

Digital Transformation and Firm Performance: The Moderating Role of Organizational Culture in Pakistani SMEs

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ABSTRACT

This study analyzed digital transformation effects on firm performance among small and medium enterprises (SMEs) in Sindh Province Pakistan with organizational culture as a moderating factor. The study has focused on Resource-Based View, Dynamic Capabilities Theory and Diffusion of Innovations Theory to assess how Digital Transformation (DT) influences Firm Performance (FP). A quantitative survey design was used and data were collected from 389 managers and employees via stratified random sampling. Structural Equation Modeling using SMARTPLS 4 revealed that Digital Transformation (DT) has a significant positive effect on Firm Performance (FP) ($\beta = 0.62$, $t = 4.35$, $p < 0.001$). Whereas Organizational Culture (OC) directly enhances Firm Performance (FP) ($\beta = 0.30$, $t = 2.80$, $p < 0.005$) and significantly moderates the Digital Transformation (DT) and Firm Performance (FP) relationship ($\beta = 0.20$, $t = 2.45$, $p < 0.015$). These results suggest that aligning digital initiatives with a supportive work culture is critical for achieving sustainable competitive advantage. The study provides practical recommendations for SME managers and policymakers and calls for future research to examine these dynamics across diverse business environments and longitudinally.

Keywords: Digital Transformation, Firm Performance, Organizational Culture, SMEs.

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1. INTRODUCTION

Digitization has become an essential competitive force which propels worldwide business success in current times. Digital transformation through technology integration in all company operations marks a basic change in how businesses deliver value while connecting with their customers (Trzaska et al., 2021). Digital tools together with processing platforms and operational processes have forced organizations to reorganize their approaches and system structures along with their business construction to stay relevant in an evolving marketplace (Calderon-Monge & Ribeiro-Soriano, 2023). The digital era depends heavily on small and medium-sized enterprises (SMEs) for its success especially within emerging economies such as Pakistan (Soomro et al., 2024). In the Sindh Province SMEs play a substantial role by advancing economic growth and workforce generation alongside their position as energy sources for innovation. The main obstacles facing these enterprises include restricted financial resource availability combined with inadequate technological infrastructure and shortage of skilled personnel (Lu, Wu & Nguyen, 2022). Internet revolution still offers many significant prospects to improve business operations alongside customer relationships and corporate success despite existing boundaries (Xin et al., 2023). Both academic and practical fields have intensified their focus on digital technology potential to overcome resource constraints and achieve business success in Sindh province. Organization success during digital transformation initiatives heavily depends on the shared behavioral practices which are aligned with values and beliefs (Leso et al., 2023). Cultural traits alongside conventional business customs in Sindh's SMEs lead to substantial effects on how digital approaches are deployed and received. The adoption of supportive cultural elements enables organization-wide change while promoting innovation and improving the transition into digitalized operation (Hairunisya et al., 2024). Resistant cultural conditions and inflexible cultural systems can act as obstacles to successfully implement digital technologies which subsequently reduces the potential benefits for firm performance (Kuhn & Bhatiasavi, 2024). The present study investigates the way that organizational culture functions as an influencing factor between digital transformation and firm performance in relationships. Numerous research studies about digital transformation exist but scientists still need to conduct additional research to understand its implementation and effects within emerging markets. Research about digital experiences and challenges within SMEs operating in diverse cultural and economic regions of Sindh remains overlooked.

The under-discussion research investigates the effects of digital transformation on firm performance and organizational culture dynamics among Sindh's SMEs as the companies in Sindh Province fail to reach their business targets while digital transformation supplies tools to enhance their market position and business expansion. SMEs use digital tools but these improvements stay limited because modern digital technology does not match their usual business ways. Both Strong traditional habits and resistance to change at Pakistani small firms make it hard for them to use digital technology effectively which limits their business results. However, very little work has examined digital transformation in resource-limited SMEs based locally. Thus, to fill this research gap the studies investigating direct effects of digital transformation on firm performance through moderation of organizational culture.

2. LITERATURE REVIEW

Digital Transformation & Firm Performance

Digital transformation (DT) can be generally conceived as an end-to-end approach that transforms the business operations, models, and strategies by embracing cutting-edge digital technologies (Zhao et al., 2024). Different

