Exploring the Mediating Role of Operational Capabilities in the Relationship Between Digital Transformation and Firm Performance in SMEs

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Abstract

This study investigates the impact of digital transformation on firm performance in small and medium enterprises (SMEs), with the mediating role of operational capabilities. Data is collected through a structured questionnaire from managers and employees of SMEs in Islamabad and Rawalpindi. The hypothesised relationship among the variables is validated through PLS-SEM using SmartPLS. The findings revealed that digital transformation has a significant effect on firm performance. Further, it is also revealed that operational capabilities significantly mediate the relationship between digital transformation and firm performance. These findings highlight the importance of operational capabilities and digital transformation for enhancing firm performance, providing valuable insights for managers, leaders, and SMEs. This research advances the existing literature by integrating digital transformation and operational capabilities, offering a novel perspective on their combined effects on SME performance.
Keywords: Digital Transformation, Operational Capabilities, SMEs, PLS-SEM.

Introduction

Globalization has accelerated the rate organizations adopt the digital economy, making conventional business models obsolete while necessitating technological incorporation to maintain competitiveness (Skare & Soriano, 2021). In the current dynamic environment, one of the most critical factors for firm performance is digital transformation (DT). It focuses on incorporating sophisticated tools, promoting the use of digital products, and formulation of strong supportive digital networks to improve functionality, creativity, and added value (Baiyere et al., 2020; Yu et al., 2022). This transformation is even more crucial to SMEs because they compete against big organizations, have limited resources, and are expected to adapt to new customer needs. SMEs play an essential role in the global economy but are more vulnerable to market disruptions because their capacity to respond to fast technological change is limited (Kraus et al., 2022). Adopting DT is no longer just a competitive advantage but a necessity for survival and growth. Along with improving financial performance, DT enhances SMEs' operations processes by improving organizational agility and decision-making and responding to market dynamics. However, many SMEs, particularly in developing economies such as Pakistan, are unsuccessful in adopting DT owing to resource constraints, digital competency, and poor facilities (Faruque et al., 2024;

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Pelletier & Cloutier, 2019), creating a gap in their competitive edge in the move to the digital economy.

In the current complex business environment, operational capabilities have been identified as a mediating variable through which DT affects firm performance. Firms' operational capabilities are defined as the ability of a firm to manage resources within a business and constructively change its operations to environmental changes while achieving operational excellence (Tan et al., 2007). Extant literature highlights that digital technologies can help enhance various functional aspects of SMEs, for example, supply chain, customer relationship and product delivery, thereby raising organizational performance ((Nwankpa & Roumani, 2016). Bouwman et al. (2019) argue that the advantages of DT move beyond cost savings, with the outcomes optimizing strategic leverage by aligning digital technologies with working practices. For instance, DT strategies like cloud computing, data analysis, and automation may help firms get better information to make informed decisions and improve operational performance. The integration between DT, OCs and Firm performance implies that OCs could drive digital initiatives to achieve better performance. However, there is a lack of conceptualization and empirical investigation of how these dynamics can be effective for practicing SMEs in pursuit of sustainable competitive advantage (Faruque et al., 2024; Straková et al., 2022).

Previous studies have investigated the impact of digital transformation on large organizations (Chouaibi et al., 2022; Warner & Wäger, 2019); however, there is a dearth of research on this in SMEs, especially firms in developing countries such as Pakistan (Hongyun et al., 2023; Shah et al., 2023). Moreover, the literature supports that DT leads to a substantial boost in the firm's overall performance in terms of innovation, operational efficiency and ability to respond to specific changes in the market. However, these benefits hinge on the organization's capability to utilize and manage resources (Alkhamery et al., 2021). This is where operational capabilities come into the picture. These capabilities provide a link between DT and business goals. Although applying technologies yielded various financial and operating benefits for SMEs, firms with strong operational capabilities were often better positioned to improve the realization of returns from their technology spending. However, to the author's knowledge, there is scarce literature documenting the nature and effect of these mediating mechanisms in the context of SMEs in developing countries such as Pakistan (Hongyun et al., 2023).

