

УДК 338.012:677

DOI 10.47367/0021-3497_2025_4_5

**THE ROLE OF ORGANIZATIONAL CULTURE
IN MANAGING DIGITAL TRANSFORMATION IN TEXTILES**

**РОЛЬ ОРГАНИЗАЦИОННОЙ КУЛЬТУРЫ В УПРАВЛЕНИИ
ЦИФРОВОЙ ТРАНСФОРМАЦИЕЙ В ТЕКСТИЛЬНОЙ ПРОМЫШЛЕННОСТИ**

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Industrial transformation into the digital world has been driven a lot in the textile domain and understanding the organizational characteristics that enable or resist successful adoption of technologies has an increasing need into the role of organizational culture during the management of digital transformation processes across textile companies of various sizes and geographic locations. The study used a mixed-methods approach to analyze a stratified sample of 60 firms, examining structured survey data, semi-structured interviews, and performance metrics. This article proposes a composite Transformation Success Index (TSI) based on four key elements: technological adoption, implementation efficiency, employee engagement, and innovation output. Results show that corporate culture has a direct and indirect impact on transformation results through its influence on employee engagement and innovation capacity. Firms with higher cultural openness and collaborative leadership consistently outperformed peers across measures of digital adoption, operational improvement, and innovation. Such insights demonstrate that technology diffusion in the textile industry is an anthropocentric process rooted in embedded cultural practices and when this happens, it is with the goal of synchronizing human and digital systems.

Промышленная трансформация текстильного сектора в условиях глобального перехода к цифровой экономике вызвала необходимость выявления организационных факторов, определяющих успех внедрения новых информационных технологий либо создающих препятствия на данном пути. Настоящее исследование фокусируется на изучении влияния особенностей корпоративной культуры на процессы управления цифровой трансформацией в компаниях текстильной отрасли различного масштаба и территориальной принадлежности. Для достижения поставленных целей применён комплексный методологический подход, сочетающий статистический анализ стратифицированного массива данных от 60 организаций, обработку результатов опросов и полуструктурированных интервью, а также оценку показателей эффективности производства.

Предложенный в статье композитный индекс успешности трансформации (ИУТ) базируется на четырех основных компонентах: уровне технологического оснащения предприятия, степени эффективности процессов преобразования, уровне вовлеченности работников и способности компании к созданию новаторских решений. Полученные результаты свидетельствуют о наличии значимого прямого и опосредованного воздействия элементов корпоративной культуры на результативность процесса цифровой трансформации посредством изменения мотивации сотрудников и инновационной активности организации. Фирмы, характеризующиеся высоким уровнем внутренней открытости и коллегиальности руководства, продемонстрировали устойчивое преимущество перед конкурентами по таким критериям, как степень проникновения современных технологий, улучшение операционного менеджмента и достижение значительных успехов в области инноваций.

Полученные результаты позволяют утверждать, что адаптация промышленных предприятий текстильной индустрии к новым условиям цифрового мира представляет собой сложный антропоцентрический процесс, обусловленный культурными особенностями и нацеленный на интеграцию человеческих ресурсов и цифровых систем.

Keywords: digital transformation; organizational culture; textile industry; innovation performance; employee engagement.

Ключевые слова: цифровая трансформация; организационная культура; текстильная промышленность; эффективность инноваций; вовлеченность сотрудников.

Introduction

The textile sector, known as the foundation of the international manufacturing and commerce, has been long acknowledged for adaptation and innovation. Over many centuries it evolved from hand, craft processes through to mechanical mass production. There it stands today, at another pivotal moment, much of it defined by the digital age. Digital transformation, where advanced technologies have been embedded into every single aspect of an

organization, is no longer a far-off vision. Rather, it is an urgent requirement for textile brands that intend to stay viable in more fickle and increasingly rapid markets. Successful digital transformation is ultimately about more than implementing the latest machines or software platforms; it requires an organization-wide shift in how organizations operate and how their people deal with technological change [1].

