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IMPACT OF DIGITAL TRANSFORMATION ON FIRM PERFORMANCE IN THE TEXTILE INDUSTRY: THE MEDIATING ROLE OF ORGANIZATIONAL AGILITY

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Abstract

This study aims to understand how digital transformation affects the performance of textile firms in Pakistan and to clarify the mediating role of organizational agility in the relationship between digital transformation and textile firms' performance. The study draws on dynamic capabilities theory and the resource-based view, and views digital transformation as a strategic capability to redefine processes, information flows, and managerial routines. In the context of the textile industry, the study used a quantitative, cross-sectional survey design. A total of 263 respondents were considered for hypothesis testing, and the proposed relationships were examined using partial least squares structural equation modeling. Indicator reliability, internal consistency, convergent and discriminant validity of the measurement model were acceptable. The structural results indicate that digital transformation has a positive direct effect on firm performance and a positive, strong direct effect on organizational agility. Organizational agility also positively affects firm performance and creates a strong indirect link from digital transformation to performance. The results suggest that the direct effect remained significant, indicating complementary partial mediation. The study contributes to the literature by explaining how digital investments generate performance value in a resource-constrained manufacturing setup in a developing country. It also shows that technology alone is not enough; companies can achieve better results when digitalization becomes more responsive, flexible, and adaptable in production and operations.

Introduction

The digital transformation has shifted from a technology support to business strategy (Agustian et al., 2023). Integrated information systems, cloud platforms, data analytics, automation, digital production technologies,

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and connected supply networks are some of the technologies being adopted by manufacturing companies increasingly to enhance the way in which decisions are made and operations are coordinated. In addition to enabling digitization of current activities, the strategic importance of these technologies is that they also signal the way businesses will feel market changes, select resources, coordinate production, and provide customer service. Cost pressure, short delivery times, personalized orders, quality demands and uncertainty in supply have become critical issues in the industry, particularly in companies that find themselves in a position where all these factors are present. Consequently, the performance implications of digital transformation more and more rely on the ability of firms to transform digital investments into organizational capabilities (Barba-Sánchez et al., 2024).

In the manufacturing industry, previous studies tend to link the concept of digital transformation with improved information visibility, process integration, decision quality, innovation, productivity, and market responsiveness (Lu et al., 2023). But it doesn't mean that all firms have the same pattern. There are cases where digital systems can deliver measurable improvements, but others where returns are not as strong as they could be because it's locked in to technologies, yet not connected to processes, people, and decision processes. It's a difference of value to textile producers. They operate the chain of raw material, spinning, weaving, processing, apparel manufacturing, quality control, logistics and export customers. A fast reaction to the change of demand, product mix, material availability, production volume, lead time, and delivery requirement is essential for the economic value of these activities to be achieved with digital technologies (Mohsen, 2023).

One aspect of the current literature that is missing is the focus on the effect of digital transformation as a direct technology effect on performance (Bindeeba et al., 2025). This does not give much explanation on the mechanism which transforms digital resources into better outcomes. This is especially problematic in developing manufacturing-based economies because companies often experience a lack of uniformity in their digital preparedness, outdated equipment, limited knowledge and expertise, disjointed information systems, and financial limitations. Another drawback is that the evidence gained in technology-intensive sectors cannot simply be carried over to textile production, as the production systems, supply chain linkages, export needs and flexibility requirements are very different. A third restriction is regarding the agility of the organizations in the field of knowledge. Despite being often described as a desired attribute, there are fewer studies that examine whether agility becomes the process that enhances firm performance in the textile environment (Rashid et al., 2026).

The present study deals with these limitations and considers a simple, but theoretically interesting, mechanism. Digital transformation is suggested to not only have a direct impact on the performance of the firms but also an indirect impact through enhancing the agility of the firms (Gong & Ribiere, 2025). In this model, digital transformation offers a better, more complete data, more integration, more connectivity and process visibility. Organizational agility involves how effectively the firm utilizes these resources to meet the ups and downs of demand, rebalance product mix, handle supply problems, match production volume, shorten lead time and speed up delivery. Firm performance is the financial and nonfinancial results that are the direct consequence of digital capability and operational responsiveness in the better way (Ullah et al., 2026). The shift in the conversation from the importance of digitalization to what the value is inside the organization.

