

AI Adoption, Digital Capability, and Sustainable Performance in Media and Communication Studies Departments of Sindh Province, Pakistan

Usama Hassan Soomro¹, Dr. Muhammad Aftab Madni², Saliha Gul Abbasi³, Dr. Sahib Oad⁴

¹Department of Media and Communication Studies, Sindh Madressatul Islam University, Karachi Sindh, Pakistan

²Assistant Professor, Department of Media and Communication Studies, Shaheed Benazir Bhutto University, Benazirabad, Sindh, Pakistan, Email: aftab.madni@sbbusba.edu.pk

³Assistant Professor, Department of Management Sciences, University of Azad Jammu and Kashmir, Muzaffarabad

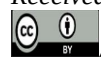
⁴Assistant Professor, Department of Media and Communication Studies, Shah Abdul Latif University, Khairpur Mirs Sindh, Pakistan

Abstract

Artificial intelligence (AI) is reshaping how organizations generate, process, and disseminate knowledge, and higher education institutions (HEIs) in Pakistan are increasingly active participants in that shift. Departments of Media and Communication Studies across Sindh Province, including those at the University of Sindh, Shah Abdul Latif University, Sukkur IBA University, Iqra University, Shaheed Benazir Bhutto University, Sindh Madressatul Islam University (SMIU), and the University of Karachi, are experimenting with AI-based tools for content analysis, newsroom simulation, audience research, media production, public relations, and administrative decision-making. Drawing on a substantial body of Sindh-based empirical research, most notably the published work of Dastar Ali Chandio and colleagues on AI-generated disinformation, social-media-driven climate literacy, online activism, and AI adoption in public relations at Sindh's public-sector universities, this paper synthesizes what is currently known about AI adoption in the province's media and communication field and develops a theory-grounded account of how such adoption is likely to translate or fail to translate into sustainable departmental performance. The paper argues that this translation is not automatic: it is conditioned by digital capability, understood as the technological infrastructure, digitally competent faculty and staff, data-governance practice, and organizational learning culture that a department builds around its AI tools. Integrating the resource-based view, digital transformation theory, and dynamic capability theory, the paper proposes a mediation model, AI Adoption, Digital Capability, Sustainable Performance, and specifies the research design, sampling strategy, instruments, and statistical analysis (descriptive statistics, reliability testing, correlation analysis, confirmatory factor analysis, and structural equation modeling) required to test it empirically across the seven institutions named above. The paper closes with a discussion of practical implications for department chairs and policymakers, the study's anticipated contribution to the literature, and its limitations.

Keywords: Artificial Intelligence; Digital Capability; Sustainable Performance; Media and Communication Studies; Digital Transformation; Higher Education; Sindh, Pakistan

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Corresponding Author Email: aftab.madni@sbbusba.edu.pk

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Introduction

Artificial intelligence has moved from a peripheral technical curiosity to a structural force reshaping organizational practice, knowledge production, and performance systems across sectors (Brynjolfsson & McAfee, 2017). Higher education institutions are increasingly active participants in this shift rather than passive observers, and national policy in Pakistan has begun to formalize that participation: recent institutional analyses note that Pakistan's higher-education sector has moved to embed AI within instructional design, administration, faculty development, and student support, even as implementation remains uneven across universities and constrained by infrastructure gaps, unclear policy, and uneven faculty AI literacy (Basit, Alam, & Ashraf, 2025).