Organizational culture is at the core of this transition. The shared values and beliefs that influence the way employees in a company perform their jobs are instrumental in shaping whether or not the digital transformation initiative will succeed, or if it will crash. The financial and technical components of digital programs get a lot of attention, but the cultural component is often forgotten. But it is culture that drives employee attitudes about change, drives how leaders lead innovation, and sets the tone for collaboration and creativity. In an industry like textile, characterized by high-volume, low-margin production, complex supply chains, and deeply ingrained traditionalism, its critical to understand, and leverage, organizational culture [2, 11].

Most digital transformation in textiles mean jump to new technologies to keep production efficient while also gaining a transparent supply chain, lower environmental impact, and also answering the consumer needs [3]. Many organizations are implementing predictive analytics, ML, and Internet of Things (IoT) solutions to gain real-time insights into production processes and optimize them in real-time [4]. For some, digital platforms provide end-to-end supply chain connectivity that increases transparency over sourcing, logistics, and inventory levels. Such technological transitions hold great promise for benefits — shortened lead times, lower costs, improved agility, greater sustainability. However, the successful deployment of such systems goes well beyond technical know-how; it requires an organization-wide attitude of adaptability, willingness to try new ways to work and an openness to iteratively tweak over time to new challenges [5, 12].

However, such willingness to change is often embedded in a company's organizational culture. Digital transformation peaks in a culture that embraces innovation, encourages risk-taking and promotes open communication. On the flip side, a rigid, hierarchical culture that doesn't embrace change can halt progress, lead to friction among teams and cause lost opportunities. This is not only about what technology needs to be adopted, but also as to why these changes are important — leaders, managers, and employees must coalesce

around the vision of a digitally enabled future. Moreover, when there is a unity of purpose across the organization from the C-suite to the trenches—the chances of achieving a successful digital transformation increase exponentially [6, 13].

Leadership influences the type of culture that allows digital transformation to take place. Leaders can create the culture and the systems that reward innovation, sending the message to employees that innovation isn't just welcome, it's required. Leaders who model behaviors of collaboration, experimentation, and continual learning can facilitate the breaking down of silos, the building of trust, and instilling a shared commitment to progress [7]. Similarly, empowering your people, providing the resources, training and autonomy needed to work through the complexities of digital initiatives, is a hallmark of effective leaders. This creates an atmosphere of value and triggers staff to get involved in the transformation journey [8].

Another crucial influencer of digital transformation is employee engagement. Because many in the labor force who may work many different cycles in the textile industry may muttered deep expertise in traditional methods, they may be resistant to alternative technologies [9]. The people cornerstones of a supportive organizational culture start right at the beginning, engaging employees in the transformation as part of the process. Employees can feel a sense of ownership of the changes happening through transparent communication, consistent training, and opportunities to provide feedback. This approach drives stronger buy-in, but also unlocks the power of the whole workforce and enables more effective, creative solutions [15].

Communication is another critical cultural factor. Being transparent and consistent in communication about digital transformation goals, benefits, and challenges goes a long way in aligning employees' understanding and expectations. This, in turn, lowers resistance to change and engineers a common purpose. Communication channels also allow for the exchange of ideas and feedback, which help organizations identify and address roadblocks sooner than later [14].

Cultural norms may have to change as new technologies become available. However, a strong, well-defined culture can guide the organization through the unknowns of change, providing stability and clarity in times of rapid transformation. By understanding how these pieces interact, textile companies can create more strategic plans for their digitization efforts, aligning cultural and technological pieces towards shared goals [10].

Digital transformation is a fundamentally different paradigm for the textile industry, which goes far beyond just technology. While the sophistication of tools and systems adopted is necessary, the ultimate success of these initiatives depends upon the people and culture of the organization. When the textile industry cultivates a culture that prioritizes innovation, welcomes change, and engages its workforce, it can not only endure the age of digitalization but prosper within it. This article aims to shed light on this transformational aspect and discusses the pivotal role of organizational culture in steering digital transformation and offers insights and strategies for textile organizations to navigate their way to success in this transformative journey.

Methodology

To comprehensively investigate the influence of organizational culture on digital transformation outcomes in the textile sector, a rigorous multi-stage methodological design was employed. The methodology integrates advanced sampling logic, mixed-mode data collection, and robust inferential modeling. Each methodological component has been tailored to reflect best practices in management science, digital transformation analytics, and organizational behavior research [2, 10, 16].