The textile sector is an excellent arena for this research, as it has not only played a vital role in the export and industrial sectors of Pakistan but is also under strong competition and pressure from operational issues. In July-March FY2026, the value of textile exports was

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approximately US$13.5 billion, accounting for approximately 59.6 percent of the total exports of Pakistan (Oztarsu, 2026). During the same period, readymade articles brought in approximately US$3.2 billion, bed wear US$2.4 billion and knitwear US$3.7 billion (Oztarsu, 2026). Official industrial data, meanwhile, indicated mixed industrial production in their industry reports, especially in the textile and garment sector. With export relevance, value added production, worldwide competition, supply insecurity and speedy response times, digital transformation is strategically relevant. Companies that are able to relate digital data to agile operational decisions may have a better chance of safeguarding margins, satisfying buyer demands, and adapting to the unpredictable domestic and international markets (Mishra et al., 2025).

This study has four contributions. First, it describes firm performance in a capability way rather than from a one-off technological input perspective, as digital transformation. It is basically because it describes firm performance in a capability way and not as a one-off technological input as digital transformation. Secondly, it puts the organizational agility in the middle between the digital resources and operational outcomes, thus explaining how companies can have similar technologies but not generate similar outcomes. Third, it expands the study of the digital transformation to a big export-oriented manufacturing context, the textile industry, which has not been studied empirically as much as the high technology and services industry. Fourth, it offers management proof that the advantages of digital investments will be greater if processes of decision making, production flexibility, and response are simultaneously re-designed along with new technology.

Literature Review and Theoretical Foundation

The proposed model is mainly based on the theory of dynamic capabilities. This theory describes how the firm's successful adaptation to a changing environment is achieved by sensing opportunities and threats, seizing opportunities by committing resources, and reconfiguring assets, routines, and processes when conditions change (Teece et al., 1997). This attitude is suitable for the digital transformation as digitalization is more than the buying of software or machines. It's about refreshing the flow of information, manufacturing, coordination, decision-making processes, and customer and supplier relations. Digital systems can enhance real time order, inventory, production status, quality information, and delivery requirements visibility in a textile company. These resources are strategically important when management implements changes in their operations in a more timely fashion than they would be able to using traditional processes (Hera et al., 2024).

This ability logic has an adaptive part known as organizational agility and agility helps the company to adapt to change and respond to it promptly (Cho et al., 2023). In the textile sector it can be anything from reacting to unexpected fluctuations in demand, changing the product line, altering production volumes, dealing with a material or supply disruption, shortening lead times, or speeding up deliveries. With digital transformation, these actions can be reinforced by minimizing information delays and by linking functions that have not been linked before, or linked with incomplete or separate information. In the light of dynamic capabilities theory, organizational agility is thus a process that can be treated as a means of translating digital resources into timely reconfiguration of the operating activities (Feng & Abd Rani, 2024).

The resource-based view supports this argument by focusing on the value created by the resources when they are incorporated into organisational capabilities, rather than being considered as 'standalone'. Many competitors can acquire digital platforms, automation, analysis and integrated information systems; technology alone doesn't necessarily generate better performance (Vannuccini & Prytkova, 2024). Value is determined by the way the firm

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integrates the technology with the managerial knowledge, skills of its employees, its routines, the cooperation with its suppliers and its production system. The proposed model is built around the notion that digital transformation is an enabling resource base, organizational agility is a capability that allows for the mobilization and recombination of those resources and the firm performance is the result of the configuration of these resources and capabilities (Rafi et al., 2022).

The two approaches complement one another, and give a coherent account of the three study variables. Digital transformation enhances the company's capacity to gather, manipulate and relay data. How effective that information is at transforming into quick operational adjustment is dependent on organizational agility. Faster responses, coordination, and flexibility in operations help to minimize delays, assist customers, and enhance financial and nonfinancial results, which boosts firm performance. This theoretical sequence would be especially important for Pakistani textile companies which strive to achieve competitiveness by controlling variability at various stages of production while satisfying the price, quality, lead time and export market specifications.