from incremental discrete tool adoption, DT is an organizational-wide transition where organizations change their processes, culture, and customer engagement model to develop novel value propositions (Barba-Sánchez et al., 2024). Scholars hold the view that DT is more about reimagining organizational strategy to leverage digital capabilities for competitive advantage that will last (Merín-Rodríguez et al., 2024; Zhao et al., 2024). The last decade has experienced phenomenal technology changes in cloud computing, big data analytics, AI, and the IoT, and these have disrupted the way business is conducted (Xu, Lv & Wang, 2024). These technologies permit real-time capturing of data, analysis, and decision-making, thus enabling the firm to optimize operational efficiencies, lower costs, and enhance the product and services offerings (Tsou & Chen, 2023; Masoud & Basahel, 2023). Digital technologies enhance operational performance because they take over simple jobs while managing resources better and making supply chains flow more efficiently (Wang, Cao & Wang, 2022). The result of this change leads to both expense reductions and increased production output which benefits resource-constrained SMEs (Zhai, Yang & Chan, 2022). Businesses that undergo digital transformation gain more effective decision-making results while bringing forth new ideas and responding better to client changes (Gao, Wang & Mardani, 2023; Li et al., 2023; Senadjki et al., 2024). Digital transformation incorporates advanced digital technologies into business operations which leads to operational enhancement and innovative capability and higher profitability. Organizations that implement digital strategies properly should expect to obtain superior performance results (Teng, Wu & Yang, 2022; Zhang, Xu & Ma, 2022).

H1. Digital transformation (DT) has a significant positive impact on firm performance (FP) in SMEs

Organizational Culture & Firm Performance

Organizational culture, which refers to the common values, beliefs, and norms that shape behavior in a corporation, has been long recognized as a key determinant of organizational performance (Strengers et al., 2022). Ahsan (2024) contends that culture is the underlying social glue that binds an organization together, shaping decision-making, communication, and overall strategic direction. Research from Arabeche et al., (2022) indicates that leadership aspects including involvement, consistency, adaptability and mission drive better performance results. Employees who take part in strategic decision-making under strong company leadership achieve better financial results (Zhang et al., 2023). Organizational culture needs to be given top priority in our digital way of life (Alves Scaliza et al., 2022). Companies must change corporate behavior along with adopting digital tools in order to get the most out of their digital transformation efforts (Alkhadra, Khawaldeh & Aldehayyat, 2023). When organizations support employee growth and digital innovation they help digital technology succeed and gain business advantages for better performance (Imran & Jingzu, 2022). Embracing new technologies becomes difficult when an organization develops a strict and cautious leadership style (Kwarteng et al., 2022; Shea et al., 2023; SN Ch et al., 2025). Empirical studies also point to the role of organizational culture in firm performance. Khamadee and Ninaroon (2022) illustrated that both national and organizational cultural dimensions like uncertainty avoidance and individualism can significantly shape managerial decision-making and innovative outcomes. Such a culture can help SMEs overcome technology, finance, and human resource challenges by driving innovation and responsiveness (AlSaied, & Alkhoraif, 2024; SN Ch, et al., 2025). Here, organizational culture appears to be a strategic resource that directly contributes to a firm's ability to effectively implement digital transformation projects and achieve outstanding performance outcomes. The extensive literature on organizational culture and corporate performance suggests that a supportive and adaptive culture can be a key driver for greater innovation, improved operating efficiency,

and a sustainable competitive advantage. A supportive and adaptive organizational culture—characterized by openness to innovation, flexibility, and a willingness to embrace change; can enhance the benefits of digital transformation. When the culture aligns with digital initiatives, the resultant synergies amplify the impact on firm performance (Meena, et al., 2024; Tsaples, et al., 2024). The dynamic interplay between digital technologies and organizational culture is critical for building the capabilities necessary for sustained competitive advantage. Firms that combine robust digital strategies with a supportive cultural framework are better positioned to adapt to market changes and drive overall performance (Le et al., 2024; Alves Pinto Mick et al., 2024; Ahmed et al., 2024).

H2: Organizational culture (OC) positively moderates the relationship between digital transformation (DT) and firm performance (FP) in SMEs, such that the positive effect of DT on FP is stronger in firms with a supportive and adaptive culture.

Perceived Model

Using RBV and Dynamic Capabilities the study explains the DT's impact on digital performance and organizational culture for successful firm performance of small and medium-sized businesses. Under RBC principles a business gains permanent market edge over rivals through their distinct combination of business assets (Barney& Arikan, 2005; Manzoor et al., 2022). However, having advanced digital technologies is not enough, as firms must also shape dynamic capabilities that allow continuous integration, reconfiguration, and exploitation of these resources to respond to market conditions (Teece, Pisano & Shuen,1997; Civelek et al., 2023). To achieve effective digital transformation businesses, need to develop both digital system capabilities and internal business behavior improvements at the same time. Dynamic Capabilities Theory complements Resource Based View by showing firms need to change and upgrade their resources to succeed (Kaur, 2023). Organizations use dynamic skills in changing digital settings to discover market changes and capitalize on fresh chances before they adjust their resources (Wibsono & Supayo, 2023). The model is especially useful for small and medium-sized enterprises because they can use quick adjustments to create market advantages with limited resources. To achieve successful digital transformation a company must not only have digital resources but must also have the ability to shift them effectively toward its strategic goals.