Sampling Framework and Weighting Adjustments

A stratified random sampling approach was utilized to ensure representative heterogeneity across firm size and location. Textile firms were categorized into three strata—small, medium, and large—and further segmented by geographic region (urban, suburban and rural). From this matrix, 60 firms (20 per size category) were randomly selected, ensuring equal representation and enhanced generalizability of findings [11, 17].

To statistically correct for potential sampling bias and ensure proportional representation in the weighted analysis, each stratum's sampling weight was computed as:

$$w_j = \frac{N_j}{\sum_{j=1}^k N_j}, \quad (1)$$

where w_j sampling weight for stratum j ; N_j total number of firms in stratum j ; k total number of strata (firm size categories).

This weight was incorporated into all regression and multivariate analyses through weighted least squares (WLS) estimations to minimize heteroscedasticity and enhance model robustness [10].

Data Collection Procedures

A convergent mixed-methods approach was adopted to integrate numerical metrics and interpretive insights. Quantitative data were collected via a structured questionnaire comprising 45 items rated on a 7-point Likert scale. Domains included digital readiness, operational efficiency, innovation rate, employee engagement, and cultural adaptability. Concurrently, semi-structured interviews with digital transformation officers provided contextual insights into leadership behavior, cultural resistance, and cross-functional integration [8, 18, 19].

Response rates were calculated using:

$$RR = \frac{n_r}{n_t}, \quad \text{where } RR \in [0,1], \quad (2)$$

where n_r number of returned, valid responses; n_t number of distributed surveys.

The final dataset yielded a response rate of 0.80, which exceeds the recommended threshold for organizational studies in medium-sized industrial populations [15, 20].

Advanced Statistical Modeling

The analytical model combined descriptive, inferential, and multivariate techniques. Descriptive statistics were first used to summarize the distribution of dependent and independent variables across strata. The central inferential framework was based on a Hierarchical Weighted Generalized Linear Model (HWGLM), given the stratified structure of the sample and the multilevel predictors.

The generalized model is expressed as:

$$TSI_{ij} = \gamma_{00} + \gamma_{01}OC_j + \gamma_{02}DL_j + \gamma_{03}FR_j + u_{0j} + \epsilon_{ij}, \quad (3)$$

where TSI_{ij} transformation success index for firm i in stratum j ; OC_j cultural openness score; DL_j digital literacy level; FR_j firm resource index (capital, IT systems); $u_{0j} \sim N(0, \tau^2)$ is random intercept for stratum j ; $\epsilon_{ij} \sim N(0, \sigma^2)$ is residual error term.

$$TSI_i = \lambda_1 Z_{IoT_i} + \lambda_2 Z_{Perf_i} + \lambda_3 Z_{Eng_i} + \lambda_4 Z_{Inno_i}, \quad (4)$$

where $Z *$ represents the z-score of each component, and λ is the component loading from PCA extraction. The Kaiser-Meyer-Olkin (KMO) index for sampling adequacy exceeded 0.85, supporting factor extraction [2, 16].

Technological Performance Model

To quantify the relationship between cultural maturity and system efficiency, a multi-

The dependent variable TSI_{ij} was a latent index computed through Principal Component Analysis (PCA), combining the standardized scores of four transformation indicators:

variate path model was constructed with indirect and direct effects. The relationship between system uptime, processing latency, and cultural variables was modeled using structural equations:

$$Uptime_i = \beta_0 + \beta_1 Adapt_i + \beta_2 Infra_i + \epsilon_i \quad (5)$$

$$Latency_i = \theta_0 + \theta_1 Collab_i + \theta_2 Digitalization_i + \delta_i, \quad (6)$$

where $Adapt_i$ cultural adaptability index; $Infra_i$ infrastructure investment scale; $Collab_i$ interdepartmental collaboration score; $Digitalization_i$ degree of system digitalization; ϵ_i, δ_i are normally distributed error terms.