Hypothesis Development

Digital Transformation and Firm Performance

Information accuracy, lack of fragmentation of processes, decisions based on data, and coordination between functions are some of the areas in which digital transformation can positively impact the performance of the company (Xu et al., 2024). Digital systems can integrate production planning, procurement, quality control, inventory, sales and logistics to enable managers to make decisions based on shared operational data and information. This integration can minimize wasted time, be more efficient with assets, enhance service quality, be more responsive to customers, and help to control costs. It also can help in product and process innovation by providing managers with more information about demand patterns and operating limitations. Such advantages are applicable to textile companies since they need to collaborate various activities of a production line and adhere to delivery and quality demands (Patel et al., 2024). The existing empirical evidence in the manufacturing sector confirms that there is a positive relationship between the overall level of digital transformation and organizational outcomes, though the impact of digital transformation depends on the capability of the organizations. The study predicts a positive direct impact of digital transformation on the performance of the firm on this basis. Therefore, following hypothesis is suggested:

H1: Digital transformation is positively related to firm performance.

Digital Transformation and Organizational Agility

To be agile within an organization, you need information to be in a timely manner, you need to coordinate things quickly, and you need to be ready to adapt your decisions as the situation evolves. Digital transformation enhances these demands by providing greater visibility of the firm and speeding up the process of capturing and communicating on the firm operational information (Roy et al., 2024). Integrating production, sales, procurement and supply chain operations into a single digital chain allows managers to identify shifts in demand, bottlenecks, late deliveries, or delivery risks sooner. These can then adjust their plans, rebalance their product mix, change the amount of their production or redirect resources faster. Digital systems can help to reduce time-to-approval and time-to-communication, which slows down the response time. This is especially vital for the textile sector, where order and style changes can occur quickly, as can input availability and delivery schedules (Robertsone et al., 2022). A digitally transformed company should, therefore, be better prepared to respond quickly and flexibly, instead of just reacting to

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change. Thus, following hypothesis is recommended:

H2: Digital transformation is positively related to organizational agility.

Organizational Agility and Firm Performance

Agility can be a key to firm performance as fast and flexible firms can better adjust their operations to market and supply conditions (Darmawan et al., 2023). A firm that offers flexibility in production quantity and product mix, adapts to changes in production, and is able to shorten lead times and speeds up deliveries has a better way to reduce the costs of delay and mismatch. It can also help to deliver better service to customers and ensure greater reliability in competitive markets. These benefits come with financial implications such as reduced disruption costs, better utilization of resources, better sales retention and better capacity utilization. They also impact nonfinancial results like customer satisfaction, and market position. In the textile industry, the delays can ripple through a number of interdependent processes and ultimately impact the export timetables (Farrukh & Sajjad, 2025). In an agile organisation, the disturbances can be better absorbed and performance protected. Thus, the study suggests that there could be a positive correlation between organizational agility and firm performance. Therefore, following hypothesis is suggested:

H3: Organizational agility is positively related to firm performance.

Mediating Role of Organizational Agility

Technological change alters the information and coordination capacity of the firm and then the capacity must be used by managers and operational staff to adjust and re-organize activities (Tanveer, 2026). In this regard, organizational agility is the capturing of this conversion process. While digital systems can deliver real-time data and integrated workflows, the real time advantage comes when the firm leverages the systems to make faster schedule changes, solve disruption, adjust production and respond to customers (Roy et al., 2024). This reasoning is in line with the perspective that resources shape outcomes via intermediate capacities. This is particularly true of textile companies, where technology can be used to make conditions of production and supply transparent and agility can be used to either make them or not. The study hence anticipates that digital transformation will increase the performance of the organization partly through the increased agility of the organization (Zhang et al., 2023). Therefore, following hypothesis is proposed:

