

Digital Transformation and Organizational Performance: The Mediating Role of Servitization and the Moderating Role of Organizational Adaptive Capacity in Project-Intensive Organizations

Hammad Ahmed¹, Dr. Muhammad Iftikhar Ali², Maryam Batool³, Dr. Ehtasham Ul Haq⁴

^{1,2} Department of PM & SCM, Bahria Business School, Bahria University, Islamabad, Pakistan

³ School of Education, Lincoln University College, Malaysia

⁴ Quaid-i-Azam University, Islamabad

DOI: <https://doi.org/10.70670/sra.v4i1.2345>

ARTICLE INFO

Received:

Revised:

Accepted:

Available Online:

Keywords:

Digital Transformation, Servitization, Organizational Adaptive Capacity, Organizational Performance, Moderated Mediation, Project-Intensive Organizations, Pakistan

Corresponding Author:

Hammad Ahmed

Email: [01-398242-](mailto:01-398242-033@student.bahria.edu.pk)

033@student.bahria.edu.pk

ABSTRACT

This study examines how digital transformation (DT) influences organizational performance (OP) in project-intensive Pakistani organizations, with servitization as mediator and organizational adaptive capacity (OAC) as moderator. Grounded in Dynamic Capabilities Theory, Service-Dominant Logic, and Contingency Theory, a conditional process model was empirically tested using Hayes' PROCESS Model 8. Data were collected from 236 managerial professionals across IT/Telecom, Construction, and Professional Services sectors in Pakistan. Findings confirm that DT has a significant positive direct effect on OP ($B = .341, p < .001$) and strongly predicts servitization ($B = .430, p < .001$). Partial mediation through servitization was established (indirect effect = 0.1687, BootCI [0.1078, 0.2398]), identifying servitization as the primary performance-generating mechanism of digital investment. OAC did not significantly moderate either the DT-servitization or DT-performance pathways; however, it contributes directly and additively to performance ($B = .193, p = .005$). The DT-servitization-performance pathway proved structurally stable across all OAC levels. The study contributes to digital servitization and project management literature by empirically confirming the mediation chain in an underexplored emerging economy context and by refining the role of OAC as an additive capability rather than a contingency moderator.

Introduction

The need to digitalize is growing in project-oriented business sectors such as ICT, construction and professional services. In Pakistan, organisations are not only incorporating cloud-based technologies, AI, advanced analytics and collaboration tools, but are also fundamentally reconfiguring how projects are governed, how value is realised for their clients, and how they can continue to position themselves as competitors (Vial, 2019; Verhoef et al., 2021). Digital transformation is a strategic need for these companies, but the use of digital technology doesn't

mean better organizational results. The level of performance returns will vary according to the depth of digital capabilities in the wider context of organizational strategy and value creation processes (Garrido et al., 2024).

In addition to digital transformation, many organizations are also engaged in the pursuit of what is known as servitization – moving from one-off project delivery to maintaining customers over the life of the product and providing them with advisory services, as well as digitally supported lifecycle support – at the same time. Many companies are also working on servitization, a strategic extension of their value propositions from one-off project delivery to ongoing maintenance contracts, advisory services, and digitally enabled lifecycle support, in parallel to digital transformation (Mao & Wang, 2024). These two strategies go hand-in-hand: digital tools provide the coordination ecosystem and visibility of data that makes the continuous delivery of services operational. Concurrently, volatile environments with technological uncertainty, regulatory uncertainty and macroeconomic instability require high adaptive capacity in organizations, understood as the dynamic capacity to anticipate, absorb and reconfigure in the face of change (Duchek, 2020; Hillmann & Guenther, 2020).

Although there has been a significant investment in digital, results are not consistent. Other companies use digital tools to enhance the service quality and financial performance, while others are stuck implementing the tools without attaining competitive financial returns (Nwankpa & Merhout, 2020). This gap is particularly underexplored in Pakistan's project-intensive context, where institutional complexity, infrastructure constraints, talent shortages, and macroeconomic volatility further complicate digital strategy implementation (Zhang et al., 2025). The core challenge is not whether to invest in digital technology, but through which organizational pathways and under what contextual conditions digital transformation generates meaningful and durable performance returns.

Three interrelated gaps motivate this study. Theoretically, existing studies predominantly examine the direct DT-performance link, overlooking the intervening mechanisms (Verhoef et al., 2019), and no integrated model combining servitization as mediator and organizational adaptive capacity (OAC) as moderator has been empirically tested (Kludacz-Alessandri et al., 2025). Methodologically, prior studies test mediation or moderation in isolation; research applying moderated mediation to examine how OAC shapes the DT-servitization-performance chain is entirely absent. From a contextual perspective, the empirical basis is characterized by manufacturing firms in Western economies (Ginting et al., 2025), and project-intensive organizations in emerging markets like Pakistan have been under-investigated (Schiliro, 2024).

This study aims to fill these gaps by focusing on the influence of DT on OP in the project-intensive organizations of Pakistan with the mediation of servitization and the moderation of OAC. The study utilizes the managerial professionals of three different sectors (IT/Telecom, Construction, and Professional Services) in Pakistan with a sample size of 236 and is based on Dynamic Capabilities Theory (DCT; Teece, 2007), Service-Dominant Logic (SDL; Vargo & Lusch, 2004), and Contingency Theory (Lawrence & Lorsch, 1967) employing Hayes' PROCESS Model 8 for simultaneous moderated mediation testing.

Research Objectives

RO1: To assess the direct effect of digital transformation on organizational performance in Pakistan's IT/Telecom, Construction, and Professional Services sectors.

RO2: To determine whether servitization mediates the digital transformation-performance relationship in project-intensive organizations.

RO3: To evaluate whether organizational adaptive capacity moderates (a) the DT-servitization pathway and (b) the DT-performance pathway.

RO4: To test whether the service-mediated performance effect of digital transformation is contingent on organizational adaptive capacity, constituting a moderated mediation.

Research Questions

RQ1: To what extent does digital transformation directly influence the performance of project-intensive organizations in Pakistan?

RQ2: Does servitization mediate the relationship between digital transformation and organizational performance?

RQ3: Does organizational adaptive capacity moderate (a) the DT-servitization relationship and (b) the DT-performance relationship?

RQ4: Does organizational adaptive capacity condition the magnitude of the servitization-mediated indirect performance effect of digital transformation?

