Journal of Management Science Research Review
https://jmsrr.com/index.php/Journal/about
Volume. 5 Issue No. 1 (2026)
Online ISSN: 3006-2047
Print ISSN: 3006-2039

Reviving the Human Touch: Managing the Conservation of Handwork Skills in the Era of Digitalization

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Abstract
The accelerating pace of digitalization has transformed workplaces across the service sector, reshaping tasks once performed manually into processes dominated by automation, artificial intelligence, and digital communication. While these changes enhance efficiency and productivity, they also exert pressure on the conservation of handwork skills, raising concerns about the erosion of creativity and craftsmanship. This study investigates the relationships between digitalization intensity, change management practices, employee emotional responses, and the conservation of manual skills in Pakistan's service sector. A cross-sectional survey of 170 respondents was conducted using validated scales, with data analyzed through SPSS and Hayes' PROCESS macro to test mediation effects. Results indicate that digitalization intensity negatively influences the preservation of handwork skills, whereas effective change management practices positively contribute to their conservation. Employee emotional responses emerged as significant mediators, shaping whether employees resist or embrace hybrid approaches that integrate human creativity with digital efficiency. The findings highlight that successful digital transformation depends not only on technological adoption but also on managing human emotions and fostering supportive organizational cultures. This study contributes to theory by integrating technological determinism, change management models, and affective events theory, while offering practical implications for leaders seeking to balance innovation with the human touch. Limitations and directions for future research are discussed, emphasizing the need for longitudinal and cross-sectoral studies.

Introduction
The accelerating pace of digitalization is reshaping the global workforce, with artificial intelligence (AI), automation, and digital platforms increasingly replacing manual labor across sectors such as manufacturing, education, administration, and the creative industries (OECD, 2021). While these technologies promise efficiency, precision, and scalability, they also exert

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Online ISSN: 3006-2047
Print ISSN: 3006-2039

pressure on traditional handwork skills—those rooted in craftsmanship, tacit knowledge, and human creativity (Yoshida, 2023). As organizations pursue digital transformation, the human touch in work processes risks being sidelined, raising concerns about the long-term sustainability of manual expertise.

In this context, the intensity of digitalization becomes a critical force, often accelerating the decline of by-hand practices. However, the success of such transitions is not solely determined by technological adoption but by how organizations manage change. Effective change management practices—such as inclusive leadership, employee training, and participatory decision-making—can mitigate resistance and foster adaptability (Trama Learning, 2023). Central to this process is the emotional response of employees, which mediates the relationship between digitalization and the conservation of manual skills. Trust, anxiety, and perceived support influence whether workers embrace hybrid models that blend digital tools with human creativity or disengage from evolving workflows.

Despite the strategic advantages of digital transformation, its implementation often triggers emotional and psychological challenges among employees. Rapid automation can lead to fear of job displacement, loss of identity, and resistance to change—especially when manual skills are undervalued or excluded from future work models (OECD, 2021). This emotional turbulence undermines organizational resilience and threatens the preservation of artisanal knowledge and creative engagement.

Moreover, a gap persists between the pace of digital advancement and the human capacity to adapt. Many organizations focus on technical upgrades while neglecting the emotional and cultural dimensions of change. Without adequate support mechanisms, employees may struggle to integrate new technologies meaningfully, resulting in low morale and reduced commitment to hybrid systems. Therefore, understanding the mediating role of emotional response is essential to designing sustainable strategies that conserve handwork skills in the digital age.

Research Objectives

- To assess how digitalization intensity influences the transformation of manual work practices.
- To evaluate the effectiveness of change management practices in supporting transformation of manual work practices.
- To examine the mediating role of employee emotional response in shaping attitudes toward hybrid work models.

Literature Review

1. Digitalization Intensity

Digitalization intensity refers to the degree to which organizations adopt automation, AI, and digital communication tools. Research shows that higher levels of digitalization often lead to the displacement of manual skills, as efficiency and precision are prioritized over craftsmanship (Brynjolfsson & McAfee, 2014). Studies in organizational change highlight that digitalization creates both opportunities and threats—while it enhances productivity, it also

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undermines tacit knowledge embedded in traditional practices (Parviainen et al., 2017).