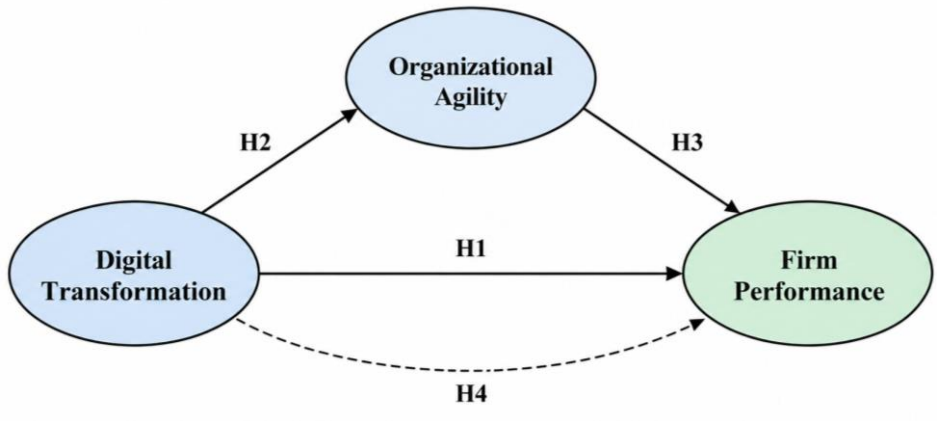
H4: Organizational Agility mediates the relationship between Digital Transformation and Firm Performance.

The following conceptual model developed based on above theoretical framework and hypothesis development.

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Figure 1

Conceptual Model



Methodology

Research Design and Context

To test the expected relationships in the textile manufacturing industry of Pakistan, the study was of quantitative and cross-sectional research design. The organization was selected as the context of the firm and the assumed informants were the managerial and professional respondents who were knowledgeable about the operation of the firm with regards to the study variables, which involve digital initiatives, operational responsiveness and overall performance. The survey method was suitable for the study as the conceptual model demands the standardization of information among various firms and estimation of both direct and mediating relations simultaneously (Groves et al., 2011). The structural model was evaluated after screening of responses for complete and appropriate data.

Measurement

The constructs were all assessed with existing multi-item scales, and were modified to fit the needs of the textile manufacturing context. Digital transformation was assessed using three items that were developed by (Singh et al., 2021). The sample item was "Our firm increasingly uses digital technologies to transform its business processes".

Organizational Agility was assessed using six measures related to being responsive to demand changes, managing product mix, handling supply disruption, flexibility in production volume, shortening lead times, and speeding delivery adopted from the study of (Nguyen et al., 2025). The sample item was "Our firm can rapidly adjust its product mix in response to market changes".

Six items measured based on the measure developed by (Khin & Ho, 2019) were used to assess Firm Performance. The items are based on both financial and nonfinancial outcomes, such as profitability and asset related performance, customer/market related outcomes, and employee related outcomes. The sample item was "Our firm's profitability growth is better than the industry average". Responses were evaluated on a five Likert-type agreement scale and the higher the score given, the higher the level of the construct.

Data Analysis

Partial least squares structural equation modelling was conducted due to the presence of multiple latent constructs and a mediation relationship in the model (Sarstedt et al., 2021). The analysis was in two stages. First, the measurement model was evaluated using outer loadings, Cronbach's alpha, composite reliability, average variance extracted, heterotrait-monotrait ratio and Fornell-Larcker criterion. Second, in this study the structural model was tested by using bootstrapped significance tests and path coefficients. For H1-

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H3, direct effects were assessed while the specific indirect effect of digital transformation on organizational agility leading to firm performance was investigated in the case of H4. The results were reported as being statistically significant ($p < .001$) and not as $p = .000$.

Results

Measurement Model

The model of measurement had acceptable reliability and convergent validity. All outer loadings were greater than .70, and varied between .748 and .868 (see Table 1). The digital transformation indicators fell within the range of .816 to .845, firm performance of .748 to .868, and organizational agility of .765 to .860. Cronbach's alphas of .777, .905, and .903 were obtained for digital transformation, firm performance, and organizational agility, respectively. The composite reliability ranged from .871 to .927 and average variance extracted was .673 to .692. The thresholds for internal consistency and convergent validity are higher than typically required for most internal consistency and convergent validity analyses, so that these values suggest that the indicators do an acceptable job of representing each of the constructs (Hair et al., 2021).