This research has targeted SMEs in Islamabad and Rawalpindi due to the significance of its implementation due to rising competition and improved technological solutions. These cities act as emerging technology-oriented cities, making the application of DT the mandatory precondition for the development of businesses. This research explores the relationship between DT and SME performance and analyses the mediating role played by operational capabilities. The theoretical advancements by integrating dynamic capabilities and resource-based perspectives to provide a broad understanding of how SMEs can harness DT for business advantage (Yu et al., 2022). With a focus on Pakistan and the technology sector among SMEs, this study provides a rich understanding of the drivers of DT and contributes to theoretical and practical knowledge.

The findings offer several implications of the proposed research that connect DT, operational capabilities and firm performance. From these relationships, managers can gain valuable information for deciding where to invest in digital resources, improve employees' digital skills, and incorporate new technologies into the strategic plan. Such insights can then be helpful to policymakers as they formulate ways and means of helping SMEs overcome challenges to digitalization. Furthermore, this research enhances the existing body of knowledge by adopting

operational capabilities as a moderating variable and gives a more accurate picture of how DT enhances organizational effectiveness.

Literature Review
Digital Transformation
The concept of digital transformation is complex and refers to applying digital tools, methods and technologies to redesign business processes and improve value proposition (Mukul & Büyüközkan, 2023). It includes technological transformation, organizational culture, and business processes implemented to enhance organizational performance. The recent global trend of Industry 4.0 has shifted focus to the need for businesses, especially SMEs, to adopt digital transformation as a survival tool (Singh et al., 2022). Research shows digital businesses create new organizational value, improve operations, and achieve strategic flexibility. However, for many organizations, digital transformation poses challenges that include copulated strategies, change resistance, and the digital skills gap, the latter being especially concerning for SMEs (Vial, 2019).

Digital Transformation in SMEs
Digital transformation is the process of adopting digital technologies like artificial intelligence, cloud computing, and the Internet of Things into organizational activities to transform the business and design novel operation models. However, this change is both a threat and a prospect for SMEs. Larger organizations may have more significant resources to invest in digital tools, but smaller organizations, particularly SMEs, will likely be more effective at exploiting the opportunities (Vial, 2019). Digital transformation is a process that allows SMEs to enhance their business performance by optimizing their activities, increasing customer satisfaction, and providing quicker reactions to market needs (Fletcher & Griffiths, 2020).

The COVID-19 pandemic showed that SMEs need to proceed with digitalization because organizations with higher levels of digital development are more prepared for disruptions and can continue operations. The complex transformation process demands considerable capital on technology, employees and strategies (Gopal et al., 2019; Ahmad et al., 2024). The digital transformation for SMEs is not merely about system integration but also involves reorganizing and redesigning business processes and creating a new digital culture (Zhang et al., 2022). Hence, the success of digital transformation requires more of a planned effort to align technology with business goals.

Key Factors for the Digital Transformation of SMEs
Several factors determine the probability of the success of digital transformation in SMEs. Literature has determined that digital technology, employee digital skills, and digital transformation strategies are key factors in the successful adoption of digital transformation. Digital technology is the core that supports SMEs and helps them align operations to produce value. AI, blockchain, and IoT allow organizations to manage real-time data integration and improve decision-making and processes (Magistretti et al., 2019). However, SMEs undergo high implementation costs and lack adequate technical skills in applying these technologies (Bennett & McWhorter, 2021). Similarly, employee digital skills are crucial since digital transformation is driven by human resources, which will find ways to use new technology. Research shows that learning related to digital skills or employees ' readiness to engage in digital processes substantially impacts transformation outcomes (Kane, 2019). Employee training and development remains a critical success factor for SMEs since many face the challenge of talent management (Scuotto et

al., 2021). An effective digital transformation strategy guides where an organization wants to go and how technology can get there. Successful strategies position customer-driven advancements, improve control and/or leadership, and cultivate innovation (Chanias et al., 2019). Due to this, SMEs have to adapt their strategies according to their context; they have to be innovative without necessarily being resource-intensive (Zhang et al., 2022).