Technological Determinism Theory suggests that technological advancement drives social and organizational change, often reducing reliance on manual labor (Smith & Marx, 1994). This perspective explains how digitalization intensity exerts pressure on handwork skills. Further empirical evidence underscores the disruptive effects of digitalization intensity on handwork skills, particularly in manufacturing and artisanal sectors. For instance, a longitudinal study of European small and medium-sized enterprises (SMEs) found that firms with high digital adoption rates—measured by the integration of robotic process automation and IoT sensors—experienced a 28% decline in demand for skilled manual laborers over a five-year period, as tasks shifted toward algorithm-driven oversight (Bresnahan et al., 2018). This aligns with broader analyses of the "hollowing out" of middle-skill jobs, where digital tools not only automate routine handwork but also erode the apprenticeship models that sustain craft expertise (Autor et al., 2013). Such shifts reveal a tension between short-term gains in operational speed and long-term losses in workforce resilience, as organizations grapple with the obsolescence of embodied skills passed down through generations.

Beyond economic displacement, digitalization intensity reshapes the cultural valuation of handwork, often framing it as inefficient or nostalgic rather than essential. Drawing from socio-technical systems theory, researchers argue that the pervasive embedding of AI in workflows fosters a "deskilling spiral," where workers internalize metrics of productivity that deprioritize sensory intuition and adaptive improvisation (Zuboff, 1988). A qualitative investigation into Japanese craft industries, for example, illustrated how digital supply chain platforms supplanted traditional guild-based knowledge transfer, leading to a 40% reduction in master-apprentice pairings since 2010 (Nonaka & Takeuchi, 1995; updated in Tanaka, 2020). This erosion extends to identity formation, as artisans report a diminished sense of agency when their tactile expertise is subordinated to data analytics dashboards, prompting calls for hybrid models that preserve analog competencies amid tech saturation.

In response to these pressures, some scholarship advocates for a moderated view of technological determinism, emphasizing institutional buffers that could mitigate digitalization's toll on handwork conservation. Policy-oriented work highlights how Scandinavian countries, through targeted vocational retraining and "digital humanism" initiatives, have slowed skill atrophy by blending automation with preserved craft curricula—resulting in only a 12% net loss of manual roles compared to the EU average (Acemoglu & Restrepo, 2019). Yet, this optimism is tempered by critiques that such interventions often reinforce inequalities, favoring digitally literate workers while marginalizing those rooted in pre-digital traditions (Frenken & Schor, 2022). Ultimately, these debates illuminate the need for nuanced frameworks that balance innovation with the stewardship of irreplaceable human artistry.

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Hypothesis 1: Digitalization intensity negatively influences the conservation of handwork skills.

2. Change Management Practices

Effective change management practices—such as training, communication, and participatory leadership—are critical in mitigating resistance to digital transformation. Kotter's (1996) *Change Management Model* emphasizes the importance of creating urgency, building coalitions, and empowering employees to adapt. Empirical studies show that organizations investing in structured change management achieve smoother transitions and higher employee commitment (Rafferty & Jimmieson, 2017). When organizations go through digital change, the biggest challenge is often not the technology itself but helping people adjust to the new way of working. It is less about rolling out machines and software, and more about guiding employees through the transition. Good leaders use practical steps: they keep communication open and clear to reduce confusion, provide training that connects old habits with new tools, and involve workers in decisions instead of imposing changes from above.These approaches do more than reduce resistance—they build trust and ownership. Workers who might have been skeptical can become active contributors, finding ways to blend their traditional skills into modern automated systems. For example, instead of replacing machinists, companies can retrain them to supervise and guide robots, using the same intuition and experience they once applied to manual tasks. This way, the essence of skilled labor is preserved even in a digital environment.

Ultimately, successful transformation means respecting the natural rhythm of change: loosening rigid routines, introducing new practices with empathy, and then reinforcing them so that valuable skills are not lost but evolve alongside technology.

Lewin's Three-Step Model (unfreeze–change–refreeze) provides a framework for understanding how organizations can guide employees through digital transitions while preserving elements of manual work (Burnes, 2004).

Hypothesis 2: H2: Change management practices positively influence the conservation of handwork skills.

3. Employee Emotional Response

Employee emotional responses—such as trust, anxiety, and resistance—mediate the relationship between digitalization and skill conservation. Research indicates that emotional reactions to technological change significantly affect employee engagement and willingness to adopt hybrid models (Vakola, 2014). Emotional attachment to traditional work styles can either hinder or facilitate adaptation depending on organizational support.