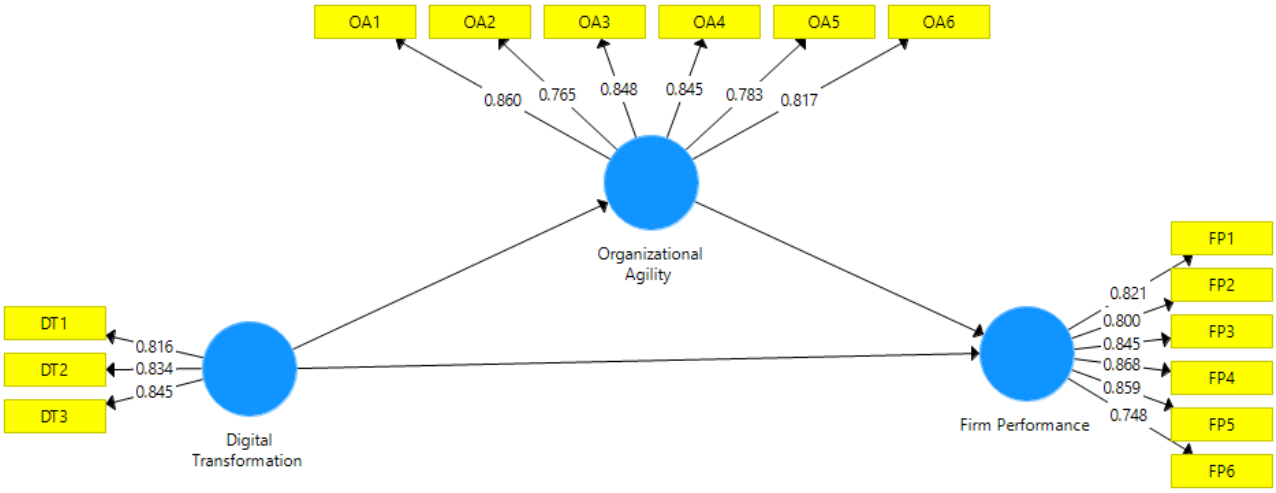
Table 1 ***Outer Loadings, Reliability, and Convergent Validity***

Construct	Item	Loading	Cronbach's α	Composite Reliability	AVE
Digital Transformation	DT1	.816	.777	.871	.692
	DT2	.834			
	DT3	.845			
Firm Performance	FP1	.821	.905	.927	.680
	FP2	.800			
	FP3	.845			
	FP4	.868			
	FP5	.859			
	FP6	.748			
Organizational Agility	OA1	.860	.903	.925	.673
	OA2	.765			
	OA3	.848			
	OA4	.845			
	OA5	.783			
	OA6	.817			

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Figure 2

Measurement model



Discriminant validity

This was also confirmed by the discriminant validity. All the HTMT ratios were less than .85 as per (Rönkkö & Cho, 2022). digital transformation and organizational agility had a .796 correlation, followed by a .788 correlation between digital transformation and firm performance, and a .767 correlation between firm performance and organizational agility. (Refer to Table 2)

Table 2 ***Heterotrait-Monotrait Ratio (HTMT)***

	Digital Transformation	Firm Performance	Organizational Agility
Digital Transformation			
Firm Performance	.788		
Organizational Agility	.796	.767	

The Fornell-Larcker criterion is given in Table 3. The square root of AVE was .832 for digital transformation, .824 for firm performance and .820 for organizational agility. All the diagonal values were more than the inter-construct correlation values (Rönkkö & Cho, 2022). The combination of the two tests suggests empirical distinctiveness of the three constructs. (Refer to Table 3)

Table 3 ***Fornell-Larcker Criterion***

	Digital Transformation	Firm Performance	Organizational Agility
Digital Transformation	.832		
Firm Performance	.667	.824	
Organizational Agility	.674	.704	.820

Structural Model and Hypothesis Testing

The structural model results support all four hypotheses. H1 was supported by digital transformation under which the $\beta = .353$, $t = 6.793$, $p < .001$. The effect that digital transformation had on organizational agility was also positive, $\beta = .674$, $t = 21.907$, $p < .001$, in favor of H2. For the organizational agility,