A review of the digital transformation literature stresses the importance of such dimensions as digital technology, digital infrastructure, and digital literacy as crucial to the success of digital transformation strategies. Digital technology enhances operation productivity and introduces innovation into the system, and solid infrastructure supports the integration of digital tools. Furthermore, the digital competencies of the employees and other stakeholders remain high enough to unlock the full potential of change (Magistretti et al., 2019; Zhang et al., 2022). Furthermore, it was found that factors like government support, partnerships, and financial resources in the external environment foster enablers for transformation (Ghobakhloo et al., 2021). SMEs must also be prepared for operation and adapt external digital services for their internal IT structures to get the most out of their transitional status (Ivančić et al., 2019). Strengthening digital adoption is engaging various stakeholders in the supply chain value chain (Brodeur et al., 2022).

Digital Transformation and Firm Performance in SMEs
Digital transformation plays a significant role in financial performance since firms can use technology to advance operations, customer satisfaction, and return on investment. Existing literature proves the connection between digital transformation and economic performance mainly through efficiency gains, process improvements and the generation of new revenue streams (Bikse et al., 2021). AI, big data, and blockchain are some of the latest advances that can increase the firm's decision-making toolkits, minimize costs, and expand the revenue gap of firms (Magistretti et al., 2019).

The effectiveness of operational capabilities is one of the main ways digital transformation influences financial performance. For instance, real-time data integration and analysis for firms reveal the areas that require enhancements and solutions that can help to reduce costs and enhance profitability (Ghobakhloo & Iranmanesh, 2021). Furthermore, the availability of digital tools increases customer experience, improving customer loyalty and increasing sales (Vial, 2019). Also, digital transformation prepares firms to handle market circumstances and dynamic changes. In the current dynamic era, organizations with relatively more significant levels of digital preparedness were found to have fewer financial sustainability concerns than many organizations worldwide (Fletcher & Griffiths, 2020). More prominent firms have adapted digital strategies to compete fairly with other players; SMEs especially have been able to grow their operations and book new opportunities (Zhang et al., 2022).

Although it is evident that the financial returns of digital transformation are promising, successful implementation depends on alignment, resource availability, and a skilled workforce. Companies that incorporate a strong digital vision employ adequate employee training, and implement suitable technologies in their organizational development strategy experience more sustainable financial performance regarding their digital transformation outcomes (Chanias et al., 2019). Based on the literature, it is hypothesized that digital transformation has a significant role in the financial performance of SMEs.

H1: Digital Transformation has a significant influence on firm financial performance.

Digital Transformation and Operational Capabilities

DT is adopting and implementing digital technologies and improved processes across an organization and its value chain to enhance organizational performance and achieve digital optimization. The benefits of DT on operational capabilities are nonetheless well acknowledged as it supports efficiency, effective decision-making and flexibility with change. DT supports firms in adopting AI, cloud, and IoT technologies to enhance operation processes. These technologies improve decision support and monitoring, which leads to the optimization of resources (Yu et al., 2022). In addition, DT fosters dynamic capabilities such as the identification of opportunities, the capture of these opportunities and reconfiguring operations to keep up with the competition (Warner & Wäger, 2019).

In SMEs, DT enables operational performance enhancement by integrating IT initiatives with business objectives and promoting innovation and process improvements (Draganić, 2023). Further, dynamic capabilities moderate the interaction between DT and operational readiness, enabling organizations to respond to digital strategies (Alkhamery et al., 2021). More studies indicate that skills like digital technology and digital operations are central to realizing operational evolution. These are real-time performance responses and improving cooperation within and between teams (Ren et al., 2023).

H2: Digital Transformation has a significant influence on the operational capabilities of SMEs.

Operational Capabilities as a Mediator

Organizational and operational capabilities are seen as a mediating factor between DT and financial performance, meaning that the organizations can fully leverage the success of their digital projects. In this sense, operational capabilities are how DT achieves financial benefits through optimizing operations, resource management, and strategic flexibility. Digital transformation embeds complex technologies like Artificial Intelligence (AI), Internet of Things (IoT) or Blockchain in the business value chain. All these technologies address productivity in terms of process expediencies, efficiency of decisions made and real-time flexibility. Better operational capabilities—the organization's use and deployment of resources—are other essential outcomes of this integration. These capabilities enable firms to increase their efficiency and anticipatory behaviour, thus achieving superior financial performance (Yu et al., 2022).