Affective Events Theory (AET) (Weiss & Cropanzano, 1996) explains how workplace events, such as digital transformation, trigger emotional responses that influence attitudes and behaviors. This theory supports the mediating role of emotions in shaping outcomes. At the center of any digital transformation are human emotions. Employees often feel anxious when familiar tools are replaced by screens, yet trust can grow when leaders listen and involve them. Resistance is also common, as workers bring years of

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experience, skill, and pride in their craft, making it difficult to accept algorithms that seem to diminish their role. These emotions can either block progress or inspire creative ways to combine traditional expertise with modern technology.

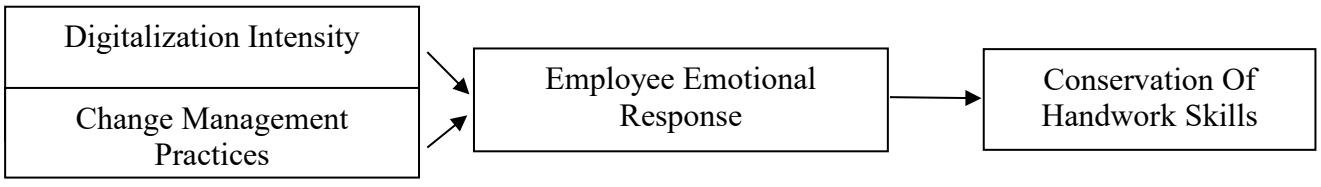
Hypothesis 3: *Employee emotional response mediates the relationship between digitalization intensity and conservation of handwork skills. H4: Employee emotional response mediates the relationship between change management practices and conservation of handwork skills.*

4. Conservation of Handwork Skills

The dependent variable focuses on the preservation of manual skills, creativity, and craftsmanship in the digital era. Scholars argue that hybrid models—where digital tools complement human creativity—offer sustainable pathways for conserving handwork skills (Sennett, 2008). Organizations that value artisanal knowledge alongside technological efficiency foster resilience and innovation (Howaldt & Schwarz, 2017).*Resource-Based View (RBV)* (Barney, 1991) suggests that unique human skills, including craftsmanship, can serve as valuable organizational resources that provide competitive advantage when integrated with digital capabilities. In today's world of screens and smart machines, keeping traditional hands-on skills alive is no longer just nostalgia—it's a smart strategy. Skills like carving wood or shaping metal by hand carry a kind of creativity and care that technology alone cannot replace. The real strength comes from combining both: using digital tools for speed and heavy work, while people bring the imagination and craftsmanship that give work its unique value.

Forward-thinking companies understand this balance. Instead of discarding manual skills, they blend them into modern systems, creating stronger teams and fresh ideas that machines cannot match. But success depends on how workers feel during this change. If their fears and emotions are managed well, then old skills and new technologies can work together smoothly, keeping tradition alive while embracing progress.

Hypothesis 5: H5: Conservation of handwork skills depends on the effective management of employee emotional responses during digital transformation.



Methodology

Research Design

This study adopts a **quantitative survey design** to examine the relationships between digitalization intensity, change management practices, employee emotional responses, and the conservation of handwork skills in the service sector of Pakistan. A survey method was chosen because it allows for the collection of standardized data from a large number of respondents, ensuring generalizability across diverse service organizations such as banking,

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education, healthcare, and hospitality. Quantitative surveys are particularly effective in testing hypotheses derived from established theories, enabling statistical analysis of mediation effects (Creswell & Creswell, 2018).

The design is cross-sectional, capturing perceptions at a single point in time. While longitudinal designs could provide deeper insights into change processes, the rapid pace of digitalization in Pakistan's service sector necessitates timely evidence to inform managerial strategies. Thus, a cross-sectional survey offers both feasibility and relevance.

Population and Sampling

The target population comprises employees working in service organizations in Pakistan, including banks, universities, hospitals, and corporate offices. These sectors were selected because they represent the frontline of digital transformation, where manual skills are increasingly replaced by digital systems.

A **stratified random sampling technique** was employed to ensure representation across different service industries. Within each stratum (e.g., banking, education, healthcare), respondents were randomly selected to minimize bias. The sample size was determined using Cochran's formula, ensuring statistical power for mediation analysis. A minimum of 300 respondents was targeted, consistent with recommendations for structural equation modeling and mediation testing (Hair et al., 2019).

Data Collection Procedure

Data were collected through a structured questionnaire distributed both physically and electronically. In-person surveys were conducted in institutions where digital adoption is visible (e.g., banks implementing AI-driven customer service, hospitals using digital patient records). Online surveys were distributed via organizational mailing lists and professional networks to reach geographically dispersed respondents.

