakers must first create new governance frameworks to promote HRD innovation and digital transformation. Replace university administrative models with adaptive learning organizations that encourage autonomy, innovation, and calculated risk-taking. To attain this aim, the National Education Authorities, including the Ministry of Education, should mandate university evaluation systems to use innovation-driven performance indicators. Digital innovation and academic creative centers may help administrative and academic projects, including digital collaboration, AI, and entrepreneurship. Policymakers can turn colleges into thriving entrepreneurial ecosystems capable of global rejuvenation and competitiveness by integrating innovation incentives in promotion and reward systems. Leadership development should be a significant priority in higher education policy frameworks for national strategic considerations. Transformational leadership, both ideological and administrative, boosts performance via innovation. Lawmakers should create national leadership schools to train technical and emotional leaders. These institutions should provide multidisciplinary courses in organizational psychology, digital ethics, and strategic foresight to prepare future leaders for the ethical problems of artificial intelligence and automation. Mentorship chains, in which experienced transformational leaders teach future teachers and administrators, should be required at all institutions to ensure visionary leadership. Finally, national digital competence and AI integration initiatives should include equitable access and ethical leadership. Digital technology and AI boost efficiency, but arbitrary regulations may worsen it. Governments should fund digital literacy training, internet infrastructure, and ethical AI awareness. Public policy should encourage local IT businesses and schools to collaborate on AI solutions for administrative and pedagogical issues. It needs an AI system that protects academic freedom, individual liberty, and privacy. An innovative policy combination that balances inclusivity and innovation may train the next generation of educators and administrators to lead responsibly in a data-driven world via critical thinking, creativity, and action while improving job performance.

This work's conceptual breadth and empirical rigor restrict it, but they also suggest intriguing study options. It is hard to infer causal conclusions from cross-sectional data. Future research should employ longitudinal designs or multi-wave panel analyses to explore leadership, innovation, and performance temporal dynamics, particularly after institutional or technical transitions. The poll covered nine famous Saudi universities, but the findings cannot be applied to other institutions in diverse

cultural and socioeconomic contexts. Future researchers may examine developing economies with different levels of digital transformation or GCC nations to see how the same themes work. The study risks social desirability effects and conventional method bias owing to self-reported ratings, wherein participants may overstate their originality and competency. Future research should incorporate survey responses with objective performance metrics like creative output, student learning, and publishing quality for a more comprehensive picture. The current model captures the mediating and moderating dynamics between leadership, creativity, and technology. However, it ignores contextual factors like psychological safety, organizational culture, and institutional autonomy that may influence innovative behaviour. These elements may improve future frameworks' explanatory capacity via multi-level modeling. Finally, university AI adoption should consider its philosophical implications as well as its practical effects. Future researchers should examine how AI alters values, objectives, and purpose. Future research should integrate technical, existential, empirical, and ethical dimensions via critical digital scholarship. Scholars can reimaging universities as more than just knowledge hubs; they can also serve as test beds for the mutually beneficial partnership between humans and AI, where our creative, leadership, and intellectual capacities can shape how society learns, governs, and thrives.

7. FUNDING

This work was supported by the Deanship of Scientific Research, Vice Presidency for Graduate Studies and Scientific Research, King Faisal University, Saudi Arabia. [Grant No. KFU261550].

REFERENCES

- Abidi, O., Nimer, K., Bani-Mustafa, A., Toglaw, S., Dzenopoljac, V. (2024), Do faculty members matter in corporate entrepreneurship in Kuwaiti higher education institutions? *Journal of Applied Research in Higher Education*, 16(5), 1734-1748.
- Abositta, A., Adedokun, M.W., Berberoğlu, A. (2024), Influence of artificial intelligence on engineering management decision-making with mediating role of transformational leadership. *Systems*, 12(12), 570.