Literature Review and Hypotheses Development

Digital Transformation

Digital transformation refers to the process of incorporating digital technologies and changing the nature of an organization's operations, value creation and market interactions (Vial, 2019; Verhoef et al., 2021). It's not a matter of just modernizing IT, but rather strategically reconfiguring processes, capabilities and value propositions (Kraus et al., 2021). For project heavy industries, this includes integrated project management systems, sophisticated analytics, digital collaboration environments on the cloud, BIM, and digital client facing user interfaces that enhance coordination, transparency, and decision-making (Verhoef et al., 2019). Importantly, the value of performance only becomes realised when digital skills are explicitly built into the planning, implementation and offering of projects.

Servitization

Servitization is a strategic transition from the production of discrete project products to more comprehensive service-based value propositions that generate long-term customer relationships and recurring revenues (Vandermerwe and Rada 1988; Kohtamaki et al. 2019). For project intensive environments, it includes, for example, post-delivery maintenance contracts, lifecycle management, consulting retainers and outcome based agreements. Servitization is fundamentally a transformation of the traditional flow of project wins from the IT/Telecom, Construction and Professional Services sectors into more consistent, predictable and relationally-driven income streams. With the servitisation paradox which states that the more complex the service becomes the higher the cost of the service, it is also important to have digital enablement as a precondition for effective servitisation (Kohtamaki et al., 2019).

Organizational Adaptive Capacity

Organizational adaptive capacity (OAC) is an emergent higher order of dynamic capability that is described as the ability of the organization to anticipate threats, absorb disruptions, and reconfigure structures and processes to ensure a performance level that is maintained or enhanced as conditions change (Duchek, 2020; Hillmann & Guenther, 2020; Lengnick-Hall et al., 2010). It falls at the transformation dimension of Teece's (2007) sense-seize-transform model within DCT. OAC is characterized by three interdependent dimensions: robustness (resisting shocks), agility (quick adaptations to change), and adaptive learning (learning to adjust routines). In Pakistan, where project funding is a significant driver of economic and social development, regulatory uncertainty, volatile project volumes, and macroeconomic volatility and downturns pose constant challenges, especially for all three (Li et al., 2024).

Organizational Performance

Organizational performance is a multidimensional concept, which indicates financial results, market position and operational efficiency, compared to other competitors (Richard et al., 2009; Venkatraman & Ramanujam, 1986). In project-intensive industries, performance refers to

profitability, revenue growth, successful project delivery and customer satisfaction (Korhonen et al., 2022). Perceptual measures are commonly employed and are highly associated with objective measures, when industry specific firm level financial data are not available.

Theoretical Framework

The research model is based on three complements theories. Dynamic Capabilities Theory (Teece, 2007) helps to understand the DT-servitization-performance chain: digital transformation involves the activation of “sensing” and “seizing” capabilities; “servitization” is the capability transformation that reconfigures value propositions; and performance is the result of the coordinated deployment of the two. Servitization as mediator is driven by the Service-Dominant Logic (SDL) of Vargo and Lusch (2004), which maintains that value creation is achieved in the “massive fluidity of ongoing service integration with the customer, not in the individual transaction”. Digital capabilities will be useful in creating value, but they will do so mainly by facilitating service co-creation with customers. From a contingency theory (Lawrence & Lorsch, 1967), OAC is the mediating variable between digital transformation and its subsequent impacts on performance: The performance outcomes of digital transformation depend on the extent to which firms are able to use digital investment under uncertain conditions.

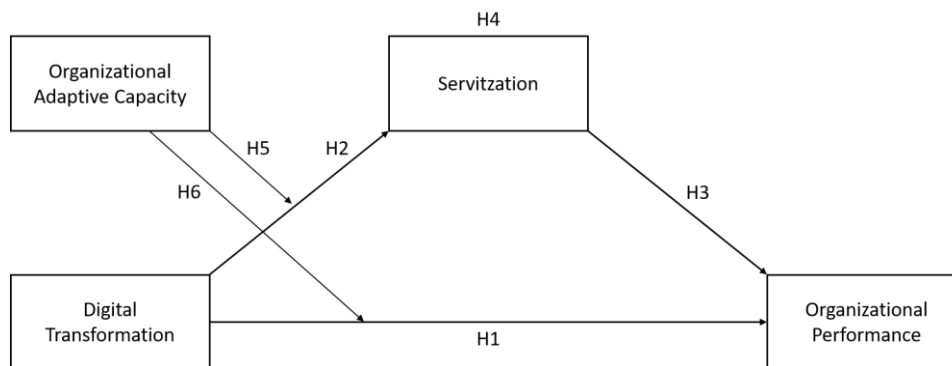


Figure 1. Conceptual Research Model. IV: Digital Transformation; Mediator: Servitization; Moderator: Organizational Adaptive Capacity; DV: Organizational Performance.

Hypotheses

H1: Digital transformation positively affects organizational performance. DT improves efficiency, coordination, and decision-making in project-intensive firms (Vial, 2019; Teece, 2007), with empirical evidence consistently linking digital maturity to superior financial and market outcomes.

H2: Digital transformation positively affects servitization. Digital platforms and cloud systems provide the technological infrastructure that makes integrated service offerings operationally feasible at scale (Kohtamaki et al., 2019); without digital infrastructure, coordination costs of ongoing service delivery are prohibitively high.

H3: Servitization has a favourable impact on performance of the organization. Service-oriented models allow companies to secure consistent revenue streams, foster customer loyalty, and mitigate risks associated with fluctuations in project volumes (Chirumalla et al., 2023).

H4: Servitization acts as a mediator between DT and performance. DCT performances gains are connected with sequential capability deployment: DT constructs the sensing/seizing infrastructure; Servitization transforms it into market value by service co-creation (SDL). Partial mediation is theoretically conceivable, since some performance advantage of DT can occur through internal efficiency without the presence of servitization (Vargo & Lusch, 2004; Teece, 2007).

H5: The relationship between DT and servitization will be stronger at higher levels of OAC. Adaptive capacity of an organisation, including knowledge integration, flexible governance and adaptive learning, can more effectively handle the complex multi-stage DT to servitization reconfiguration (Duchek, 2020).

H6: DT-performance relationship is moderated by OAC, which means, the stronger the OAC the stronger the DT-performance relationship. DT initiatives are characterized by uncertainty and disruption during the implementation process; high OAC helps organizations overcome these challenges and maintain performance benefits from digital investments (Zhang et al., 2025).