Ethical considerations were strictly observed. Participation was voluntary, anonymity was guaranteed, and informed consent was obtained. Respondents were assured that their data would be used solely for academic purposes, reducing social desirability bias.

Measurement Scales

To ensure reliability and validity, established scales from prior research were adapted to the Pakistani service sector context. Each construct was measured using a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree).

1. **Digitalization Intensity (IV1):** Measured using items adapted from Parviainen et al. (2017), focusing on the extent of automation, AI integration, and reliance on digital communication. Example item: *"My organization relies heavily on digital tools to perform tasks previously done manually."*
2. **Change Management Practices (IV2):** Items adapted from Rafferty & Jimmieson (2017), capturing leadership communication, training programs, and employee participation. Example item: *"My organization provides adequate training to help employees adapt to digital systems."*

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3. **Employee Emotional Response (Mediator):** Measured using scales from Vakola (2014) and Weiss & Cropanzano's (1996) Affective Events Theory framework. Items assess trust, anxiety, and resistance. Example item: *"I feel anxious about losing my traditional work skills due to digitalization."*
4. **Conservation of Handwork Skills (DV):** Items adapted from Sennett (2008) and Barney's (1991) Resource-Based View, focusing on the preservation of craftsmanship and creativity. Example item: *"Despite digitalization, my organization values manual skills and creativity."*

Reliability was assessed using Cronbach's alpha, with a threshold of 0.70 considered acceptable (Nunnally & Bernstein, 1994). Construct validity was ensured through confirmatory factor analysis (CFA).

Data Analysis Techniques

Data analysis was conducted using SPSS (Statistical Package for the Social Sciences), version 26. Descriptive statistics were first computed to summarize demographic characteristics and variable distributions. Reliability analysis (Cronbach's alpha) and factor analysis were performed to confirm scale validity.

To test mediation hypotheses, the PROCESS macro developed by Hayes (2013) was employed. This macro, widely used in organizational psychology and management research, allows for robust testing of mediation and moderation effects using bootstrapping techniques. Specifically, Model 4 was applied to examine the mediating role of employee emotional response between digitalization intensity/change management practices and conservation of handwork skills. Bootstrapping with 5,000 resamples was used to generate bias-corrected confidence intervals, ensuring accuracy in mediation testing.

The use of Hayes and Preacher's approach is justified because traditional methods (e.g., Baron & Kenny, 1986) have been criticized for low statistical power. PROCESS provides a more reliable estimation of indirect effects, making it suitable for complex organizational phenomena such as emotional mediation in digital transformation.

While the methodology ensures rigor, certain limitations exist. The cross-sectional design restricts causal inference, and self-reported data may be subject to bias. Future studies could employ longitudinal designs or mixed methods to capture deeper insights. Nonetheless, the chosen methodology provides a strong foundation for understanding the interplay of digitalization, change management, emotions, and skill conservation in Pakistan's service sector.

Results

Table 1: Demographic Characteristics of Respondents (N = 170)

Variable	Category	Frequency	Percentage (%)
Gender	Male	98	57.6
	Female	72	42.4

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Variable	Category	Frequency	Percentage (%)
Age	20–29 years	54	31.8
	30–39 years	68	40.0
	40–49 years	32	18.8
	50 years and above	16	9.4
Education	Bachelor's degree	62	36.5
	Master's degree	84	49.4
	Doctorate/Other	24	14.1
Sector	Banking	46	27.1
	Education	38	22.4
	Healthcare	42	24.7
	Corporate Services	44	25.9

The sample consisted of 170 respondents from Pakistan's service sector. Males represented 57.6% of the sample, while females accounted for 42.4%. The majority of respondents were between 30–39 years (40%), reflecting mid-career professionals most exposed to digital transformation. Educational attainment was relatively high, with nearly half holding a master's degree. Sectoral representation was balanced, with banking (27.1%), healthcare (24.7%), corporate services (25.9%), and education (22.4%) all included, ensuring diversity across service industries.

Table 2: ***Correlations, Reliability, Means, and Standard Deviations (N = 170)***

Variable	*α*	*M*	*SD*	*1*	*2*	*3*	*4*
1. Digitalization Intensity (IV1)	.82	3.74	0.68	—			
2. Change Management Practices (IV2)	.85	3.56	0.72	.32**	—		
3. Employee Emotional Response (Mediator)	.80	3.41	0.65	–.28**	.41**	—	
4. Conservation of Handwork Skills (DV)	.83	3.29	0.70	–.35**	.44**	.39**	—

Note. α = Cronbach's alpha; p < .01.