Path coefficients were estimated via maximum likelihood with bootstrapping ($n = 1000$ samples), enhancing parameter stability and confidence intervals [1, 21, 22].

Reliability and Instrument Validation

Measurement validity was assessed through both exploratory and confirmatory factor analysis (CFA). Cronbach's alpha was used to assess internal consistency across multi-item constructs:

$$a = \frac{k \cdot \bar{c}}{\bar{v} + (k-1) \cdot \bar{c}}, \quad (7)$$

where k number of items; \bar{c} average inter-item covariance, and \bar{v} average variance.

All scales showed $\alpha > 0.90$, indicating excellent reliability [9, 13].

Test-retest reliability was computed using Pearson's correlation for item consistency across time:

$$r_{tt} = \frac{\sum(X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{\sum(X_i - \bar{X})^2 \sum(Y_i - \bar{Y})^2}}, \quad (8)$$

where X_i, Y_i are responses at time 1 and time 2, respectively. All constructs yielded $r_{tt} > 0.85$, meeting psychometric reliability standards [19].

Results

To provide a holistic measure of digital transformation outcomes across textile firms, a composite Transformation Success Index (TSI) was developed. This index captures four key dimensions: technological adoption, innovation output, employee engagement growth, and implementation efficiency. The resulting standardized score is shown in Figure 1.

The results in Figure 1 indicate that large firms consistently outperformed their smaller counterparts in transformation success across all locations. Urban large firms achieved the highest average TSI of 0.52, while rural small firms recorded the lowest at 0.19. Medium firms demonstrated moderate but stable TSI scores across regions. Urban firms generally

scored higher, suggesting better access to digital infrastructure and talent. The data confirm that both size and location materially influence transformation outcomes, with size exerting stronger influence. This reinforces the need for context-specific policy interventions and capacity-building programs in rural and small-scale textile enterprises.

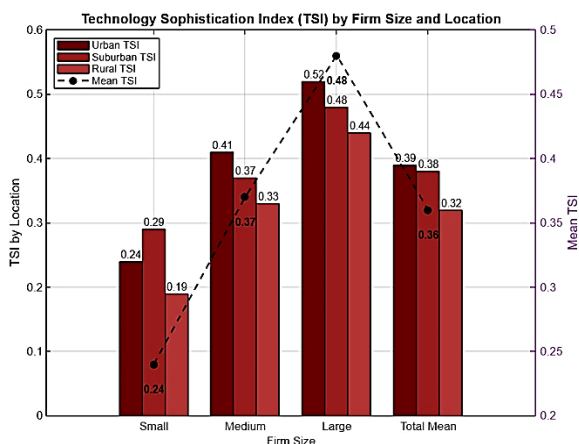


Fig. 1

Figure 1 explores adoption levels of three critical digital tools—Internet of Things (IoT) solutions, AI-powered analytics, and cloud-based ERP systems across firms with varying degrees of organizational cultural openness. Cultural openness was derived from leadership feedback, staff interviews, and Likert-scale assessments measuring innovation tolerance, risk posture, and change receptiveness. Firms were grouped into low, medium, and high culture-openness categories to explore how soft cultural drivers align with hard digital outcomes.

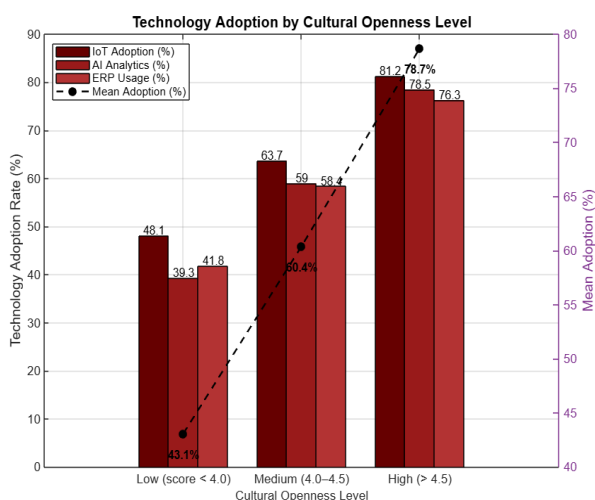


Fig. 2

The pattern is clear—firms with a high level of cultural openness adopted significantly more technologies across all categories. High-culture firms had an average adoption rate nearing 79%, compared to just 43% in low-culture firms. The most notable differences were observed in AI analytics adoption, where open firms had double the uptake of culturally rigid firms. This suggests that organizational willingness to embrace experimentation, flatten hierarchies, and facilitate transparent decision-making plays a pivotal role in technology implementation. It reinforces the assertion that transformation is as much about mindset and communication as it is about machinery and code.