H7: Organizational adaptive capacity moderates the indirect DT-performance effect via servitisation, and the indirect effect is greater when the level of OAC is higher. When OAC strengthens the DT-servitization path, the servitization mediated performance effect of DT would be contingent upon adaptive capacity.

Research Design

A quantitative, cross-sectional survey design was employed. A positivist philosophy underpins the study, reflecting the aim to objectively measure relationships between constructs and test theoretically derived hypotheses through statistical analysis (Kaushik & Walsh, 2019). A deductive approach translates propositions from DCT, SDL, and Contingency Theory into seven testable hypotheses. Survey research is appropriate because the constructs of interest, DT, servitization, OAC, and OP, are latent organizational capabilities not directly observable through administrative records; standardized multi-item scales enable cross-sectoral comparison and regression-based conditional process analysis (Kotronoulas et al., 2023).

Sample and Data Collection

The target population included managerial professionals working in project intensive organizations in Pakistan's IT/Telecom, Construction and Shared and Professional Services industry in Islamabad, Rawalpindi, Karachi and Lahore. The respondents were those who had a role at the project coordinator level or higher, and were directly involved in digital transformation or organizational change. The selection of the sample used was purposive which ensured criterion-based and information-rich selection (Etikan, 2016). 250 responses were collected and 236 were usable after screening for incomplete and inconsistent responses. A priori power analysis (Cohen 1992) was used to determine that this sample size is greater than the minimum required (n = 119) for PROCESS Model 8 at a medium effect size ($f^2 = 0.15$, $\alpha = 0.05$, power = 0.80) with a statistical power of > 0.95.

Measures

The items of each construct were assessed using validated multi-item, Likert type, items ranging from 1 (strongly disagree) to 5 (strongly agree). Digital Transformation was assessed using 3 items from Zhao et al., (2023) with $\alpha = 0.759$. The measure of servitization was composed of 5 items from Ayala et al. (2018) ($\alpha = 0.799$). Organizational Adaptive Capacity (OAC): 12 items from Santos & Spers (2023) ($\alpha = 0.837$). The 11 items from Shea et al. (2012) and Delaney & Huselid (1996) ($\alpha = 0.867$) were used to measure organizational performance. The Cronbach's alpha values were all above the level of 0.70 (Adamson & Prion, 2013). A modification for content validity was not made because scales were used.

Table 1. *Measurement Instruments: Constructs, Sources, Items, and Reliability*

Construct	Role	Source	Items	α
Digital Transformation	IV	Zhao et al. (2023)	3	0.759
Servitization	Mediator	Ayala et al. (2018)	5	0.799

Org. Adaptive Capacity	Moderator	Santos & Spers (2023)	12	0.837
Org. Performance	DV	Shea et al. (2012); Delaney & Huselid (1996)	11	0.867

Note. IV = Independent Variable; DV = Dependent Variable. All α values exceed the 0.70 threshold (Adamson & Prion, 2013). Scales used without modification.

Analytical Strategy

Data were analyzed using IBM SPSS v28 and Hayes' (2018) PROCESS macro. The analytical sequence comprised descriptive statistics, reliability analysis, Pearson correlations, VIF-based multicollinearity assessment, simple and multiple regression, and PROCESS Model 8 conditional process modeling. Model 8 was selected because it simultaneously tests a moderator conditioning both the mediator pathway and the direct IV-DV pathway. Bootstrapping with 5,000 resamples generated empirical confidence intervals for indirect and conditional indirect effects. Control variables including industry type, firm size, firm age, and respondent experience were included to minimize omitted variable bias. Common method bias was assessed using Harman's single factor test (Podsakoff et al., 2003).

Results

Demographic Profile

The final sample of 236 managerial professionals consisted mostly of males (83.1%) and half (52.5%) were in the age group 30-39. The majority had Bachelor's degree (60.2%) and 5-10 years of work experience (40.3%). The top occupation was Project Managers (44.1%) and the second was Team Leads (25.4%). The size of the firm ranged from less than 50 employees (44.1%) to medium size (31.8%) organizations to large size (24.2%) organizations. The sample for this profile is a mid-career, experienced sample, ideal for measuring organisational-level constructs.

Reliability, Descriptive Statistics, Correlations, and Multicollinearity

The internal consistency of all constructs was satisfactory: Digital Transformation $\alpha = 0.759$, Servitization $\alpha = 0.799$, Organizational Adaptive Capacity $\alpha = 0.837$, Organizational Performance $\alpha = 0.867$. The skewness and kurtosis values were moderate for all the constructs (between minus 1.0 and 1.5) and acceptable for parametric analysis. Hypothesized relationships were preliminarily supported with Pearson correlations between DT and other variables, including servitization ($r = .446$, $p < .001$) and performance ($r = .370$, $p < .001$). The degree of servitization was most strongly correlated with performance ($r = .488$ and $p < .001$). The correlation between OAC and DT was positive and significant ($r = .250$, $p < .001$) and with performance ($r = .235$, $p < .001$) and, conceptually, OAC and servitization showed a small non-significant correlation ($r = .090$, $p = .168$). There were no multicollinearity problems as VIF values were very low (Table 2), and were well below the threshold of 5.

Table 2. Reliability, Descriptive Statistics, and Correlation Matrix (N = 236)

Variable	1. DT	2. SERV	3. OAC	4. OP
1. Digital Transformation	—			
2. Servitization	.446***	—		

Variable	1. DT	2. SERV	3. OAC	4. OP
3. Org. Adaptive Capacity	.250***	.090	—	
4. Org. Performance	.370***	.488***	.235***	—
Mean	3.27	3.25	3.07	3.14
SD	1.01	0.98	0.78	0.93
VIF	1.321	1.249	1.067	—

Note. *** $p < .001$; diagonal entries replaced with em-dash. VIF values from full multiple regression model.