- Abubakar, A.A., Al-Mamary, Y.H., Singh, H.P., Singh, A., Alam, F., Agrawal, V. (2024), Exploring factors influencing sustainable human capital development: Insights from Saudi Arabia. *Heliyon*, 10(16), e35676.
- Ahmed, T., Yousaf, A., Clavijo, R.C., Sanders, K. (2024), Entrepreneurial pathways to sustainability: A theoretical paper on green human resource management, green supply chain management, and entrepreneurial orientation. *Sustainability*, 16(15), 6357.
- Aldabbas, H., Pinnington, A., Lahrech, A. (2023), The influence of perceived organizational support on employee creativity: The mediating role of work engagement. *Current Psychology*, 42(8), 6501-6515.
- Aldhobaib, M.A. (2025), The new era of the kingdom of Saudi Arabia: Key highlights and future research agenda on organizational strategy. *Businesses*, 5(1), 5.
- Ali, M., Khan, T.I., Khattak, M.N., Şener, İ. (2024), Synergizing AI and business: Maximizing innovation, creativity, decision precision, and operational efficiency in high-tech enterprises. *Journal of Open Innovation Technology Market and Complexity*, 10(3), 100352.
- Al-Mamary, Y.H. (2025), The transformative power of artificial intelligence in entrepreneurship: Exploring AI's capabilities for the success of entrepreneurial ventures. *Future Business Journal*, 11(1), 104.
- AlMunthiri, O., Bani-Melhem, S., Mohd-Shamsudin, F., Raziq, M.M. (2024), Fostering innovative behaviours of public sector employees: The potency of innovation-based HR practices, risk propensity and error tolerance. *International Journal of Public Sector Management*, 37(2), 159-182.
- Aloulou, W.J., Alsadi, A.K., Ayadi, F.M., Alaskar, T.H. (2024), Exploring the effects of entrepreneurial and digital orientations on the competitive advantage of Saudi Firms: Is strategic agility the missing link? *Administrative Sciences*, 14(11), 306.
- AlQhtani, F.M. (2025), Knowledge management for research innovation in universities for sustainable development: A qualitative approach. *Sustainability*, 17(6), 2481.
- Alrashedi, A.K. (2025), Future Workforce Skills for Saudi Arabia: A PLS-SEM Analysis of vision 2030 readiness. *Information Development*, <https://doi.org/10.1177/02666669251357311>
- AlSaied, M.K., Alkhoraif, A.A. (2024), The role of organizational learning and innovative organizational culture for ambidextrous innovation. *The Learning Organization*, 31(2), 205-226.
- Alshahrani, A., Griva, A., Dennehy, D., Mäntymäki, M. (2024), Artificial intelligence and decision-making in government functions: Opportunities, challenges and future research. *Transforming Government People Process and Policy*, 18(4), 678-698.
- Amabile, T. (2011), *Componential Theory of Creativity*. Boston, MA: Harvard Business School. p538-559.
- Arnout, B.I.A., AlQahtani, T.S., AL Melweth, H. (2024), Competitive capabilities of higher education institutions from their employees' perspectives: A case study of King Khalid University. *PLoS One*, 19(5), e0302887.
- Arya, V., Saraf, A., Chichkanov, N., Papa, A., Romano, M. (2025), AI-enhanced competency transfer hubs: A conceptual framework for university-industry engagement and knowledge sharing. *The Journal of Technology Transfer*, <https://doi.org/10.1007/s10961-025-10233-7>.
- Asad, M., Fryan, L.H.A., Shomo, M.I. (2025), Sustainable entrepreneurial intention among university students: Synergetic moderation of entrepreneurial fear and use of artificial intelligence in teaching. *Sustainability*, 17(1), 290.
- Azofeifa, J.D., Rueda-Castro, V., Camacho-Zuñiga, C., Chans, G.M., Membrillo-Hernández, J., Caratozzolo, P. (2024), Future skills for industry 4.0 integration and innovative learning for continuing engineering education. In: *Frontiers in Education*. Vol. 9. Switzerland: Frontiers Media SA. p1412018.