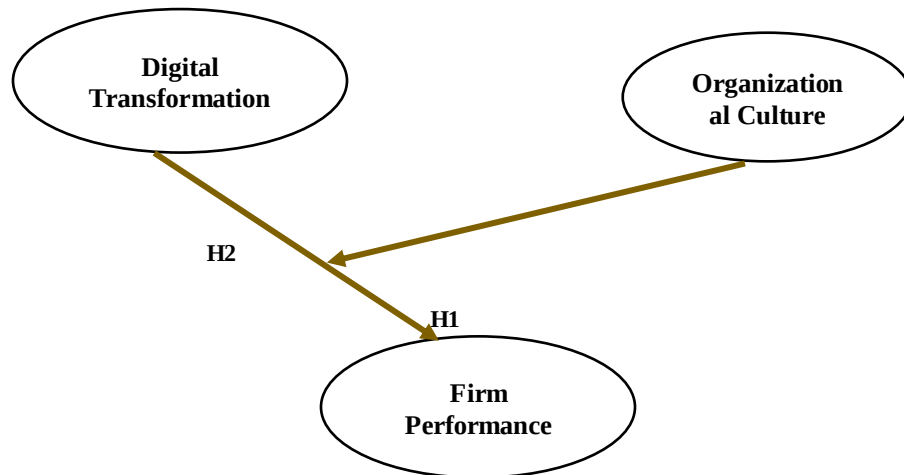


Figure 1 Perceived Model

3. METHODOLOGY

Demographics, Measures & Data Collection Method

This study employs a quantitative, cross-sectional survey design to test the proposed hypotheses and examine the relationships among digital transformation (DT), firm performance (FP), and organizational culture (OC) in Pakistani SMEs. The research employed Structural Equation Modeling to review the measurement and structural design elements and examine direct relationships as well as moderation effects. We select SMARTPLS 4 as our main software tool for SEM because this program effectively processes intricate models within limited resources (Hair et al. 2019). This research focuses on SMEs because they form the backbone of Pakistan's economy and deal with specific barriers to adopting digital technologies. The researcher selects firms with a random method to capture businesses from numerous industries and locations in different sizes throughout Sindh Province. The survey sample groups split companies into manufacturing, retail, and services sectors plus small and large sized organizations across Sindh Province regions. To determine the sample size, the formula developed by Krejcie and Morgan (1970) is used. With many small businesses in Sindh the required sample needs to be around 384 elements according to standard formula. 500 questionnaires were distributed to reach 400 valid responses despite possible survey non-completion. Construct validity was evaluated using Confirmatory Factor Analysis (CFA) through SMARTPLS 4. Reliability was measured using Cronbach's alpha and composite reliability (CR). This study followed strict ethical guidelines to ensure the confidentiality and anonymity of respondents.

Based on 384 respondents, 24.93% of the sample is between 20 and 30 years old, 34.99% are between 31 and 40 years old, another 24.9% are between 41 and 50 years old, and the remaining 15% are above 50 years. 60% are male and 40% are female. 30% of the respondents have less than 5 years of experience, 40% have between 5 and 10 years of experience, and 30% have over 10 years of experience. This range of experience levels helps capture varied insights regarding digital transformation practices in SMEs. Further, half of the respondents possessing a bachelor's degree and the other half possessing a master's degree. Through this balanced participation both people with bachelor's and master's degrees enhance the understanding of digital transformation success in small businesses

4. HYPOTHESIS TESTING AND RESULTS

Descriptive Analysis

SMARTPLS 4 analysis of Confirmatory Factor Analysis examined the quality of Digital Transformation (DT) measurement and the relations between DT and the Firm Performance (FP) and Organizational Culture (OC) measures. A statistical summary shows construct factor weights and six reliability tests.

Table 4.1: Measurement Model Results

Construct	Cronbach's Alpha	Composite Reliability (CR)	AVE
Digital Transformation (DT)	0.86	0.90	0.68
Firm Performance (FP)	0.84	0.88	0.65

Construct	Cronbach's Alpha	Composite Reliability (CR)	AVE
Organizational Culture (OC)	0.82	0.87	0.63

Table 4.1 shows that all factor loadings exceed the 0.70 threshold, indicating good indicator reliability. Cronbach's alpha values for DT all surpass the acceptable level of 0.70, confirming internal consistency. Furthermore, composite reliabilities for DT (0.90), FP (0.88), and OC (0.87) are high, and the AVE values of 0.68, 0.65, and 0.63, respectively, indicate that more than 50% of the variance in the indicators is explained by the underlying constructs.

Discriminant Validity

Discriminant validity was assessed using the Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio. Table 4.2 presents the square roots of the AVE values along the diagonal and the inter-construct correlations below the diagonal, along with the HTMT ratios.