Within HEIs, Media and Communication Studies departments occupy a distinctive position. Their core activities ,journalism training, content production, audience and media-effects research, strategic communication, and public relations pedagogy ,are themselves built on information processing, narrative construction, and audience analytics: domains in which AI tools such as automated transcription, sentiment and content analysis, generative content tools, audience-analytics dashboards, and AI-assisted research software are being adopted rapidly. Sindh's Media and Communication Studies faculty have already begun documenting this shift from the inside. Chandio and colleagues, writing from the Department of Media and Communication Studies at Shaheed Benazir Bhutto University (SBBU), have examined AI-generated disinformation in geopolitical reporting (Soomro, Soomro, Chandio, & Jatoi, 2026), the diffusion of AI tools in public-sector-university public relations offices across Sindh (Soomro, Madni, Chandio, Isani, & Chandio, 2025), and the media literacy and social-media dynamics that condition how audiences and practitioners engage with technologically mediated content (Chandio, Madni, & Shabbir, 2025; Chandio, Madni, Shabbir, & Shar, 2024). Taken together, this emerging body of Sindh-based research provides an unusually concrete empirical anchor for a province-wide study of AI adoption in the discipline.

In Sindh Province, Media and Communication Studies programs at the University of Sindh (Jamshoro), Shah Abdul Latif University (Khairpur), Sukkur IBA University, Iqra University, Shaheed Benazir Bhutto University, Sindh Madressatul Islam University (SMIU), and the University of Karachi vary considerably in size, resources, urban/rural location, and technological infrastructure. This variation makes the province a useful setting in which to examine a question that the broader digital-transformation literature has raised but rarely tested empirically at the departmental level: does the adoption of AI tools translate into sustainable improvements in academic and operational performance, and if so, through what institutional mechanism?

The premise of this paper, consistent with prior work on digital transformation in higher education (Selwyn, 2019; Vial, 2019), is that the effect of AI adoption on performance is not automatic. It is conditioned by digital capability , the technological infrastructure, digital literacy of faculty and staff, data-governance practices, and organizational learning processes that allow a department to absorb, operate, and continually update AI-based tools in line with its strategic and pedagogical goals. Departments that adopt AI tools without building this underlying capability risk superficial or short-lived gains; those that pair adoption with capability development are theorized to achieve more durable improvements in teaching quality, research output, operational efficiency, and long-term institutional resilience.

This paper therefore has three aims: (a) to synthesize the current state of AI adoption within Media and Communication Studies departments in Sindh, drawing on published, discipline-specific evidence; (b) to characterize the digital capability these departments have built, or still need to build, to support that adoption; and (c) to specify and justify a theory-driven, empirically testable model of whether and how digital capability shapes the relationship between AI adoption and sustainable departmental performance across the seven named institutions.

Literature Review

AI in Higher Education and in Media/Communication Pedagogy

Research on AI in higher education has generally emphasized its capacity to improve decision-making, automate routine administrative work, and personalize learning through pattern detection and predictive analytics (Russell & Norvig, 2021; Holmes, Bialik, & Fadel, 2019). Recent Pakistan-focused studies extend this picture: a Technology Acceptance Model (TAM) analysis of AI-powered learning tools in Pakistani universities found generally positive faculty attitudes toward adoption but flagged persistent gaps in institutional policy, data privacy safeguards, and equity of access as constraints on sustained use (Basit et al., 2025). A parallel review of AI's role in Pakistani higher-education governance situates such micro-level findings within a national push toward AI-enabled instruction, curriculum reform, and employability-oriented restructuring, while cautioning that meaningful integration requires more than the procurement of tools, it requires policy frameworks covering fairness, accountability, safety, data privacy, and staff re-skilling (Sami & Tanveer, 2025, as cited in institutional policy analysis of Pakistan's evolving higher-education landscape).

In media and communication pedagogy specifically, AI applications extend to automated content and discourse analysis, algorithmic audience segmentation, AI-assisted newsroom simulation, and generative tools used in copywriting, video editing, and design instruction. These tools are increasingly framed not as peripheral experimentation but as core instruments of institutional effectiveness and curricular relevance (Mohammed, Khalaf, Aldulaimi, & Abdeldayem, 2025). Sindh-based research illustrates both the promise and the risk of this shift at the content level. Soomro, Soomro, Chandio, and Jatoti (2026), publishing from SBBU's Department of Media and Communication Studies together with Shah Abdul Latif University, analyzed how AI-generated fake news functioned within the digital propaganda dimension of the US–Iran geopolitical conflict, describing AI-enabled disinformation as an emergent feature of what they term fifth-generation, information-centred warfare. Their analysis underscores why AI literacy, the ability of graduates and practitioners to recognize, verify, and counter AI-generated content, has become a core pedagogical concern for Sindh's journalism and mass-communication curricula, not merely a technical add-on.