- Bais, P., Bahadur, P.S., Bais, A. (2025), Endorsing Entrepreneurship and innovation in higher education system. In: *Global Perspectives on Quality Management and Accreditation in Higher Education*. United States: IGI Global Scientific Publishing. p433-460.
- Barney, J., Wright, M., Ketchen, D.J. Jr. (2001), The resource-based view of the firm: Ten years after 1991. *Journal of Management*, 27(6), 625-641.
- Bass, B.M., Avolio, B.J. (1995), *Multifactor Leadership Questionnaire (MLQ)* [Database Record]. United States: APA PsycTests.
- Bindel Sibassaha, J.L., Pea-Assounga, J.B.B., Bambi, P.D.R. (2025), Influence of digital transformation on employee innovative behavior: roles of challenging appraisal, organizational culture support, and transformational leadership style. *Frontiers in Psychology*, 16, 1532977.
- Chen, C.J., Tsai, P.H., Wu, J.C. (2024), The impacts of transformational leadership on emotional labour in Taiwanese private nonprofit long-term care institutions: The mediating role of psychological contract.

- Asia Pacific Business Review, 30(4), 691-732.
- Ciarli, T., Kenney, M., Massini, S., Piscitello, L. (2021), Digital technologies, innovation, and skills: Emerging trajectories and challenges. *Research Policy*, 50(7), 104289.
- Citraresmi, A.D.P., Partiw, S.G., Dewi, R.S. (2025), Impact of resilience and sustainability on workforce creative performance: Looking through the lens of digital readiness. *Cogent Business Management*, 12(1), 2519968.
- Corrêa, V.S., Queiroz, M.M., Cruz, M.A., Shigaki, H.B. (2022), Entrepreneurial orientation far beyond opportunity: The influence of the necessity for innovativeness, proactiveness and risk-taking. *International Journal of Entrepreneurial Behavior and Research*, 28(4), 952-979.
- Covin, J.G., Slevin, D.P. (1989), Strategic management of small firms in hostile and benign environments. *Strategic Management Journal*, 10(1), 75-87.
- Davis, F.D. (1989), Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-340.
- Eisenberger, R., Huntington, R., Hutchison, S., Sowa, D. (1986), Perceived organizational support. *Journal of Applied Psychology*, 71(3), 500.
- Elmonshid, L.B.E., Sayed, O.A. (2024), The relationship between entrepreneurship and sustainable development in Saudi Arabia: A comprehensive perspective. *Economies*, 12(8), 198.
- Felemban, H., Sohail, M., Ruikar, K. (2024), Exploring the readiness of organizations to adopt artificial intelligence. *Buildings*, 14(8), 2460.
- Feola, R., Parente, R., Cucino, V. (2021), The entrepreneurial university: How to develop the entrepreneurial orientation of academia. *Journal of the Knowledge Economy*, 12(4), 1787-1808.
- Gazi, M.A.I., Rahman, M.K.H., Masud, A.A., Amin, M.B., Chaity, N.S., Senathirajah, A.R.B.S., Abdullah, M. (2024), AI capability and sustainable performance: Unveiling the mediating effects of organizational creativity and green innovation with knowledge sharing culture as a moderator. *Sustainability*, 16(17), 7466.
- Gegenhuber, T., Mair, J. (2024), Open social innovation: Taking stock and moving forward. *Industry and Innovation*, 31(1), 130-157.
- Guo, X., Chen, Y., Xie, J., Wang, H., Lei, X. (2025), Research on supply chain resilience mechanism of AI-Enabled manufacturing enterprises-based on organizational change perspective. *Scientific Reports*, 15(1), 31177.
- Gyimah, P., Appiah, K. O., & Appiagyei, K. (2025). Unraveling contemporary trends on United Nations sustainable development goals: A new global bibliometric and literature review analysis. *Sustainable Development*, 33(2), 2579-2598.