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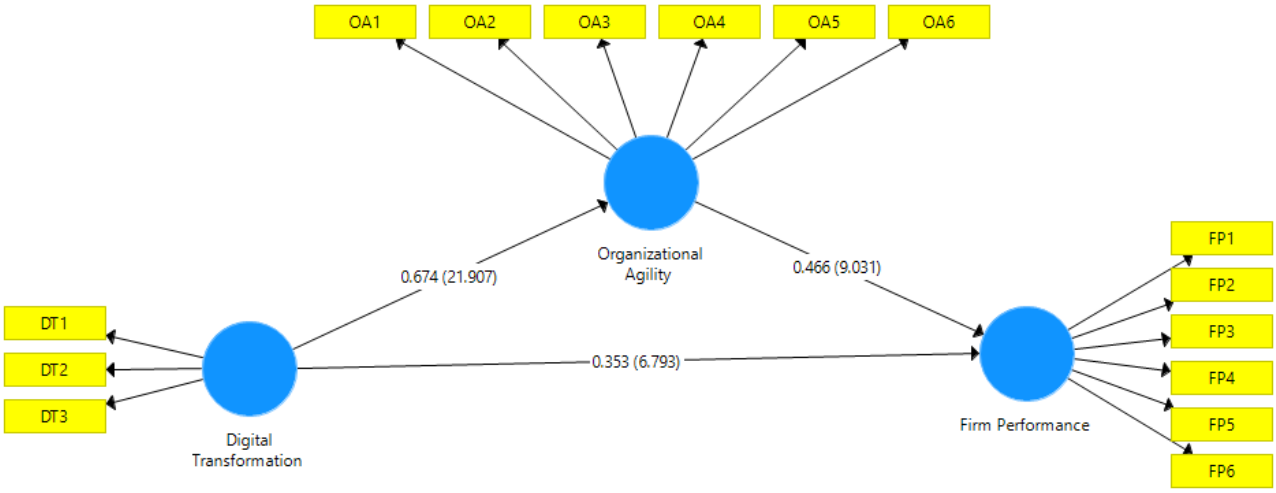
the result was positive for firm performance: β = .466, t = 9.031, p < .001, which supports H3. The specific indirect effect of digital transformation on the firm performance via organizational agility was significant, β = .314, t = 8.220, p < .001, which supports H4. The pattern of positive and significant direct and indirect effects from digital transformation to firm performance indicated complementary partial mediation. From a business perspective, the digital transformation helps to enhance the performance of organizations directly and indirectly by providing them with the agility to deal with the business world.

Table 4 *Direct and Indirect Effects*

Hypothesis / Path	β	t	p	Decision
H1: Digital Transformation → Firm Performance	.353	6.793	< .001	Supported
H2: Digital Transformation → Organizational Agility	.674	21.907	< .001	Supported
H3: Organizational Agility → Firm Performance	.466	9.031	< .001	Supported
H4: Digital Transformation → Organizational Agility → Firm Performance	.314	8.220	< .001	Supported

Figure 3

Path directions (SEM)



Discussion

The results give a uniform understanding of the value creation of digital transformation in the textile industry. A positive direct relationship between digital transformation and firm performance suggests that digital technologies have a positive impact on firm performance when they are introduced into business and operating processes. Improved information availability, coordination and information process connectivity can contribute to enhanced decision quality and lower operational inefficiencies. Most importantly, digital transformation has the highest model structural relationship with organizational agility. This indicated one of the core advantages of digitalization is the ability to adjust better to varying operating conditions. The positive effect of organizational agility on firm performance also indicates that responsiveness, production flexibility, shorter lead times and delivery speed have significant performance implications. The result of the mediation provides a summary of these findings in this study.

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One element of why digital transformation helps with performance is that it grows the ability of the firm to be fast to respond to new information. This is in line with manufacturing research which sees digitalization as an enabler and not as a guarantee of improved outcomes. It also applies to the textile industry, where shifts in the market and supply chain disruptions can have a rapid impact on production planning, customer promises and profit margins. If there is a significant direct effect and a significant indirect effect, then agility is an important, but not exclusive pathway. Other ways digital transformation can improve performance include process efficiency, innovation, quality control and greater customer and supplier integration.

H1: This is consistent with what Barba-Sánchez et al., (2024) found through examining 246 firms, the direct effect of digital transformation and firm performance were positively significant (β = .328). The results fail to offer evidence of the importance of the digital transformation as a means of making it a significant mechanism that allows firms to transform the use of IT capabilities and digital orientation into performance improvements. In addition to this, Yonghong et al., (2023) based on the manufacturing companies in mainland China showed that digital transformation positively affected the companies' financial performance, and that the companies' inventory turnover and total asset turnover improved. However, the findings in the present result are in contrast to research that has indicated that the benefits of digital transformation are not guaranteed. Guo et al., (2023) found that while digital transformation drives overall productivity improvements among Chinese listed firms, it can also have negative effects on firm performance due to higher operating expenses, management expenses, and lower asset turnover.