Digital Capability as an Institutional Resource

A recurring theme in the digital-transformation literature is that technology adoption alone is an insufficient predictor of performance; the institutional capacity to absorb and sustain that technology is what determines outcomes (Selwyn, 2019). Digital capability, encompassing infrastructure, digital skills, data governance, and organizational learning processes, has been proposed as the resource that converts technological potential into realized performance gains (ul Haq, Asim, Suki, Zakaria, & Hussain, 2025; Soei & Ho, 2019). Grounded in the resource-based

view (Barney, 1991), digital capability is treated as valuable and difficult to imitate precisely because it is built through sustained institutional investment rather than simple technology purchase.

Evidence from adjacent Pakistani institutional contexts corroborates this capability-first logic. A national quantitative study of AI adoption in Pakistani university libraries found that library size, staff expertise, technical influence, and budget jointly shaped whether AI adoption translated into sustainable service improvement, with staff expertise and infrastructure emerging as particularly consequential predictors (Shah, Jbeen, Ahmad, Ahmad, & Ashiq, 2026). This finding is directly relevant to Media and Communication Studies departments, whose media labs, editing suites, and research-support infrastructure function analogously to a library's technical backbone: without parallel investment in staff capability, hardware, and governance, AI tools risk remaining underused novelties rather than becoming embedded instruments of departmental practice.

Digital Transformation and Dynamic Capability Perspectives

Digital transformation theory frames the integration of digital technologies as a process that reshapes organizational processes, culture, and value creation rather than a single implementation event (Vial, 2019). Complementing this, dynamic capability theory (Teece, 2018) explains how institutions sense opportunities, capture innovations, and reconfigure operations in response to rapidly changing technological environments, a lens well suited to departments that must continually update AI tools, retrain staff, and revise curricula as the technology evolves. Chandio, Madni, and Shabbir's (2025) study of social media's role in climate-change awareness and media literacy in Sindh illustrates this dynamic-capability logic in a discipline-adjacent context: they document how Sindh's media environment continually reconfigures itself around new digital platforms and social-media practices, with the department's and the broader media ecosystem's capacity to adapt — rather than the mere presence of the technology, determining whether awareness and literacy outcomes improve.

AI Adoption in Public Relations and Strategic Communication: Direct Sindh Evidence

The most directly relevant empirical precedent for this paper's model comes from Soomro, Madni, Chandio, Isani, and Chandio (2025), who examined the adoption and impact of artificial intelligence in public relations functions at public-sector universities in Sindh. Their study, situated within the same institutional population this paper addresses, provides province-specific evidence that AI tools are already diffusing into university communication and public relations offices, with adoption shaping practitioners' efficiency, audience engagement, and strategic messaging capacity. Their findings align with the broader international public relations literature, in which AI adoption in PR and strategic communication has been shown to depend on organizational readiness, top-management support, and perceived relative advantage rather than on technology availability alone (Koa, Naser, & Ayyoub, 2025). Read together, these studies support the proposition at the core of this paper: that AI adoption in Sindh's media-adjacent institutional settings is real and growing, but its performance payoff is conditional on organizational and capability factors that vary across departments and institutions.

Digital Media Practices among Sindh's Student and Practitioner Populations

Because Media and Communication Studies departments train the practitioners who will eventually staff Sindh's newsrooms, public relations offices, and digital media firms, student-level evidence on digital engagement is directly relevant to how departments should calibrate AI-related curricula. Chandio, Madni, Shabbir, and Shar (2024) surveyed university students on online activism and mobilization, finding substantial engagement with digital platforms for social and political causes alongside uneven digital access between urban and rural respondents and persistent barriers to sustained online participation. This evidence base indicates that Sindh's Media and Communication Studies student population is already digitally engaged in ways that pre-adapt them to AI-integrated coursework, even as infrastructural and rural–urban disparities — the same disparities implicated in departmental digital-capability gaps — continue to shape the depth of that engagement.