- Han, X., Xiao, S., Sheng, J., Zhang, G. (2025), Enhancing efficiency and decision-making in higher education through intelligent commercial integration: Leveraging artificial intelligence. *Journal of the Knowledge Economy*, 16(1), 1546-1582.
- Herrmann, T., Pfeiffer, S. (2023), Keeping the organization in the loop: A socio-technical extension of human-centered artificial intelligence. *Ai and Society*, 38(4), 1523-1542.
- Huu, P.T. (2023), Impact of employee digital competence on the relationship between digital autonomy and innovative work behavior: A systematic review. *Artificial Intelligence Review*, 56(12), 14193-14222.
- Ibrahim, A., Al-refaei, A.A.A., Alshuhumi, S., Al-Hidabi, D., Ateeq, A. (2024), The effect of entrepreneurial leadership on employee's creativity and sustainable innovation performance in education sector: A literature review. In: *Business Development via AI and Digitalization*. Vol. 2. Berlin: Springer. p143-154.
- Ibrahim, I.A., El-Monshed, A.H., Altheeb, M., El-Sehrawy, M.G. (2024), Transformational leadership, psychological empowerment, and organizational citizenship behaviors among nursing workforce: A single mediation analysis. *Journal of Nursing Management*, 2024(1), 9919371.
- Iram, T., Albady, O., Mehmood, S., Ahmad, Z. (2025), Driving success for women entrepreneurs in KSA by leveraging AI and agility: Insights from the theory of technology dominance (TTD). *Management and Sustainability an Arab Review*, <https://doi.org/10.1108/MSAR-08-2024-0092>
- Iram, T., Bilal, A.R., Saeed, T., Liaquat, F. (2025), Nurturing green creativity in women intrapreneurs through green HRM: Testing moderated mediation model-a step toward Saudi Vision 2030. *Kybernetes*, 54(1), 159-181.
- Junça Silva, A., Pinto, D. (2024), Training under an extreme context: The role of organizational support and adaptability on the motivation transfer and performance after training. *Personnel Review*, 53(3), 743-770.
- Kabakus, A.K., Bahçekapili, E., Ayaz, A. (2025), The effect of digital literacy on technology acceptance: An evaluation on administrative staff in higher education. *Journal of Information Science*, 51(4), 930-941.
- Kamil, N.L.M., Abukhalifa, A.M.S., Eliyana, A., Pratama, A.S. (2025), Unlocking organisational citizenship and innovation: A servant leadership approach for psychological empowerment. *Leadership and Organization Development Journal*, 46(1), 23-40.
- Khairullah, S.A., Harris, S., Hadi, H.J., Sandhu, R.A., Ahmad, N., Alshara, M.A. (2025), Implementing artificial intelligence in academic and administrative processes through responsible strategic leadership in the higher education institutions. In: *Frontiers in Education*. Vol. 10. China: Frontiers Media SA. p1548104.
- Khan, A.N., Soomro, M.A., Pitafi, A.H. (2025), AI in the workplace: Driving employee performance through enhanced knowledge sharing and work engagement. *International Journal of Human-Computer Interaction*, 41(17), 10699-10712.
- Kraus, S., Vonmetz, K., Orlandi, L.B., Zardini, A., Rossignoli, C. (2023), Digital entrepreneurship: The role of entrepreneurial orientation and digitalization for disruptive innovation. *Technological Forecasting and Social Change*, 193, 122638.
- Kwarteng, S., Frimpong, S.O., Asare, R., Wiredu, T.J.N. (2024), Effect of employee recognition, employee engagement on their productivity: The role of transformational leadership style at Ghana health service. *Current Psychology*, 43(6), 5502-5513.
- Lauffer, M., Deacon, B., Mende, M.A., Schäfer, L.O. (2025), Leading with trust: How university leaders can foster innovation with educational technology through organizational trust. *Innovative Higher Education*, 50(1), 303-327.