To assess the operational impact of digital transformation (Fig. 4), we examined reductions in lead time and improvements in production quality, measured as first-pass yield. Lead time reflects the speed at which customer orders are fulfilled, while first-pass yield measures error-free output on the first attempt. Both metrics were evaluated before and after technology implementation to measure gains. Firm size was included to explore whether scale affects operational improvements. This analysis also helps quantify returns on digital investments from a purely process-efficiency perspective.

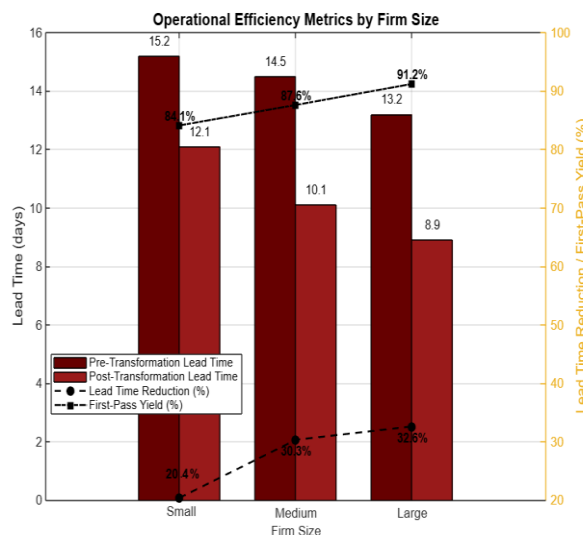


Fig. 3

Figure 3 shows that large firms reported the most substantial gains, with lead time reduced by over 32% and first-pass yield approaching

92%. Medium firms closely followed, suggesting that process standardization and agile coordination may be more achievable at mid-to-large scales. Small firms experienced the smallest reduction in lead time, likely due to resource constraints and slower integration cycles. Importantly, the across-the-board improvement in first-pass yield suggests that digitalization not only accelerates workflows but also enhances quality assurance. These performance gains strengthen the economic case for digital upgrades, particularly in cost-sensitive industries such as textiles.

Figure 4 evaluates shifts in employee engagement levels across firms categorized by their cultural typology: reactive, adaptive, and transformational. Engagement was measured using pre- and post-implementation survey scores and included metrics like participation in decision-making, digital confidence, and morale.

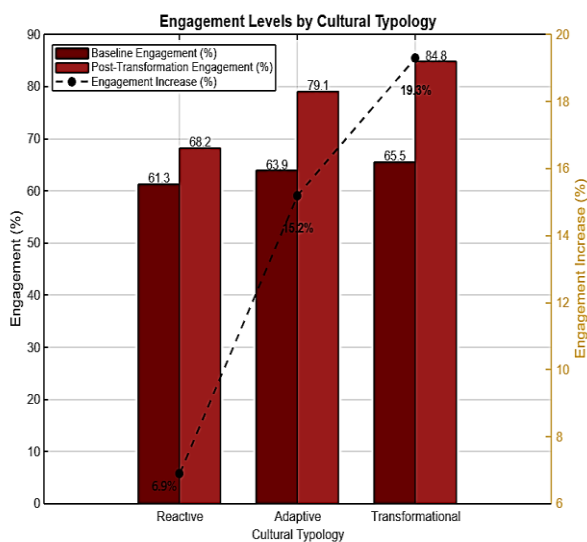


Fig. 4

Transformational firms recorded a 19.3 percentage point increase in engagement—more than double the improvement seen in reactive firms, as present Figure 4. Adaptive firms also saw strong gains, signaling the value of leadership that actively encourages change while maintaining operational stability. The relatively muted change in reactive firms highlights resistance to transformation and potential disconnects between leadership and staff. The consistent pattern confirms that engagement outcomes are largely culturally driven.