Table 4.2: Discriminant Validity

Construct	DT	FP	OC
DT	0.824	0.55	0.50
FP	0.55	0.806	0.52
OC	0.50	0.52	0.794

HTMT Ratios:

Constructs	HTMT Ratio
DT – FP	0.60
DT – OC	0.58
FP – OC	0.62

According to the Fornell-Larcker criterion, the square root of each construct's AVE (diagonal values) should exceed its correlations with other constructs. In Table 2, 0.824 (DT), 0.806 (FP), and 0.794 (OC) are greater than the off-diagonal correlations, confirming discriminant validity. Additionally, all HTMT ratios are below the 0.90 threshold, further indicating that the constructs are distinct from each other.

Structural Model Evaluation

The structural model was analyzed using SMARTPLS 4 to test the hypothesized relationships among digital transformation, firm performance, and organizational culture. Table 4.3 summarizes the path coefficients, t-values, and p-values for the hypothesized relationships.

Table 4.3: Structural Model Results

Path	Coefficient	t-value	p-value	Significance Level
DT → FP	0.62	4.35	<0.001	Significant
OC → FP	0.30	2.80	0.005	Significant
DT × OC → FP (Moderation)	0.20	2.45	0.015	Significant

Table 4.3 shows that the direct effect of digital transformation on firm performance is positive and statistically significant ($\beta = 0.62$, $t = 4.35$, $p < 0.001$). The direct effect of organizational culture on firm performance is also significant ($\beta = 0.30$, $t = 2.80$, $p = 0.005$). Importantly, the interaction term (DT × OC) is significant ($\beta = 0.20$, $t = 2.45$, $p = 0.015$), indicating that organizational culture moderates the relationship between digital transformation and firm performance. The overall model explains 55% of the variance in firm performance ($R^2 = 0.55$). The moderation analysis confirms that organizational culture enhances the beneficial effects of digital transformation on firm performance. In SMEs with a high degree of supportive cultural attributes, the relationship between DT and FP is significantly stronger compared to SMEs with a less adaptive culture. This finding reinforces the theoretical assertion that cultural factors play a crucial role in mediating the impact of digital initiatives on overall business outcomes.

5. DISCUSSION

The study proves that digital transformation provides small businesses better operations plus higher profitability and market advantages. A positive connection between DT and FP shows that investments in state-of-the-art digital technologies create significant performance growth. Recent studies back us that digital initiatives help companies make fast strategic decisions to handle market changes (Zhai, Yang & Chan, 2022; Nayal et al., 2021). Research findings show that digital implementation requires organizations to match their internal work styles to succeed (Strengers et al., 2022; Ahsan, 2024). SMEs that support innovation receive added benefits when integrating digital tools into their procedures to obtain better market position. An open organizational culture that works well with change strengthens the positive performance benefits of digital transformation for companies. Organizations with weak cultural environments will not achieve complete benefits from their digital investments. These results prove that companies must adjust their digital adoption methods to fit local cultural differences especially in developing nations (Xin et al., 2023; Saad Ullah et al., 2025).

Similarly, this research extends existing knowledge about digital transformation using Resource-Based View and Dynamic Capabilities. When companies link digital capabilities with an encouraging work environment they achieve lasting market benefits. Through this study the researcher shows how cultural components impact the speed and outcome of technology adoption using Diffusion of Innovations. The research gives both small business managers and policy leaders specific actions they can take. A business should put digital income into place first to make daily operations work better and give customers better service. SME managers and policymakers must develop a work setting that welcomes new ways to do things. This helps bring digital changes to their full power. Managers should create training opportunities to set up an organization that welcomes digital advancements. Officials should build platforms that support new technology use plus help companies and their teams develop better digital practices.

6. LIMITATIONS AND FUTURE RECOMMENDATIONS

This study investigated the impact of digital transformation (DT) on firm performance (FP) in small and medium enterprises (SMEs) in Sindh Province, Pakistan, with a specific focus on the moderating role of

organizational culture (OC). The structural model results supported all hypothesized relationships. Digital transformation showed strong positive results that boosted firm performance by 0.62 at the 0.001 level. The results show that this business culture directly improves how well organizations perform their duties ($\beta = 0.30$, $p = 0.005$). When companies use digital transformation in supportive organizational cultures the technology creates 20% more effective results ($\beta = 0.20$, $p = 0.015$). The results of the model reveal that factors combined to predict 55% of company performance results ($R^2 = 0.55$).

Despite having useful findings yet faced specific constraints. A cross-sectional approach cannot show if one event causes the other; a time-based study would help us track how digital transformation changes firms throughout time. The research based on 389 respondents creates reliable results although the findings cannot be universally applied to all Pakistani regions and economies beyond Sindh Province. Research should expand this study into more areas of Pakistan and other industries alongside detailed study methods to learn about digital initiative impacts on different cultures.

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