Hypothesis Testing: Direct Effects (H1, H2, H3)

The simple regression results that were consolidated for the three hypotheses are shown in Table 3. H1 was supported: DT had a significant positive effect on OP ($B = .341$, $SE = .056$, $\beta = .370$, $t = 6.102$, $p < .001$, $R^2 = .137$, $F(1,234) = 37.231$, $p < .001$). The DT maturity was significantly related to OP in project-intensive firms in Pakistan, with each unit increase in DT maturity being correlated with 0.341-unit increase in OP, which supports the notion of digital transformation as a meaningful factor of firm-level performance in project-intensive firms in Pakistan. H2 was supported: DT significantly predicted servitization ($B = .430$, $SE = .056$, $\beta = .446$, $t = 7.617$, $p < .001$, $R^2 = .199$, $F(1,234) = 58.016$, $p < .001$). Compared with H1, the effect size for DT is larger, suggesting that the link between DT and firms' strategic orientation to service-based value delivery is particularly strong. H3 was supported: Servitization was the strongest single predictor of OP ($B = .465$, $SE = .054$, $\beta = .488$, $t = 8.542$, $p < .001$, $R^2 = .238$, $F(1,234) = 72.963$, $p < .001$), explaining 23.8% of variance in performance, notably higher than the DT-OP model (13.7%). This supports the idea that service-oriented value propositions are more sustainable and relationally embedded sources of competitive advantage than digital technology adoption.

Table 3. Simple Linear Regression Results for H1, H2, and H3

Predictor	B	SE	β	t	p	R ²	Adj. R ²
H1: DV = Organizational Performance							
Constant	2.023	.191	—	10.602	<.001	.137	.134
Digital Transformation	.341	.056	.370	6.102	<.001		
H2: DV = Servitization							
Constant	1.847	.193	—	9.579	<.001	.199	.195
Digital Transformation	.430	.056	.446	7.617	<.001		
H3: DV = Organizational Performance							
Constant	1.624	.185	—	8.794	<.001	.238	.234
Servitization	.465	.054	.488	8.542	<.001		

Note. All models significant at $p < .001$. Coefficients are unstandardized (B), standardized (β). F-statistics: H1: $F(1,234) = 37.231$; H2: $F(1,234) = 58.016$; H3: $F(1,234) = 72.963$.

Hypothesis Testing: Mediation through Servitization (H4)

The complete multiple regression analysis with DT, SERV and OAC as concurrent predictors of OP gave $R^2 = .291$, $F(3,232) = 31.804$, $p < .001$. When servitization was used as a covariate in the multiple regression model, its standardized coefficient decreased from $\beta = .370$ in simple regression to .149, suggesting that part of the association between the independent variable and the dependent variable was mediated by servitization. Critically, both DT ($B = .137$, $SE = .058$, $\beta = .149$, $t = 2.344$, $p = .020$) and Servitization ($B = .388$, $SE = .059$, $\beta = .407$, $t = 6.585$, $p < .001$) remained significant predictors in the full model, as did OAC ($B = .193$, $SE = .068$, $\beta = .161$, $t = 2.828$, $p = .005$). The positive and significant indirect effect of DT on OP via Servitization was found (effect = 0.1687, BootSE = 0.0337, 95% BootCI [0.1078, 0.2398]). The results fully support H4, which states that the relationship between DT and performance is partially mediated by servitization, indicating that the service-based co-creation mechanism is the main path by which digital investments bring market returns in project-intensive organizations (see Table 4).

Table 4. Mediation Analysis: Indirect Effect of DT on OP through Servitization (PROCESS Model 8)

	B / Effect	SE	t / z	p	BootLLCI	BootULCI
Multiple Regression: DV = Organizational Performance ($R^2 = .291$, $F(3,232) = 31.804$, $p < .001$)						
Constant	.835	.266	3.139	.002	—	—
Digital Transformation (DT)	.137	.058	2.344	.020	—	—
Servitization (SERV)	.388	.059	6.585	<.001	—	—
Org. Adaptive Capacity (OAC)	.193	.068	2.828	.005	—	—
Indirect Effect: DT → SERV → OP (Bootstrap 5,000 resamples)						
DT → SERV → OP	0.1687	0.0337	—	—	0.1078	0.2398

Note. Bootstrap 5,000 resamples. Indirect effect CI excludes zero, confirming significant partial mediation. OAC included as covariate.

Hypothesis Testing: Moderation by Organizational Adaptive Capacity (H5 and H6)

To test the hypotheses that OAC conditions moderate the relationship between DT and servitization (H5) and DT and performance (H6), the interaction terms were tested in the moderation analyses. For H5 (DV = Servitization): while DT remained a significant predictor ($b = 0.4350$, $p < .001$), the interaction term $DT \times OAC$ was non-significant ($b = 0.0081$, $SE = 0.0760$, $t = 0.107$, $p = .915$), and the incremental variance explained by the interaction was negligible ($\Delta R^2 = .0000$, $F\text{-change } p = .915$). Does not support H5. For H6 (DV = Organizational Performance): DT ($b = 0.1366$, $p = .020$), Servitization ($b = 0.3877$, $p < .001$), and OAC ($b = 0.1959$, $p = .005$) were all significant predictors in the full model. However, the $DT \times OAC$ interaction was again non-significant ($b = 0.0229$, $SE = 0.0683$, $t = 0.335$, $p = .738$), with near-zero incremental explanatory power ($\Delta R^2 = .0003$, $F\text{-change } p = .738$). Help us to offer help and support. Importantly, the direct path for OAC to OP was significant in a positive direction ($B = .193$, $p = .005$) suggesting that OAC is a performance-enabling capability, rather than a contingency moderator, as it was not multiplicative (Table 5).

Table 5. Moderation Analysis: OAC as Moderator of DT-Servitization (H5) and DT-Performance (H6)

Predictor	b	SE	t	p	LLCI	ULCI
H5: DV = Servitization ($R^2 = .199$, $R^2\Delta$ for interaction = .0000, F-change $p = .9150$)						
Constant	3.2493	0.0591	54.980	<.001	3.1328	3.3657
Digital Transformation (DT)	0.4350	0.0585	7.437	<.001	0.3197	0.5502
Org. Adaptive Capacity (OAC)	-0.0278	0.0766	-0.362	.718	-0.1788	0.1232
DT $\times$ OAC (Int_1)	0.0081	0.0760	0.107	.915	-0.1415	0.1578
H6: DV = Organizational Performance ($R^2 = .292$, $R^2\Delta$ for interaction = .0003, F-change $p = .7379$)						
Constant	1.8712	0.1990	9.405	<.001	1.4792	2.2632
Digital Transformation (DT)	0.1366	0.0585	2.336	.020	0.0214	0.2519
Servitization	0.3877	0.0590	6.569	<.001	0.2714	0.5039
Org. Adaptive Capacity (OAC)	0.1959	0.0689	2.843	.005	0.0601	0.3316
DT $\times$ OAC (Int_1)	0.0229	0.0683	0.335	.738	-0.1116	0.1574

Note. Int_1 = DT $\times$ OAC interaction term. ΔR^2 = incremental R^2 from adding the interaction term. Neither interaction was statistically significant.