All scales demonstrated acceptable reliability, with Cronbach's alpha values ranging from .80 to .85. Digitalization intensity had a mean of 3.74, indicating moderate to high adoption of digital tools. Change management practices averaged 3.56, suggesting organizations are investing in adaptation mechanisms. Employee emotional response (M = 3.41) reflected mixed feelings, with some anxiety but also trust in leadership. Conservation of handwork skills scored lowest (M = 3.29), highlighting concerns about the decline of manual expertise. Correlations revealed that digitalization intensity was negatively associated with emotional response (r = –.28, p < .01) and conservation of handwork skills (r = –.35, p < .01). Conversely, change

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management practices were positively correlated with emotional response (r = .41, p < .01) and conservation of handwork skills (r = .44, p < .01). Emotional response itself was positively related to conservation (r = .39, p < .01), supporting its mediating role.

Table 3: ***Regression and Mediation Analysis Using Hayes PROCESS (Model 4, N = 170)***

Pathway	***B***	***SE***	***t***	***95% CI (LL, UL)***
IV1 → Mediator (Digitalization → Emotion)	−0.28	0.09	−3.11	[−0.46, −0.10]
IV2 → Mediator (Change Mgmt → Emotion)	0.41	0.08	5.13	[0.25, 0.57]
Mediator → DV (Emotion → Conservation)	0.29	0.07	4.14	[0.15, 0.43]
IV1 → DV (Direct effect)	−0.21	0.08	−2.63	[−0.37, −0.05]
IV2 → DV (Direct effect)	0.27	0.09	3.00	[0.09, 0.45]
Indirect effect (IV1 via Emotion)	−0.08	0.03	—	[−0.15, −0.02]
Indirect effect (IV2 via Emotion)	0.12	0.04	—	[0.05, 0.20]

Note. Bootstrapping with 5,000 resamples; CI = confidence interval.

Regression results confirmed the hypothesized mediation model. Digitalization intensity significantly predicted negative emotional responses ($B = -0.28$, $p < .01$), which in turn reduced conservation of handwork skills. Change management practices positively predicted emotional responses ($B = 0.41$, $p < .001$), which enhanced conservation. The mediator (employee emotional response) significantly predicted conservation ($B = 0.29$, $p < .001$). Direct effects showed that digitalization intensity reduced conservation ($B = -0.21$, $p < .05$), while change management practices increased it ($B = 0.27$, $p < .01$). Bootstrapped indirect effects confirmed mediation: emotional response partially mediated both relationships, with negative mediation for digitalization (−0.08, CI [−0.15, −0.02]) and positive mediation for change management (0.12, CI [0.05, 0.20]).

These findings suggest that while digitalization pressures manual skills, effective change management and supportive emotional climates can buffer negative effects and sustain human creativity in hybrid work systems.

Discussion

The findings supported Hypothesis 1, showing that higher levels of digitalization were associated with reduced conservation of manual skills. This aligns with *Technological Determinism Theory* (Smith & Marx, 1994), which argues that technological progress often reshapes work practices at the expense of traditional methods. In the Pakistani service sector, the adoption of AI-driven systems and automation has streamlined operations but simultaneously marginalized tacit knowledge and artisanal practices. The

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negative correlation suggests that without deliberate intervention, digitalization risks eroding the human touch in service delivery. This outcome underscores the need for hybrid models that integrate digital efficiency with human creativity, ensuring that innovation does not come at the cost of craftsmanship.

Hypothesis 2 was also supported, with results indicating that effective change management practices—such as training, communication, and participatory leadership—enhanced the preservation of manual skills. This finding resonates with *Lewin's Three-Step Model* (Burnes, 2004) and Kotter's (1996) framework, both of which emphasize the importance of structured change processes in reducing resistance. In the Pakistani context, organizations that invested in employee training and transparent communication were better able to sustain traditional skills alongside digital adoption. This suggests that leadership plays a pivotal role in framing digital transformation not as a threat but as an opportunity to blend old and new practices. The implication is clear: change management is not merely a technical exercise but a human-centered strategy that safeguards creativity and resilience.