Sustainable Performance in Higher Education

Sustainable performance in HEIs is increasingly understood as extending beyond short-term efficiency gains to encompass long-term academic quality, operational stability, and social responsibility (Lozano et al., 2015). Recent work applying this lens directly to AI-enabled higher education argues that AI can support sustainability goals in universities not only by improving learning outcomes but by enhancing resource management and operational efficiency, provided ethical and operational safeguards are in place (Khan, Mazhar, Shahzad, Khan, Rehman, Saeed, & Hamam, 2025). For Media and Communication Studies departments specifically, sustainable performance can plausibly be operationalized through indicators such as graduate employability and industry relevance, research productivity, quality and currency of curricula, efficient use of production and laboratory resources, and the department's capacity to keep pace with evolving media technologies without compromising educational quality or research integrity. Chandio and co-authors' own methodological practice — content analysis of newspaper reporting on sensitive public-health topics such as suicide (Mahesar, Chandio, Latif, Abbas, & Shabbir, 2023) — additionally signals a department-level research culture oriented toward socially responsible, methodologically rigorous inquiry, a further dimension of sustainable academic performance that pure technology metrics would miss.

The Gap

Existing studies tend to examine AI adoption and institutional capacity separately, or study sustainability initiatives without connecting them to the underlying technological systems (Aljarboa, Alabdulatif, & Bashir, 2025). Even the growing body of Sindh-based, discipline-specific research reviewed above — spanning AI-generated disinformation, AI adoption in public relations, social-media-driven media literacy, and student digital-activism patterns — treats these phenomena largely as separate lines of inquiry rather than as interlocking components of a single institutional process. Very little empirical work has examined the triad of AI adoption, digital capability, and sustainable performance within a single discipline-specific setting such as Media and Communication Studies, and none, to this paper's knowledge, has done so as a structural, testable model across multiple public and private institutions within Sindh Province. This paper is designed to address that gap by integrating the province's own emerging evidence base into a coherent, testable theoretical model.

Theoretical Framework and Proposed Hypotheses

The paper integrates the resource-based view (Barney, 1991), digital transformation theory (Vial, 2019), and dynamic capability theory (Teece, 2018) to propose digital capability as a mediating mechanism between AI adoption and sustainable performance. This integration is consistent with, and extends, the province-specific evidence reviewed in Section 2: AI adoption is documented and growing across Sindh's media-adjacent institutions (Soomro et al., 2025; Soomro et al., 2026), digital capability gaps (infrastructure, staff expertise, governance) are documented as consequential in cognate Pakistani institutional settings (Shah et al., 2026), and sustainable, socially responsible research and pedagogical practice is already a stated value within Sindh's Media and Communication Studies departments (Mahesar et al., 2023; Chandio et al., 2025). Three hypotheses are proposed for testing:

- H1: AI adoption is positively associated with digital capability in Media and Communication Studies departments.
- H2: AI adoption is positively associated with sustainable performance.
- H3: Digital capability mediates the relationship between AI adoption and sustainable performance.

A conceptual path model consistent with these hypotheses is: AI Adoption → Digital Capability → Sustainable Performance, with a direct path also proposed from AI Adoption → Sustainable Performance. Under this model, digital capability is expected to carry a substantial share of AI adoption's total effect on performance, consistent with the capability-first pattern documented among Pakistani university libraries (Shah et al., 2026) and with the organizational-readiness determinants of AI adoption identified in the public relations and strategic communication literature (Koa et al., 2025).