Hypothesis Testing: Moderated Mediation (H7)

The index of moderated mediation was 0.0031 (BootSE = 0.0287, 95% BootCI [-0.0515, 0.0646]), with the confidence interval including zero. This means that the indirect DT-OP effect via Servitization is not different significantly depending on the level of OAC, and the H7 is not supported. The conditional indirect effects at three levels of OAC were substantively similar: low OAC (effect = 0.1658, CI [0.0918, 0.2507]), mean OAC (effect = 0.1687, CI [0.1078, 0.2398]), and high OAC (effect = 0.1710, CI [0.0953, 0.2632]). Of particular note, the latter effect was found at all three OAC levels (all CIs exclude zero), suggesting the DT-servitization-performance mediation chain is structurally stable and has a strong effect across OAC levels (Table 6).

Table 6. Moderated Mediation Analysis: Conditional Indirect Effects and Index of Moderated Mediation (H7)

OAC Level	Indirect Effect	BootSE	BootLLCI	BootULCI		
Conditional Indirect Effects of DT on OP through Servitization at Values of OAC						
Low (-1SD, OAC = 2.288)	0.1658	0.0407	0.0918	0.2507		
Mean (OAC = 3.065)	0.1687	0.0337	0.1078	0.2398		

OAC Level	Indirect Effect	BootSE	BootLLCI	BootULCI		
Conditional Indirect Effects of DT on OP through Servitization at Values of OAC						
High (+1SD, OAC = 3.842)	0.1710	0.0417	0.0953	0.2632		
Index of Moderated Mediation						
OAC	Index = 0.0031	BootSE = 0.0287	BootLLCI = -0.0515	BootULCI = 0.0646		

Note. Bootstrap 5,000 resamples. IMM index CI includes zero, indicating the indirect effect does not vary significantly across OAC levels. All conditional indirect effects are significant (CIs exclude zero).

Discussion

This section interprets the empirical findings in light of the theoretical framework based on Dynamic Capabilities Theory (DCT; Teece, 2007), Service-Dominant Logic (SDL; Vargo & Lusch, 2004), and Contingency Theory (Lawrence & Lorsch, 1967) and locates them in the current body of literature on digital transformation, servitization, and organizational adaptive capability in project-intensive environments.

Digital Transformation and Organizational Performance (H1 Supported)

The results confirm that digital transformation has a significant and positive direct effect on the organizational performance ($B = .341$, $\beta = .370$, $p < .001$, $R^2 = .137$), supporting H1 and in line with a large and growing literature that shows that organizational performance is improved with higher levels of DT maturity (Vial, 2019; Khin & Ho, 2018; Garrido et al., 2024). The R^2 is fairly low, at 13.7%, which is in line with single-predictor cross-sectional models often seen in strategy research where the variance in strategy performance is spread across many organizational and environmental variables.

The DCT aspects of digital transformation relate to the sensing and seizing sides of Teece's (2007) framework. Monitoring involves being aware of the opportunities and developments in digital and technology; and capturing involves investing in technology, cloud-based collaboration, BIM and real-time analytics via integrated project management systems. These abilities collectively minimize the coordination expenses of the projects, increase information transparency throughout the organizational ranges, shorten decision-making cycles and enhance clients' responsiveness, which are all measurable performance boosters (Cavusgil & Deligonul, 2024). In the case of the ICT industry in Pakistan, the positive results include measurable gains in timelines, efficient use of resources, and enhanced client satisfaction scores for companies implementing ERP solutions and digital project dashboards. Likewise, the integration of BIM and IoT for site monitoring in the construction industry is starting to reap cost reductions and quality improvements, contributing to competitive performance gains.

Importantly, this finding carries significant implications beyond a simple technology-adoption effect. The result validates the position that digital transformation is not merely an IT investment but a fundamental reconfiguration of organizational capabilities that generates firm-level competitive returns, particularly in the project-intensive Pakistani context where traditional project delivery models are under growing pressure from clients demanding faster delivery, greater transparency, and more integrated service experiences (Vial, 2019). The direct DT-OP

relationship thus represents the baseline performance return on digital investment before the service-based transformation pathway is accounted for.

Digital Transformation as an Enabler of Servitization (H2 Supported)

The strong positive relationship between DT and servitization ($B = .430$, $\beta = .446$, $p < .001$, $R^2 = .199$) validates H2, thereby contributing to the digital servitization literature that has so far mostly theorized about, rather than empirically demonstrated, the relationship in project-intensive emerging economy contexts (Kohtamaki et al., 2019; Martin-Pena et al., 2018). The effect size of H2 ($R^2 = .199$) is meaningfully larger than the effect size of H1 ($R^2 = .137$) and should be carefully considered theoretically. It implies that DT is more related to the servitization orientation than to performance itself, thus supporting the theoretical argument that the main mechanism of value creation of DT is the reconstruction of the firm's external value proposition towards integrated service delivery.

Theoretically this result is related to the transformation dimension of DCT. Digital platforms, cloud infrastructure and client facing analytics tools are the foundations of the reduced coordination costs and information asymmetries that used to make integrated service models operationally unfeasible in project-intensive industries. The service relationships that were necessary for servitization were not economically viable or operationally manageable without real-time status of projects, client usage patterns and asset health (Spadafora & Rapaccini, 2025). These barriers are removed by the use of digital capabilities to allow companies to offer in addition to a single project product, a value proposition in the form of a lifecycle service contract, a managed service agreement, or an advisory retainer. In Pakistan's IT/Telecom arena, this transition is already underway, as deployments on cloud platforms and client portals for analytics are letting companies move from project- to multi-year managed services contracts, with digital being the service conduit.

This finding also questions the tacit assumption in much of the digital transformation literature that the main pathway to DT performance is via internal process improvement. The data indicate instead that DT's more potent pathway is external and through servitization, which is more in line with the basic premise of SDL that competitive advantage is not contained within the product or the project deliverables, but is co-created with the customer in the course of an ongoing service relationship (Vargo & Lusch, 2004).

Servitization and Organizational Performance (H3 Supported)

In the entire model, the strongest single predictor of organizational performance was servitization ($B = .465$, $\beta = .488$, $p < .001$, $R^2 = .238$), which confirmed H3 and supported the findings that servitization (service-based business model) provides more in-depth and lasting competitive performance than product-based and project-based business models (Chirumalla et al., 2023; Kohtamaki et al., 2019). Its R^2 represents the largest explanation of the constructs which is .238 among all the single predictors models in this study which indicates that SrvO is the most closest predictor to the performance of the organization.