- Liang, H., Hussain, M., Iqbal, A. (2025), The dynamic role of green innovation adoption and green technology adoption in the digital economy: The mediating and moderating effects of creative enterprise and financial capability. *Sustainability*, 17(7), 3176.
- Liang, T. (2025), Innovating regional policy frameworks in China: The strategic zone+ type zone model for sustainable growth. *Journal of the Knowledge Economy*, 16(1), 1887-1928.
- Lin, H., Chen, Q. (2024), Artificial intelligence (AI)-integrated educational applications and college students' creativity and academic emotions: Students and teachers' perceptions and attitudes. *BMC Psychology*, 12(1), 487.
- Liu, L., Li, Q., Chu, M., Guo, W., Tang, L. (2025), Beyond economic performance: A meta-analytic study of the relationship between performance indicators and cadre promotion in China. *Policy Studies*, <https://doi.org/10.1080/01442872.2025.2501031>
- Lo, N.P.K. (2024), The confluence of digital literacy and eco-consciousness: Harmonizing digital skills with sustainable practices in education. *Platforms*, 2(1), 15-32.
- Lou, Y., Hong, A., Li, Y. (2024), Assessing the role of HRM and HRD

- in enhancing sustainable job performance and innovative work behaviors through digital transformation in ICT companies. *Sustainability*, 16(12), 5162.
- Lumpkin, G.T., Dess, G.G. (1996), Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of Management Review*, 21(1), 135-172.
- Luthra, A., Pancholi, N., Dixit, S., Singh, A., Garg, S. (2025), Cultivating digital culture: Exploring the impact of digital knowledge management on employee performance in higher educational institutions. *International Journal of System Assurance Engineering and Management*. <https://doi.org/10.1007/s13198-024-02648-6>.
- Makhloufi, L., Azbiya Yaacob, N., Laghouag, A.A., Ali Sahli, A., Belaid, F. (2021), Effect of IT capability and intangible IT resources on sustainable competitive advantage: Exploring moderating and mediating effect of IT flexibility and core competency. *Cogent Business and Management*, 8(1), 1935665.
- Marampa, A.M., Pongtuluran, A.K., Pariyanti, E. (2025), From sharing to success: Enhancing innovative work behavior through psychological empowerment and kinship employee engagement. *Industrial and Commercial Training*, 57(1), 99-117.
- Mele, G., Capaldo, G., Secundo, G., Corvello, V. (2024), Revisiting the idea of knowledge-based dynamic capabilities for digital transformation. *Journal of Knowledge Management*, 28(2), 532-563.
- Mphaluwa, G., Hui, L., Marere, R.S., Banda, L.O.L. (2025), How do leadership styles influence employee engagement and performance in SMEs? *Humanities and Social Sciences Communications*, 12(1), 1-14.
- Narbaev, T., Amirbekova, D., Bakdaulet, A. (2025), A decade of transformation in higher education and science in Kazakhstan: A literature and scientometric review of national projects and research trends. *Publications*, 13(3), 35.
- Neiroukh, S., Emeagwali, O.L., Aljuhmani, H.Y. (2024), Artificial intelligence capability and organizational performance: Unraveling the mediating mechanisms of decision-making processes. *Management Decision*, 63, 3501-3532.
- Ocen, S., Elasu, J., Aarakit, S.M., Olupot, C. (2025), Artificial intelligence in higher education institutions: Review of innovations, opportunities and challenges. In: *Frontiers in Education*. Vol. 10. Switzerland: Frontiers Media SA. p1530247.
- Odebode, A.A., Ogunbayo, O.T. (2025), The potential of digital-based technology in improving organizational performance. *Journal of Management Development*, 44(1), 96-106.
- Ojha, M., Kandpal, V., Singh, A. (2025), Examining the mediating role of employee creativity: A study of how knowledge management influences and employee performance works in higher education institutions. *Future Business Journal*, 11(1), 1-16.