Research demonstrates that operational capabilities explain how Digital Technologies influence financial performance by translating digital resources into business outcomes, including cost reduction, higher efficiency, and enhanced customer satisfaction. For instance, dynamic capabilities like market sensing and adapting allow firms to leverage digital tools for financial gains (Ren et al., 2023). Similarly, aligning operational strategies with DT improves corporate profitability through internal organizational efficiency and market adaptability (Alkhamery et al., 2021). Research has pointed out that operational competencies help organizations translate the strengths of DT into financial performance, especially in process redesign and new product development (Tang & Yang, 2022). For instance, the companies that adopt DT to improve business operations have a massive impact on their revenues and competitiveness in the market (Schneider et al., 2024). Based on these findings, this study hypothesizes that:

H3: Operational capabilities significantly mediate the relationship between Digital Transformation and firm financial performance.

Conceptual Model

Figure 1: Conceptual Model
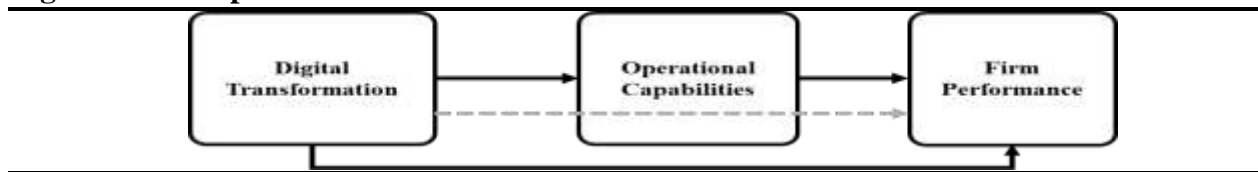
Source: Author

Methodology

Research Design

The research used cross-sectional, mono-method and quantitative research design. This design involved collecting data at one point in time which facilitated a cross-sectional analysis of the link between digital transformation, operational capacity, and financial performance of SMEs. Finally, the mono-method approach that involved the use of only quantitative data collection methods offered structured, numerical data, which ensured easy quantitative analysis (Saunders et al., 2019). One advantage of this approach is the possibility to work with large samples thus making generalization from the study results easier (Creswell & Creswell, 2018). Moreover, quantitative methods support objective calculations that eliminate subjectivity, and thereby increase the inter-subjective agreement of participants' responses (Bryman, 2015).

Population and Sample

The target population for this research is therefore Small to Medium sized Enterprises (SMEs) in the twin cities of Islamabad and Rawalpindi in Pakistan. The sample for the study comprises employees from the aforementioned SMEs, which allows collecting diverse data regarding organizational operations and performance metrics. A sample of 420 as sample size is selected based on G power analysis, allowing a more general and accurate representation of population.

Data Collection Procedure

Data were obtained from a self-administered survey questionnaire. This survey is distributed among sample. Stratified sampling is used with the aimed at achieving heterogeneity of the sample with respect to subgroups within SMEs, for example by industry or business size, which makes the results more generalizable, across SMEs. Snowball sampling reinforced this by using the participants to help identify other employees from less approachable or unidentified informal SMEs which are usually difficult to access. Altogether, these techniques allowed for a diverse and representative participant base whilst addressing the difficulties of reaching a SMES workforce.

Measures

Reliability and validity measures were taken by the use of adapted scales for all the constructs used in this study. Digital transformation was measured using an 8-item scale encompassing three dimensions: digital technology, skills of the employees, and the digital transformation plan. This scale was adopted from validated measures in the literature for example the study by Warner and Wäger (2019) on dynamic capabilities and digital transformation. Business performance was measured in terms of financial performance and was done with the aid of a scale adopted from the study of Lumpkin and Dess (2001). The scale comprises 6 items. Operational capabilities were assessed using a 7-item adapted scale concerned with resource deployment, activity velocity, and

flexibility, and based on Helfat and Peteraf's (2003) definition of dynamic capabilities in operational settings.