This finding is entirely consistent from an SDL point of view (Vargo & Lusch, 2004) as value is co-created by continual integration of resources and interaction between the services and the client, not by delivering a finished product. Service companies earn more steady revenue streams than those found in discrete project-based work, provide clients with more frequent customer interactions, foster switching costs, and gain knowledge of how clients run their businesses, which helps them evolve increasingly valuable services over time. Together, these mechanisms lead to more stable, predictable and growing revenue flows, with long-term competitive edge.

Interestingly, the findings do not show the 'servitization paradox', which is also a significant output. Some studies have recorded situations where servitisation raises operational complexity without any commensurate improvements in the operational performance of the firm, for example

if it does not have the digital infrastructure needed to ensure coordination of the service delivery process (Kohtamaki et al., 2019). This paradox is not observed in the Pakistani sample of project-intensive firms, indicating that the survey firms have reached a level of digital capability to accommodate the coordination requirements of service models and that the servitization strategies being adopted in these industries are not simply additive complexity, but true strategic reconfiguration that is enabled by digital. This discovery highlights the need to sequence digital investment with servitization and not make a choice between digital investment or servitization.

Mediation through Servitization: The Core Performance Mechanism (H4 Supported)

The most important theoretically and practically contribution of the study is the confirmation of partial mediation (H4 supported; indirect effect = 0.1687, BootCI [0.1078, 0.2398]). The significant bootstrapped indirect effect and the meaningful reduction of DT's direct coefficient in the simple regression ($\beta = .370$) compared to the full model including SERV ($\beta = .149$) (a coefficient reduction of .221, which is the amount of DT's effect on performance that operates through the servitization pathway) confirmed that partial mediation was achieved. The mediation is partial, and DT also brings about performance increase in direct ways that are independent of a service orientation the firm has developed, such as internal operational efficiency, improvement of project coordination, and decision-making speed.

This discovery brings together the DCT and SDL into a single explanation of the organizational return of digital investment. DCT offers the capability-sequencing logic: digital transformation first builds sensing and seizing infrastructure (sensing digital opportunities, seizing them through technology adoption), and then builds operational foundation for the transformation dimension, which reconfigures value propositions towards integrated service models (Teece, 2007). SDL offers the value-creation logic, and it's precisely this servitization transformation that allows digital operant resources to be externalized in the form of market value: recurring revenues, ongoing client relationships for co-creation, and service-driven competitive differentiation – as opposed to staying within the house as operational efficiencies (Vargo & Lusch, 2004). These theories account for the direct and mediated pathways in the data.

The size of the indirect effect (0.1687) compared to the total effect of DT on OP suggests that servitization spreads around 46% of the overall performance effect of DT ($0.1687 / (0.1687 + 0.1977) = 46.1\%$). This is a significant percentage and highlights the fact that digital transformation efforts that are solely focused on improving internal efficiencies are missing out on almost half of the performance return on digital transformation. Organizations that also use digital capabilities to enable service-based value propositions are seeing a much larger share of the performance potential from their investments in digital. This study directly addresses Vial's (2019) calls to the literature to investigate the mechanisms by which digital investments can lead to organizational performance in a project intensive emerging economy context which is not captured by direct-effect models, and further extends the digital servitization literature by offering one of the first empirical mediation tests in this context.

The Role of Organizational Adaptive Capacity (H5, H6, H7: Not Supported)

The absence of significant moderation by OAC across all three hypotheses (H5: $b = 0.0081$, $p = .915$; H6: $b = 0.0229$, $p = .738$; H7: IMM index = 0.0031, BootCI [-0.0515, 0.0646]) is the study's most theoretically nuanced finding. Such null findings were not due to the failure of OAC as a construct; indeed, OAC showed a significant direct positive practically meaningful effect on OP ($B = .193$, $\beta = .161$, $p = .005$), which is a testament to the value of OAC as an organizational capability. Instead, the null moderation suggests that OAC is not a Contingency Theory type boundary condition and it does not differentially amplify DT's performance pathways based on their level. Rather it is as an additive ability, and as such it is a theoretical and practical difference with significant consequences.

This pattern can be explained by three complementary theories. The first, and most fundamental and theoretical, is the argument based on endogeneity in DCT. Digital transformation can endogenously create the adaptive micro-foundations which are normally provided by OAC as the moderating condition. Digital sensing routines in enterprise systems are specifically mimicking OAC's anticipatory function; agile project governance frameworks using digital tools are specifically mimicking OAC's flexible decision-making function; and real-time data visibility systems are mimicking OAC's resource mobilization function. Furthermore, as firms become more digitally mature, these digitally embedded adaptive capabilities can be viewed as having taken over the moderating role of OAC and therefore be statistically redundant, given that the DT variable itself includes them (Zhang et al., 2025). This endogeneity between DT and OAC aligns with what Teece (2007) has called “dynamic capabilities as co-evolving routines that reconfigure due to strategic investments, such as investments in DT”.

Second, Project intensive organizations can be explained by a context specific institutional explanation in the case of Pakistan. In sectors with long project cycles, contractual governance structures and a culture of risk management, adaptive capacity is institutionalized in formal ways: project risk registers, contingency plans, multi-layer governance structures, and long-lived project management teams. In such circumstances OAC is not a parameter by which to measure the difference between high- and low-performing organizations, but a rather homogeneous competence that can be found in an organizational culture and sector norms. This limited variance of the OAC scores ($M = 3.07$, $SD = 0.78$) is an empirical finding, one that is consistent with this interpretation: If a construct possesses limited variance in a sample, then it has limited ability to differentiate relationships between two other constructs, regardless of its theoretical significance. Third, the methodological evidence strongly rules out statistical power as an explanation for the null findings. With $N = 236$ and statistical power exceeding 0.95 for medium effect sizes (Cohen, 1992), the study was well-powered to detect moderation effects of practical significance. The near-zero incremental R^2 values ($\Delta R^2 \leq .0003$) further confirm that no meaningful interaction effect was suppressed by insufficient power. The null moderation is therefore a substantive theoretical finding: the DT-servitization-performance pathway in Pakistan's project-intensive sectors is structurally stable and does not vary as a function of OAC level. This stability is not a limitation of the study's model but a theoretically important observation that the digital capability orchestration mechanism identified here operates through technological and process enablers that function with comparable effectiveness across varying levels of organizational adaptive capacity. These findings advance the theoretical literature in two ways. They refine Contingency Theory's application to digital transformation research by empirically demonstrating that not all organizational capabilities function as contingency moderators; some, like OAC in this context, function as additive rather than multiplicative contributors to performance. This distinction reflects new arguments in the resilience literature that differentiate between capabilities that buffer performance to environmental shocks (additive function) vs. capabilities that amplify returns of strategic initiatives (multiplicative or moderating function) (Hillmann & Guenther, 2020; Ducheck, 2020). They also add to a growing literature on the process of digital transformation by pinpointing situations where OAC may have a lesser moderating role: when digital maturity is already moderately high and when investments in DT could co-develop the adaptive micro-foundations that OAC would otherwise provide.