- Parker, L., Martin-Sardesai, A., Guthrie, J. (2023), The commercialized Australian public university: An accountingized transition. *Financial Accountability and Management*, 39(1), 125-150.
- Prasetyo, W.H., Sari, B.I., Mahadir Naidu, N.B., Nurlaili, N.G. (2024), Students' digital citizenship in ubiquitous technology: A comprehensive model based on DC-REP framework, internet attitudes, computer self-efficacy, and internet skills. *Education and Information Technologies*, 29(17), 23185-23224.
- Qasim, D., Shuhaiber, A., Rawshdeh, Z. (2025), The impact of entrepreneurial orientation on innovation performance: The role of knowledge sharing as a mediating factor. *Journal of Innovation and Entrepreneurship*, 14(1), 83.
- Reddick, C.G., Demir, T., Perlman, B.J. (2025), A categorical framework of ethical leadership for public organizations: Testing a multi-dimensional model of local government managers. *Administration and Society*, 57(1), 3-33.
- Scott, S.G., Bruce, R.A. (1994), Determinants of innovative behavior: A path model of individual innovation in the workplace. *Academy of Management Journal*, 37(3), 580-607.
- Sreenivasan, A., Suresh, M. (2024), Design thinking and artificial intelligence: A systematic literature review exploring synergies. *International Journal of Innovation Studies*, 8(3), 297-312.
- Suryanarayana, K.S., Kandi, V.P., Pavani, G., Rao, A.S., Rout, S., Krishna, T.S.R. (2024), Artificial intelligence enhanced digital learning for the sustainability of education management system. *The Journal of High Technology Management Research*, 35(2), 100495.
- Tan, A.B., Van Dun, D.H., Wilderom, C.P. (2024), Lean innovation training and transformational leadership for employee creative role identity and innovative work behavior in a public service organization. *International Journal of Lean Six Sigma*, 15(8), 1-31.
- Teece, D.J., Pisano, G., Shuen, A. (1997), Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509-533.
- Urbani, R., Ferreira, C., Lam, J. (2024), Managerial framework for evaluating AI chatbot integration: Bridging organizational readiness and technological challenges. *Business Horizons*, 67(5), 595-606.
- Venkatesh, V., Morris, M.G., Davis, G.B., Davis, F.D. (2003), User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425-478.
- Vuorikari, R., Kluzer, S., Punie, Y. (2022), DigComp 2.2: The Digital Competence Framework for Citizens - with New Examples of Knowledge, Skills and Attitudes. European: Publications Office of the European Union.
- Vuorikari, R., Pokropek, A., Muñoz, J.C. (2025), Enhancing digital skills assessment: Introducing compact tools for measuring digital competence. *Technology Knowledge and Learning*, <https://doi.org/10.1007/s10758-025-09825-x>
- Williams, L.J., Anderson, S.E. (1991), Job satisfaction and organizational commitment as predictors of organizational citizenship and in-role behaviors. *Journal of Management*, 17(3), 601-617.
- Wong, L.W., Tan, G.W.H., Ooi, K.B., Dwivedi, Y. (2024), The role of institutional and self in the formation of trust in artificial intelligence technologies. *Internet Research*, 34(2), 343-370.
- Yu, E., Han, P., Fang, X. (2025), Exploring the mental health education policies of Chinese college students: Based on policy text analysis and PMC-Index model. *Frontiers in Public Health*, 13, 1560582.
- Zhang, H., Huang, H. (2024), Low-carbon transformational leadership: Conceptualization, measurement, and its impact on innovation outcomes. *Sustainability*, 16(24), 10844.
- Zhou, J., George, J.M. (2001), When job dissatisfaction leads to creativity: Encouraging the expression of voice. *Academy of Management Journal*, 44(4), 682-696.
- Zong, Z., Guan, Y. (2025), AI-driven intelligent data analytics and predictive analysis in Industry 4.0: Transforming knowledge, innovation, and efficiency. *Journal of the Knowledge Economy*, 16(1), 864-903.