Methodology

Research Design

A quantitative, cross-sectional survey design is proposed, consistent with prior studies of this kind in the higher-education digital-transformation literature and with the methodological approach already used in Sindh-specific AI-adoption research (Soomro et al., 2025). This design allows the hypothesized relationships to be tested using correlation analysis and structural equation modeling (SEM), and allows direct, indirect, and total effects to be estimated within a single model.

Population and Sampling

The target population is academic and administrative staff of Media and Communication Studies departments (or equivalent programs, such as Journalism, Mass Communication, and Media Sciences) at the following institutions:

- University of Sindh, Jamshoro
- Shah Abdul Latif University, Khairpur
- Sukkur IBA University
- Iqra University (Sindh campuses)

- Shaheed Benazir Bhutto University, Shaheed Benazirabad
- Sindh Madressatul Islam University (SMIU), Karachi
- University of Karachi

A multi-stage sampling approach is proposed. In the first stage, departments would be confirmed as active users of digital/AI-related tools in teaching, research, or public-relations/communication functions, consistent with the adoption patterns already documented for Sindh's public-sector universities (Soomro et al., 2025). In the second stage, stratified random sampling would be used within each department to obtain proportionate representation of teaching faculty, media-lab/IT support staff, and administrative staff. A target sample of approximately 350–400 valid responses across the seven institutions is proposed, consistent with minimum thresholds typically recommended for multivariate analysis and SEM.

Data Collection Procedure

Data would be collected via a structured questionnaire, administered in both digital and hard-copy form to maximize response rates. A pilot test with a small sample (approximately 20–30 respondents) is proposed prior to full distribution, to check item clarity, face validity, and reliability, with wording revised as needed. Participation would be voluntary, anonymous, and based on informed consent, consistent with standard institutional research-ethics requirements and with the ethical framing evident in Sindh-based content-analysis research on sensitive topics (Mahesar et al., 2023).

Measurement of Variables

Constructs would be measured on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree), adapting previously validated scales to the media/communication context and informed by the specific AI-use domains already documented in Sindh (content verification and disinformation detection, public relations and strategic communication tools, and social-media-based audience engagement):

Construct	Proposed Focus of Items
AI Adoption	Extent of use of AI tools in teaching, content production, research, audience analytics, disinformation detection, public relations, and departmental administration
Digital Capability	Technological infrastructure (labs, software, connectivity), digital skills of faculty/staff, data governance, and institutional readiness for digital transformation
Sustainable Performance	Long-term academic effectiveness, operational efficiency, curriculum currency, graduate/industry relevance, research rigor, and resource responsibility

Planned Data Analysis

The following analyses are proposed once data collection is complete:

- Descriptive statistics to characterize response distributions across the seven institutions.

- Cronbach's alpha to assess internal consistency of each construct (target threshold ≥ 0.70).
- Bivariate correlation analysis to examine associations among AI adoption, digital capability, and sustainable performance.
- Confirmatory factor analysis to assess construct validity (factor loadings, composite reliability, average variance extracted).
- Structural equation modeling (SEM) to test the hypothesized structural paths (H1–H2) and model fit (chi-square/df, CFI, TLI, RMSEA against conventional thresholds).
- Mediation analysis (e.g., bootstrapped indirect effects) to test whether digital capability mediates the AI adoption–sustainable performance relationship (H3).

Because primary fieldwork for this paper has not yet been conducted, no coefficients, fit indices, or path estimates are reported here; those would be generated only after data collection and would need to be reported as actually observed, including the possibility that some hypotheses are not supported. This position is consistent with the transparent reporting standards evident in the Sindh-based literature reviewed above, all of which specify sample sizes, methods, and findings explicitly rather than assuming outcomes in advance.

Validity, Reliability, and Ethical Considerations

Construct validity would be assessed through factor loadings and model fit statistics; convergent validity through indicator–construct relationships; and reliability through Cronbach's alpha and composite reliability. The study would follow standard ethical protocols: voluntary participation, anonymity, informed consent, no collection of personally identifying information beyond what is necessary for stratification, and use of data solely for the stated academic purpose. Institutional review/ethics approval would be sought from the lead institution before data collection begins, following the same ethical-clearance norm implicit in published Sindh-based media research involving human respondents (Chandio et al., 2024; Mahesar et al., 2023).