Integrated Synthesis: Implications of the Full Conditional Process Model

The results collectively give a comprehensive picture of the digital transformation and the creation of organisational performance in project-intensive organisations in Pakistan. DT works in two parallel and complementary ways: a direct manner ($H1: \beta = .149$ in full model) and an indirect manner ($H4: \text{indirect effect} = 0.1687$). The indirect pathway which accounts for around 46% of DT's total performance effect is the dominant one, and it is the major source of DT's

sustainable competitive advantage in project-intensive contexts. The organizational adaptive capacity is directly contributing to this performance landscape in an independent and additive way ($B = .193$, $p = .005$; $B = .258$, $p = .002$), protecting the organizational performance stability without differential conditioning the DT-servitization-performance chain.

The configuration implies that digital investment and service strategy is not as substitutable nor as complementary as the digital servitization literature has sometimes suggested. Digital investment will not replace servitization investment and the performance potential of digital capacities cannot be reached without a service orientation strategy. In project-intensive organizations in Pakistan and similar emerging economy settings this means that DT roadmaps need not just to be an internal efficiency measure, but intentionally planned with a clear goal of servitization in mind. Digital capabilities that fail to ultimately facilitate service-based value delivery are only half as effective in contributing to performance, creating a structural disadvantage for the organizations that are only partially digital.

Conclusion

This study explored the impact of digital transformation on organisational performance of project dominated firms in Pakistan with the mediation of servitization and moderation of organizational adaptive capacity. The four research questions were answered. RQ1 is supported: DT has a significant positive direct impact on OP ($B = .341$, $p < .001$). RQ2 is confirmed through partial mediation (indirect effect = 0.1687, BootCI [0.1078, 0.2398]), establishing servitization as the primary performance-generating mechanism of digital investment by enabling service-based value co-creation with clients. RQ3 is answered in the negative: OAC does not significantly moderate either the DT-servitization ($H5$: $p = .915$) or DT-performance ($H6$: $p = .738$) pathways. RQ4 is similarly unsupported: the indirect effect does not vary significantly across OAC levels (IMM index = 0.0031, BootCI [-0.0515, 0.0646]).

Theoretical Contributions

The study makes three bounded contributions to the literature. First, it provides an empirical test of DCT's sequential capability orchestration logic, specifically the DT-as-sensing/seizing, servitization-as-transformation, performance-as-outcome sequence, in project-intensive emerging economy firms, a context absent from prior literature concentrated in manufacturing contexts in developed Western economies. Second, it advances digital servitization scholarship by empirically confirming the DT-servitization-performance mediation chain, moving beyond single-step direct-effect models and contributing a theoretically and empirically grounded answer to Vial's (2019) call for mechanism-level research. Third, the study refines scholarly understanding of OAC's role in digital transformation models by empirically distinguishing it as an additive performance-enabling capability rather than a multiplicative contingency moderator, offering new theoretical clarity on when and how OAC contributes to organizational performance.

Practical Implications

The results provide project management managers in Pakistan's project-rich sectors with actionable priorities. There is a need for digital roadmaps to be explicitly linked to the servitization strategy from the start: the combination of DT investments and intentional service portfolio development yields higher returns. IT/Telecom companies should assess their digital success by considering how digital platforms support managed service contracts and recurring revenue models. Manufacturers must use BIM, IOT monitoring and digital asset tools as a bridge to get into post-handover maintenance and lifecycle service contracts. The strongest predictor of performance in the model is the construct of Servitization which should be considered to be a formal institutional priority. While flexible governance, portfolio risk management and

knowledge continuity practices are investment in OAC, it should not be seen as a mechanism to enhance directly DT returns but as a performance protection mechanism.

Limitations and Future Research

Longitudinal studies would enable to see how DT-servitisation-performance dynamics change throughout the project lifecycle, but the cross sectional design of the study restricts causal inference. The study is contextually limited to the Pakistani context as it is a project-intensive sector and therefore generalizability may be limited to other cultural or industry contexts. Although validated, perceptual performance measures are susceptible to common method bias which has been addressed using Harman's test. The conditional process model should be replicated in other emerging economies and other industry contexts in the future. Further boundary conditions (such as leadership styles, organizational culture, team dynamics) might be added in order to achieve a more in-depth picture of the DT-performance chain. Qualitative studies would be able to reveal more in-depth understanding of the ways in which the digital capabilities can be converted into value for the client through the servitization approach.

References

- Adamson, K. A., & Prion, S. (2013). Reliability: Measuring Internal Consistency Using Cronbach's α . *Clinical Simulation in Nursing*, 9(5), e179–e180. <https://doi.org/10.1016/j.ecns.2012.12.001>
- Cavusgil, S. T., & Deligonul, S. Z. (2024). Dynamic capabilities framework and its transformative contributions. *Journal of International Business Studies*, 56(1), 33–42. <https://doi.org/10.1057/s41267-024-00758-8>
- Chirumalla, K., Leoni, L., & Oghazi, P. (2023). Moving from servitization to digital servitization: Identifying the required dynamic capabilities and related microfoundations to facilitate the transition. *Journal of Business Research*, 158, 113668. <https://doi.org/10.1016/j.jbusres.2023.113668>
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112(1), 155–159. <https://doi.org/10.1037/0033-2909.112.1.155>
- Duchek, S. (2019). Organizational resilience: a capability-based conceptualization. *BuR - Business Research*, 13(1), 215–246. <https://doi.org/10.1007/s40685-019-0085-7>
- Etikan, I. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, 5(1), 1. <https://doi.org/10.11648/j.ajtas.20160501.11>
- Garrido-Moreno, A., Martín-Rojas, R., & García-Morales, V. J. (2024). The key role of innovation and organizational resilience in improving business performance: A mixed-methods approach. *International Journal of Information Management*, 77, 102777. <https://doi.org/10.1016/j.ijinfomgt.2024.102777>
- Ginting, H., Utami, H. N., Riyadi, R., & Hutahayan, B. (2025). Exploring the impact of servitization and digitalization on firm competitiveness and performance: The moderating role of government support. *Sustainability*, 17(19), 8756. <https://doi.org/10.3390/su17198756>
- Hayes, A. F. (2018). Introduction to mediation, moderation, and conditional process analysis: A regression-based approach (2nd ed.). Guilford Press.
- Hillmann, J., & Guenther, E. (2020). Organizational resilience: a valuable construct for management research? *International Journal of Management Reviews*, 23(1), 7–44. <https://doi.org/10.1111/ijmr.12239>
- Kaushik, V., & Walsh, C. A. (2019). Pragmatism as a research paradigm and its implications for social work research. *Social Sciences*, 8(9), 255. <https://doi.org/10.3390/socsci8090255>