Data Analysis

For data analysis the study employed Partial Least Squares Structural Equation Modeling (PLS-SEM). PLS-SEM is a highly stable statistical procedure and is more appropriate for analyzing models with an interdependence of constructs and their links. It is suitable for this study because it can handle reflective and formative constructs; furthermore, it enables the assessment of measurement and structural models at the same time (Hair et al., 2017). Moreover, for small-to-medium sample sizes, PLS-SEM offers a suitable method, which does not depend on strict normality assumptions concerning the sample of 418 employees of this research. This method also allows for assessment of mediation effects, such as the operational capabilities, giving further understanding on the relationship between DT and FP.

Results

Demographic Profile

The demographic profile of sample respondents indicates 50.96% males and 49.04% females, with the majority aged between 26-35 years (35.89%). Most sample respondents hold a Bachelor's (43.06%) or Master's degree (37.08%). As per experience 47.37% have 1-5 years of work experience. The detail of sample characteristic is shown in table 1.

Table 1: Demographic Statistics

| Demographic Profile	Category	Frequency	Percent (%)
Gender	Male	213	50.96
	Female	205	49.04
Age	Below 25	87	20.81
	26-35	150	35.89
	36-45	120	28.71
	Above 45	61	14.59
Education	High School	45	10.77
	Bachelor's	180	43.06
	Master's	155	37.08
	Doctorate	38	9.09
Experience	Below 1 year	50	11.96
	1-5 years	198	47.37
	6-10 years	120	28.71
	Above 10 years	50	11.96

Statistical Assumptions

Key assumptions that are used when conducting statistical analyses were checked to confirm the validity of the data. The skewness and kurtosis values showed that the data was normally distributed because it was within the acceptable range of ± 2, as the results of the parametric tests (Kline, 2015). Furthermore, single-factor test of Harman was employed to reduce the threat of common method variance analysis showed that none of the single factor dominated the analysis and thus ruled out common method variance as a threat to validity (Podsakoff et al., 2003). These

results have shown that the data was suitable for the statistical tests as all the assumptions were met.

**Measurement Model**

Figure 2: Measurement Model
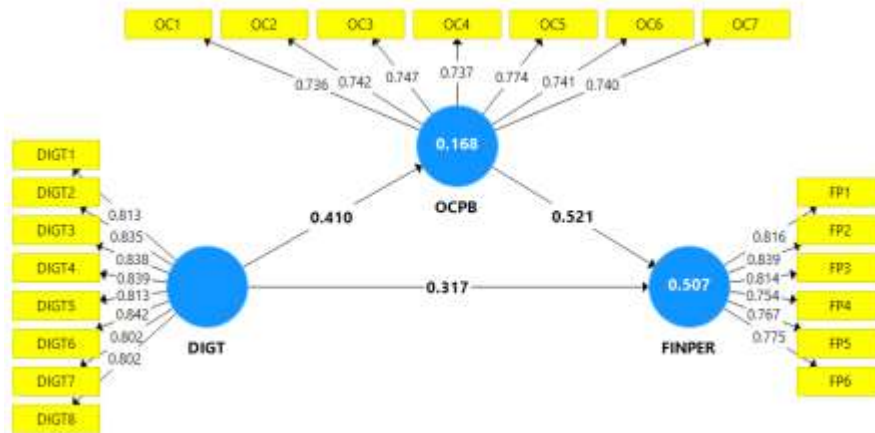
Source: Author

Table 2: Reliability and Validity

Variable	Indicator	Loading	T Statistics	Cronbach's Alpha	Composite Reliability	AVE
Digital Transformation	DIGT1	0.813	34.529	0.912	0.924	0.678
	DIGT2	0.835	41.228			
	DIGT3	0.838	47.879			
	DIGT4	0.839	45.746			
	DIGT5	0.813	38.943			
	DIGT6	0.842	45.641			
	DIGT7	0.802	33.069			
	DIGT8	0.802	36.683			
Financial Performance	FP1	0.816	36.555	0.883	0.911	0.632
	FP2	0.839	45.016			
	FP3	0.814	36.377			
	FP4	0.754	25.01			
	FP5	0.767	25.519			
	FP6	0.775	29.298			
Operational Capabilities	OC1	0.736	20.228	0.867	0.897	0.556
	OC2	0.742	25.681			
	OC3	0.747	28.304			
	OC4	0.737	23.108			
	OC5	0.774	31.91			
	OC6	0.741	24.823			
	OC7	0.74	24.296			