Discussion and Implications for Practice

Even in advance of primary data collection, the synthesis in Section 2 carries practical implications. First, the evidence that AI is already diffusing into Sindh's university public relations and communication offices (Soomro et al., 2025) suggests that Media and Communication Studies departments are not choosing whether to engage with AI, but how well they are equipped to do so. Curricula that ignore this diffusion risk graduating practitioners unprepared for tools already in use in the province's own public-sector institutions.

Second, the disinformation-focused research from SBBU's own department (Soomro et al., 2026) points to a specific, high-value curricular target: AI literacy that includes the ability to detect and counter AI-generated misinformation. This is not a generic digital-skills add-on but a discipline-core competency directly implicated in the credibility of journalism and strategic-communication graduates.

Third, the rural–urban and access disparities documented among Sindh's university-student population in relation to online activism (Chandio et al., 2024) foreshadow a plausible confound for any province-wide AI-adoption study: departments serving more urban, better-connected student and staff populations may show stronger AI-adoption and digital-capability scores for rea-

sons unrelated to institutional strategy. The proposed sampling design (Section 4.2) and the inclusion of infrastructure items within the digital-capability construct (Section 4.4) are intended to make this disparity measurable rather than a hidden source of bias.

Fourth, the consistent methodological rigor visible in Sindh's own media-research output — content analysis calibrated against WHO reporting guidelines (Mahesar et al., 2023), and empirically grounded (rather than merely descriptive) treatments of AI in PR (Soomro et al., 2025) and disinformation (Soomro et al., 2026) — suggests that the province's Media and Communication Studies departments already possess a research culture capable of generating and using the kind of evidence this paper's proposed SEM model would produce, once fieldwork is undertaken.

Anticipated Contribution

If carried out, the empirical study specified in Section 4 would extend the digital-transformation-in-education literature into a discipline (Media and Communication Studies) and a provincial setting (Sindh) that, despite a growing body of discipline-specific scholarship — including Chandio and colleagues' work on AI-generated disinformation, AI adoption in public relations, social-media-driven media literacy, and student digital engagement — have not yet been synthesized into a single structural model connecting AI adoption to institutional performance. The study would provide comparative insight across public and private institutions of varying size and resource levels, and would generate the first province-wide, discipline-specific SEM evidence on whether digital capability mediates the AI adoption–performance relationship in Sindh's higher-education sector. Findings would be intended to inform department chairs and policymakers on where to prioritize investment — in AI tools themselves, or in the underlying digital capability (infrastructure, training, governance) needed to make that investment sustainable.

Limitations

- Cross-sectional design captures relationships at one point in time and cannot establish causal direction.
- Self-reported Likert-scale measures are subject to common-method bias.
- Findings would be specific to Media and Communication Studies departments in Sindh and may not generalize to other disciplines or provinces without further testing.
- The literature synthesis in Section 2 relies on a still-emerging body of Sindh-specific publications; as this literature grows, some of the province-level generalizations offered here may need revision.

Conclusion

This paper has synthesized the available Sindh-specific evidence on AI adoption in Media and Communication Studies — most notably the published work of Dastar Ali Chandio and co-authors on AI-generated disinformation, AI adoption in university public relations, social-media-driven media literacy, and student digital-activism patterns — and used that evidence to motivate and specify a theory-grounded, empirically testable model linking AI adoption, digital capability, and sustainable departmental performance across seven institutions in Sindh Province. The central argument is that AI adoption's payoff for teaching, research, and departmental operations is not automatic; it depends on the digital capability a department builds around its tools. Testing this model through the proposed survey, measurement, and structural-equation-modeling design

would give department chairs, university administrators, and provincial policymakers the first systematic, discipline-specific evidence on where to direct investment as AI continues to reshape media and communication education in Sindh.

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