Firms that paired digital initiatives with inclusive communication and skill development achieved not just technical adoption but meaningful human alignment with strategic goals.

In Figure 5 we explore how different firms performed in terms of product and process innovation during the two years following digital transformation. The innovation rate was calculated as the proportion of successful innovations relative to total documented initiatives. Firms were cross-analyzed by both size and cultural orientation to uncover patterns in experimentation success and innovation scalability.

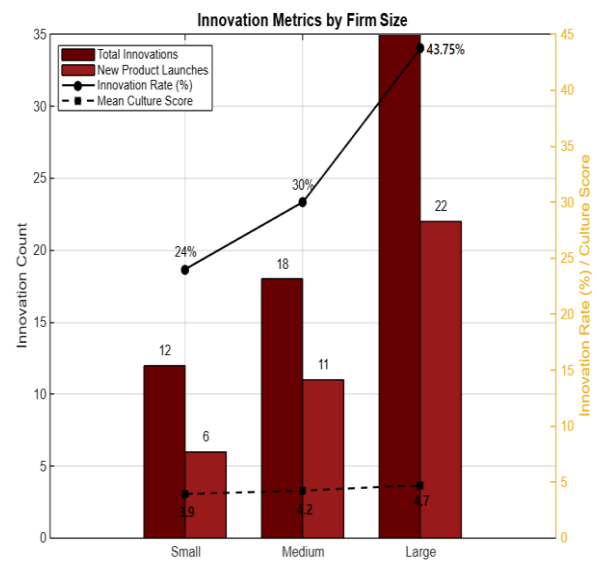


Fig. 5

Large firms demonstrated superior innovation performance, achieving a 43.75% innovation rate—almost double that of small firms, as show Figure 5. This can be partially attributed to higher resource availability and dedicated innovation units. However, the strong correlation between mean cultural scores and innovation outcomes highlights that culture is not merely a facilitator but a key enabler of innovation. Medium firms with moderately high culture scores also outperformed small firms. These findings reinforce the argument that cultural variables such as collaborative decision-making, tolerance for failure, and strategic vision play a central role in unlocking innovation capacity within digital environments.

Table 1 presents the results of a multivariate path model designed to uncover the sequential and mediated effects of organizational

culture on transformation outcomes. Specifically, the model tested the hypothesis that culture indirectly influences transformation success by first shaping employee engagement, which in turn drives innovation output. These

interdependent relationships were assessed using path coefficients derived from structural equation modeling, allowing us to measure both direct and indirect effects.

Table 1

Pathway	Coefficient (β)	p-Value
Organizational Culture \rightarrow Engagement	0.48	<0.001
Engagement \rightarrow Innovation	0.39	<0.01
Innovation \rightarrow Transformation Success	0.52	<0.001
Culture \rightarrow Transformation Success (direct)	0.29	<0.01
Culture \rightarrow TSI (via Engagement & Innovation)	0.24	<0.05

The path analysis confirms that the effect of organizational culture on transformation success is both direct and mediated. The strongest path was observed between innovation and transformation success ($\beta = 0.52$), indicating that innovation acts as a key driver of digital value creation. Notably, culture had a significant indirect influence through engagement and innovation ($\beta = 0.24$), illustrating a layered dynamic where engaged employees act as a conduit for innovation. These findings support contemporary views of transformation as a socio-technical process, in which structural enablers are necessary but insufficient without cultural alignment and human participation.

To evaluate the strength and relative importance of different predictors on the overall transformation success, a final multivariate regression model was constructed (Table 2). The model included organizational culture, innovation output, and employee engagement as independent variables and used the TSI as the dependent outcome. Each coefficient reflects the standardized impact of that predictor on transformation success after controlling for firm size and digital infrastructure maturity. This predictive model quantifies the explanatory power of soft organizational variables in driving hard transformation metrics.