H2: This finding is consistent with Xu et al., (2024) who studied 476 manufacturing businesses and found that digital transformation was associated with significantly higher agility (β = .529, p < .001). They have concluded that companies which have undergone a digital transformation can leverage information and technology resources more effectively to boost responsiveness and adaptability. The current results are similar to those recently reported by Hamid & Eledum, (2026), in the Islamic banking sector in Saudi Arabia. A significant impact was digital transformation on organizational agility (Beta = .861, p < .001) and digital transformation accounted for a large variance in agility.

H3: This finding is strongly supported by the previous empirical studies, which showed that the organizational agility had a significant positive influence on the performance of SMEs (β = .496, p < .001) with a greater magnitude effect than digital maturity in the model. In a similar study of 112 large Spanish companies, Cegarra-Navarro et al., (2016), also found that organizational agility is crucial in translating organizational knowledge to better firm performance. They found that agility is a significant organizational mechanism between knowledge-related resources and performance results.

H4: The results of this mediation are in line with the results of Hamid & Eledum, (2026) which concluded that organizational agility was one of the significant mediators between digital transformation and performance. The indirect effect was significant, β = .394 (p < .001) and the direct effect was also significant, thus showing partial mediation. So, overall, the findings support an empirically based explanation of digital transformation in terms of capabilities. Although digital transformation directly improves firm performance, the strong link between digital transformation and organizational agility and the large indirect effects suggested that a substantial part of the value of digital transformation stems from organizational adaptation. Firms can benefit more from digital transformation if they invest in digital and align the organizational structure, processes, decision making systems, and managerial processes to enhance organizational agility.

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Conclusion

This study was focused on how Digital Transformation mediates between the relationship of Digital Transformation and Firm Performance in textile industry in Pakistan. The results are consistent with all proposed relationships. Digital transformation has an immediate positive effect on firm performance, it makes firms more agile and it generates an additional indirect effect on firm performance through agility. Organizational agility is thus a key aspect of the pathway leading to the economic usefulness of digitalization. The results are consistent with the "capability-oriented" perspective on digital transformation, namely that technology can bring more value to the organisation when it allows it to sense change, act swiftly and flexibly, reconfigure operations and satisfy market needs. For the textile companies, facing challenges such as costs, supplies and delivery time, the managerial challenge is not only to be more digital, but to be faster and more flexible by digitalization.

Practical Implications

The findings indicate that digital transformation initiatives have to focus not just on the acquisition of technologies, but on how they will support the operations responsiveness of a manager. To materialize the digital investment, textile companies need to link it to real-world actions like demand sensing, production planning, product mix management, capacity management, supply disruption management, quality management, and delivery scheduling. Management should also minimize functional information gaps between sales, procurement, production, inventory and logistics to ensure that all these functional areas are able to respond to the same real time information. Investment in digital skills for employees is also key as agility relies on people's ability to comprehend and act on information without undue delay. For companies with constrained investment resources, it could be better to start with the biggest pain points that can be digitized, then add important data to various functions, set up rules of action and then expand automation and analytics. The results also suggest that in the field of performance measurement, digital projects could not be assessed solely on the basis of financial indicators, but should also measure the project's operational time: lead-time reduction, response time, production flexibility, and delivery reliability.

Future Research Directions

The model developed in this study can be further expanded on for future research. Longitudinal studies could be performed to establish whether agility increases with time following the investment in digital and whether the effects of agility increase with time. Second, future research might involve decomposing digital transformation in a technological, strategic and process and human aspect to determine how each of these aspects are the most contributing to agility. Third, the model might be extended by analyzing moderators like digital leadership, organizational culture, environmental turbulence, firm size, export intensity or supply chain complexity, and others. Fourth, comparative studies between spinning, weaving and processing, apparel and home textile companies could be conducted, since the demands for digital and agility vary among the segments. Last but not least, objective performance indicators, and more than one manager per firm would avoid some of the restrictions of single-source perceptual data. Other comparisons may also be made across countries to see if the mechanism observed is unique to Pakistan or is a general trend in manufacturing.

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