- Khin, S., & Ho, T. C. (2018). Digital technology, digital capability and organizational performance. *International Journal of Innovation Science*, 11(2), 177–195. <https://doi.org/10.1108/ijis-08-2018-0083>
- Kludacz-Alessandri, M., Hawrysz, L., Pomaranik, W., Żak, K., & Zhang, W. (2025). Organizational resilience as a mediator of the impact of digital transformation on job satisfaction in primary healthcare during crisis: evidence from Poland and the Netherlands. *Journal of Healthcare Leadership*, Volume 17, 623–640. <https://doi.org/10.2147/jhl.s522783>
- Kohtamäki, M., Parida, V., Patel, P. C., & Gebauer, H. (2019). The relationship between digitalization and servitization: The role of servitization in capturing the financial potential of digitalization. *Technological Forecasting and Social Change*, 151, 119804. <https://doi.org/10.1016/j.techfore.2019.119804>
- Korhonen, T., Jääskeläinen, A., Laine, T., & Saukkonen, N. (2022). How performance measurement can support achieving success in project-based operations. *International Journal of Project Management*, 41(1), 102429. <https://doi.org/10.1016/j.ijproman.2022.11.002>
- Kotronoulas, G., Miguel, S., Dowling, M., Fernández-Ortega, P., Colomer-Lahiguera, S., Bağçivan, G., Pape, E., Drury, A., Semple, C., Dieperink, K. B., & Papadopoulou, C. (2023). An overview of the fundamentals of data management, analysis, and interpretation in quantitative research. *Seminars in Oncology Nursing*, 39(2), 151398. <https://doi.org/10.1016/j.soncn.2023.151398>
- Kraus, S., Durst, S., Ferreira, J. J., Veiga, P., Kailer, N., & Weinmann, A. (2021). Digital transformation in business and management research: An overview of the current status quo. *International Journal of Information Management*, 63, 102466. <https://doi.org/10.1016/j.ijinfomgt.2021.102466>
- Lawrence, P. R., & Lorsch, J. W. (1967). Organization and environment: Managing differentiation and integration. Harvard Business School Press.
- Lengnick-Hall, C. A., Beck, T. E., & Lengnick-Hall, M. L. (2010). Developing a capacity for organizational resilience through strategic human resource management. *Human Resource Management Review*, 21(3), 243–255. <https://doi.org/10.1016/j.hrmr.2010.07.001>
- Li, J., Yu, H., & Deng, X. (2024). A systematic review of the evolution of the concept of resilience in the construction industry. *Buildings*, 14(9), 2643. <https://doi.org/10.3390/buildings14092643>
- Mao, N., & Wang, M. (2024). How does the interaction of digitalization and servitization contribute to manufacturing financial performance? The intermediary effect of manufacturing innovation performance. *Heliyon*, 10(19), e38312. <https://doi.org/10.1016/j.heliyon.2024.e38312>
- Nwankpa, J. K., & Merhout, J. W. (2020). Exploring the effect of digital investment on IT innovation. *Sustainability*, 12(18), 7374. <https://doi.org/10.3390/su12187374>
- Podsakoff, P. M., MacKenzie, S. B., Lee, J., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879–903. <https://doi.org/10.1037/0021-9010.88.5.879>
- Richard, P. J., Devinney, T. M., Yip, G. S., & Johnson, G. (2009). Measuring organizational performance: towards methodological best practice. *Journal of Management*, 35(3), 718–804. <https://doi.org/10.1177/0149206308330560>
- Santos, T., & Spers, R. G. (2023). Organizational adaptive capacity scale development. [Validated scale instrument].
- Schilirò, D. (2024). Digital Transformation and its Impact on Organizations. *International Journal of Business and Management*, 19(6), 71. <https://doi.org/10.5539/ijbm.v19n6p71>

- Spadafora, M., & Rapaccini, M. (2025). Exploring the linkages between servitization and circular economy: Remanufacturing as a product or as a service? *Sustainable Technology and Entrepreneurship*, 4(3), 100116. <https://doi.org/10.1016/j.stae.2025.100116>
- Teece, D. J. (2007). Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, 28(13), 1319–1350. <https://doi.org/10.1002/smj.640>
- Vandermerwe, S., & Rada, J. (1988). Servitization of business: Adding value by adding services. *European Management Journal*, 6(4), 314–324. [https://doi.org/10.1016/0263-2373\(88\)90033-3](https://doi.org/10.1016/0263-2373(88)90033-3)
- Vargo, S. L., & Lusch, R. F. (2003). Evolving to a new dominant logic for marketing. *Journal of Marketing*, 68(1), 1–17. <https://doi.org/10.1509/jmkg.68.1.1.24036>
- Venkatraman, N., & Ramanujam, V. (1986). Measurement of Business performance in Strategy Research: A comparison of Approaches. *Academy of Management Review*, 11(4), 801. <https://doi.org/10.2307/258398>
- Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Dong, J. Q., Fabian, N., & Haenlein, M. (2019). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research*, 122, 889–901. <https://doi.org/10.1016/j.jbusres.2019.09.022>
- Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, 28(2), 118–144. <https://doi.org/10.1016/j.jsis.2019.01.003>
- Zhang, J., Li, H., & Zhao, H. (2025). The impact of digital transformation on organizational resilience: the role of innovation capability and agile response. *Systems*, 13(2), 75. <https://doi.org/10.3390/systems13020075>