Table 2 shows statistics regarding reliability and validity of measurement model, including constructs such as Digital Transformation, Financial Performance, and Operational Capabilities. Indicators factor loadings is greater than threshold value of 0.70, indicating strong indicator reliability. Moreover, the Cronbach's Alpha values for Digital Transformation (0.912), Financial Performance (0.883), and Operational Capabilities (0.867) shows that all the variables have acceptable level of internal consistency reliability. Composite reliability values are also above 0.70, providing further evidence of reliability. Whereas, the Average Variance Extracted (AVE) for Digital Transformation (0.678), Financial Performance (0.632), and Operational Capabilities (0.556) shows an acceptable level of convergent validity. Further, the construct reliability is assessed with Fornell-Locker criteria and HTMT ratio indicating that all the variables have an acceptable level of convergent validity.

Structural Model

Figure 3: Structural Model
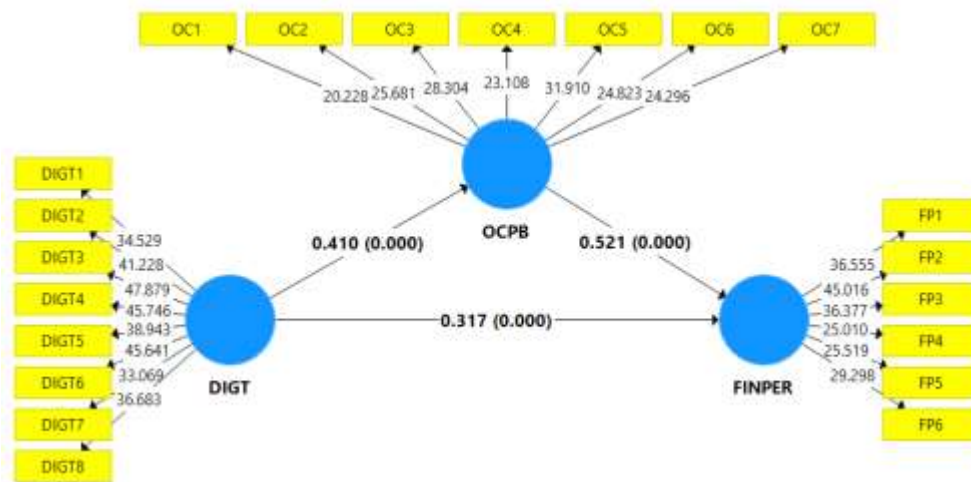
Source: Author

Table 3: Structural Model

Path	Beta	STDEV	T Statistics	P Values	2.50%	97.50%
DIGT -> FINPER	0.317	0.053	5.973	0.000	0.211	0.413
DIGT -> OCPB	0.410	0.040	10.252	0.000	0.332	0.491
OCPB -> FINPER	0.521	0.043	12.049	0.000	0.438	0.605
DIGT -> OCPB -> FINPER	0.213	0.027	7.780	0.000	0.163	0.273
Note: ** Indicates significance with $p < 0.05$; GIGTL = Digital transformation; OCPB = Operational capabilities; FINPER = Financial Performance						

Table 4.3 highlights the PLS-SEM results of structural model for hypotheses testing. The statistic shows that digital transformation (DIGT) has a significant positive effect on financial performance (FINPER) ($\beta = 0.317$, $p < 0.05$) and operational capabilities (OCPB) ($\beta = 0.410$, $p < 0.05$). Operational capabilities (OCPB) significantly impact financial performance (FINPER) ($\beta = 0.521$, $p < 0.05$). Furthermore, the mediation analysis indicates that operational capabilities (OCPB) significantly mediate the relationship between digital transformation (DIGT) and financial

performance (FINPER) (β = 0.213, p < 0.05). All paths are statistically significant, supporting the proposed model.