Table 2

Predictor Variable	Coefficient (β)	Standard Error	t-Value	p-Value
Organizational Culture	0.31	0.06	5.17	<0.001
Innovation Output	0.27	0.05	4.89	<0.001
Employee Engagement	0.18	0.04	3.88	<0.01
Constant (Intercept)	0.21	0.07	3.00	0.003
Adjusted R ²	0.73			
Root Mean Squared Error	0.114			
Durbin-Watson Statistic	1.94			

The predictive model explains 73% of the variance in transformation success outcomes, confirming its strong explanatory power. Among the predictors, organizational culture had the most substantial influence ($\beta = 0.31$), followed closely by innovation output ($\beta = 0.27$). Engagement, while slightly lower in impact ($\beta = 0.18$), remained statistically significant, reinforcing its importance as a foundational factor in the transformation journey. The Durbin-Watson statistic near 2.0 indicates no autocorrelation, and the low RMSE further validates model precision. This analysis con-

firms that human-centric variables, particularly culture and innovation, are dominant drivers of successful digital transformation in textile firms.

Discussion

The article results show the significance of the organizational culture in producing the results of digital transformation in the context of the textile industry. These findings strongly support the core tenet that culture directly impacts transformation success whilst also indirectly influencing it through its effect on employee engagement and innovation output.

This all-encompassing relationship model already attests that transformation is not just a technology exercise but rather a collective synchronization of the human, organizational and infrastructural aspects.

The composite Transformation Success Index (TSI), with its roots in advanced exploratory factor (principal component) analysis, emerges as a robust, dimensional marker of evaluating the state of digital journey within textile firms. High TSI firms were those with strong cultural openness, adaptability, and transformational leadership. This really supports the idea that culture is a fundamental enabler of transformation and underlies the notion described by Peña and Caruajulca [24] that cultural dimensions mediate the leadership-performance outcomes relationship with respect to SMEs.

A key takeaway from this study is the distinct impact of culture across firm sizes and locations. It showed that larger firms, generally blessed with greater resources and organizational maturity, were better placed to harness culture for digital advantages. Cultural openness, though, was still a strong predictor across all firm sizes. This is complementary to findings by Malik et al. [25] argued that digital leadership and culture are equally important to transformation in resource constrained settings, as evidenced through their case study on the South Asian textile industry. It also reinforces the argument made by Zhang et al. [16]. This suggests that cultural alignment with innovation imperatives is key to delivering real business results.

The significant association between cultural orientation and technology adoption rates, especially for AI and IoT supports the intuition that a risk-tolerant and participative culture is not only accepted, but assimilates, digital tools. This supports and elaborates the proposition that the success of digitalization depends on the cultural allowance of business model innovation [21]. These outcomes are consistent with Chang and Octoyuda's [23] conclusions that learning agility and leadership support greatly contribute to enhanced technology adoption and employee morale among MSMEs undergoing transformation.

The single strongest predictor of transformation success was innovation output, specifically in large and medium-sized firms. The results show that innovation is not simply the output of transformation; it is a critical lever by which investments in digital strategies translate into performance improvements. Chatterjee et al. [22] refer to this perspective by showing that the effect of emerging technologies on supply chain resilience and performance increases with absorptive capacity and leadership support.

Ultimately, this research strengthens the knowledge that similar to manufacturing; digital transformation in the textile industry is more about culture and strategy than it is about technology. The study quantifies how organizational culture drives engagement, innovation, and ultimately, success, offering recommendations to firm leaders, industry bodies, and policy stakeholders. More generally, future research should continue to build on multiple data sources, particularly cross-disciplinary sources of data, and employ multi-level analysis frames that positively align with the complex reality of transformation taking place in emerging industries and ecosystems.

Conclusion

The key insight behind this research is that transformation initiatives fail when approached solely as technological or infrastructural projects. Rather, the findings confirm that organizational readiness means a cultural propensity for openness, collaborative leadership, and employee inclusion is a crucial factor in determining the speed, direction and depth of digital change.

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Рекомендована 4th International Conference of New trends and Smart technology. Baghdad, Iraq. Поступила 27.05.2025.