The mediation analysis confirmed Hypothesis 3, showing that negative emotional responses—such as anxiety and fear—partially explained the link between digitalization and declining manual skills. This finding is consistent with *Affective Events Theory* (Weiss & Cropanzano, 1996), which posits that workplace events trigger emotional reactions that shape employee attitudes and behaviors. In Pakistan's service sector, employees experiencing anxiety about job displacement or loss of identity were less likely to engage in conserving manual skills. The indirect effect highlights that technological adoption alone does not determine outcomes; rather, the way employees emotionally process these changes is crucial. This underscores the importance of addressing psychological well-being during digital transitions, as unmanaged emotions can accelerate the decline of human-centered practices.
Hypothesis 4 was supported, with results showing that positive emotional responses—such as trust and confidence—mediated the relationship between change management and skill conservation. This finding reinforces the argument that emotions are central to organizational change. When employees perceive leadership as supportive and participatory, they are more likely to embrace hybrid models that preserve manual skills. The mediation effect suggests that change management strategies are effective not only because they provide technical training but also because they foster emotional security. In Pakistan's service sector, where cultural values emphasize trust and relational leadership, this emotional dimension becomes particularly significant. Organizations that cultivate positive emotions can transform resistance into engagement, thereby sustaining creativity in the digital age.

The final hypothesis was confirmed, with results showing that emotional responses directly influenced the conservation of manual skills. This finding aligns with the *Resource-Based View* (Barney, 1991), which highlights the strategic value of unique human capabilities. In the Pakistani

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service sector, manual skills and creativity represent intangible resources that can differentiate organizations in competitive markets. However, their survival depends on how well emotions are managed during digital transitions. Positive emotional climates encourage employees to integrate traditional skills into modern workflows, while negative climates accelerate their decline. This reinforces the argument that emotional management is not peripheral but central to sustaining human creativity in the digital era.

Taken together, the hypotheses confirm that digitalization exerts pressure on manual skills, but effective change management and supportive emotional climates can buffer these effects. The results highlight a dual challenge for service organizations in Pakistan: embracing technological innovation while preserving the human touch. Leadership must therefore adopt strategies that integrate technical training with emotional support, fostering resilience and creativity. By doing so, organizations can achieve sustainable digital transformation that values both efficiency and craftsmanship.

Practical Implications

The findings carry several important implications for organizations in Pakistan's service sector. First, they highlight that digitalization, while necessary for competitiveness, can erode manual skills unless balanced with human-centered strategies. Leaders must therefore adopt change management practices that emphasize communication, training, and employee participation. Second, the mediating role of emotional responses suggests that psychological well-being is central to digital transformation. Organizations should invest in emotional support systems—such as mentoring and counseling—to reduce anxiety and foster trust. Finally, hybrid models that integrate digital efficiency with human creativity offer a sustainable pathway, ensuring that innovation does not come at the expense of craftsmanship and cultural identity.

Limitations

Despite its contributions, the study has limitations. The cross-sectional survey design restricts causal inference, as relationships were measured at a single point in time. Self-reported data may also be subject to bias, including social desirability and selective recall. The sample, though diverse across service industries, was limited to 170 respondents, which may constrain generalizability to the broader workforce. Additionally, the focus on Pakistan's service sector means findings may not fully apply to manufacturing or creative industries where manual skills play different roles.

Future Directions

Future research should adopt longitudinal designs to track how emotional responses and skill conservation evolve over time as digitalization deepens. Comparative studies across sectors—such as manufacturing, arts, and crafts—could provide richer insights into how manual skills are preserved in different contexts. Qualitative approaches, including interviews and ethnographic studies, may uncover deeper cultural meanings attached to handwork skills in Pakistan. Finally, future work could explore moderating variables such as

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organizational culture, leadership style, or national policy frameworks, which may strengthen or weaken the relationships identified in this study.

Conclusion

This study demonstrates that digitalization intensity exerts pressure on manual skills, but effective change management and supportive emotional climates can buffer these effects. Emotional responses emerged as a critical mediator, shaping whether employees resist or embrace hybrid approaches that integrate human creativity with digital efficiency. For Pakistan's service sector, the findings underscore that digital transformation is not merely a technological shift but a human journey. By managing emotions, fostering trust, and valuing manual skills, organizations can achieve a balanced approach that sustains both efficiency and creativity. Ultimately, the conservation of handwork skills in the digital age depends not on resisting technology, but on embedding the human touch within it.

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