Discussion

The findings of this study validate the relationships postulated in the context of digital transformation, operational capabilities, and financial performance. The first hypothesis, suggesting a significant and positive impact of digital transformation on business performance (β = 0.317, p < 0.05). This suggest that digital transformation enables SMEs in standardizing processes, supporting decision making, and developing value propositions that contribute to the generation of value and profit. The findings also show that DT has a significant and positive operational capability (Beta = 0.410, p < 0.05). Moreover, the findings also showed that while operational capabilities have a direct impact on financial performance (Beta = 0.521, p < 0.05); operational capabilities also mediate the digital transformation and financial performance relationship (β = 0.213, p < 0.05),

These findings highlight that a digital transformation has a positive effect on the financial performance and proves that SMEs can benefit from improvements in efficiency, cost savings, and new market accesses. These findings are consistent with previous literature showing that technology tools such as AI, IoT, and cloud computing helps in improving business processes by automating operations and activities (Bouwman et al., 2019; Vial, 2022). Moreover, the significant relationship between DT and operational capabilities supports Warner and Wäger (2019) who consider digital transformation as an enabler of operational agility and strategic alignment. Further, the positive and significant coefficient between the operational capabilities and financial performance supports the findings of Barney (1991), Grant (1996) and other researchers that operational capabilities is a direct determinant of the firm performance. Organizations with strong operational capacities can leverage resources to achieve greater efficiency and lower expenditures to achieve customer value and improve financial returns.

The mediating role of operational capabilities offers novel understanding of how digital transformation affects financial performance. Operational capabilities serve as the mechanism in realizing digital technologies' potential and related financial benefits, by enhancing resource management, decision-making, and adaptability. It reinforces the dynamic capabilities approach which argue that capabilities provide organizations with the capacity to detect and exploit opportunities in high volatility environments (Teece, 2018). In the case of SMEs, which have limited financial, human, and informational resources, the improvement of operational capabilities is crucial for getting the maximum benefits from digital initiatives (Alkhamery et al., 2021).

Conclusion

Our findings extend the understanding of the association between digital transformation and operational capabilities for enhancing financial performance. The results show that there is a positive relationship between digital transformation and financial performance as well as between operational capabilities and financial performance. Furthermore, operational capabilities act as a mediator between the digital transformation and financial performance to assert that they play the role of the middleman between the two in terms of leveraging investment on digital technologies into a financial gain. These findings concur with prior research and underscore the need to foster digital capability in combination with enhancing operational capabilities. The analysis shows that digital transformation should be accompanied by effective and sustainable development of organizational capabilities to unlock the financial benefits and secure competitive advantage.

Implications and Future Research Directions

The present research offers theoretical and practical contributions. Theoretically, it enriches the literature on digital transformation by incorporating the mediating effect of operational capabilities to improve financial performance. As such, this research is relevant to the understanding of how digital technologies promote operational improvement and enhance the value creation process of digital transformation strategies. In practice, the results indicate that the emphasis should be placed on the acquisition of both IT and complementary operational capabilities for SMEs. The current, as well as future, managers are urged to allocate resources to employee training, digital strategy formulation, and the improvement of organizational processes to achieve the highest return on digital investments and ensure continued financial performance improvement.

Future research should consider the following limitations of this study as areas for improvement. First, a cross-sectional design may reduce the strength of conclusions drawn since relationships between variables can only be viewed at a single point in time; Longitudinal studies would portray a richer picture of the variable's relationships. Second, increasing the range of participating organizations beyond small and medium-sized enterprises in Islamabad-Rawalpindi could enhance external validity across organizations. Third, there may be other mediators/moderators that have not been considered in this study; future studies could include the organizational culture or the market environment as possible mediators/moderators of the digital transformation-performance relation. Finally, the qualitative research may provide more detailed information about certain problem and prospects that SMEs experience while adopting digital transformation. Filling these gaps will further enhance the applicability as well as strengthen the scholarly foundations of this line of research.

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