



DETERMINANTS OF DIGITAL TECHNOLOGY ADOPTION: A MULTIVARIABLE FRAMEWORK FOR ORGANIZATIONAL READINESS, PERCEIVED VALUE, AND ADOPTION BARRIERS

Parimal A. Trivedi*

*Assistant professor, Computer science Indus University, prof.parimaltrivedi@gmail.com

Corresponding author: prof.parimaltrivedi@gmail.com

ARTICLE INFO

Received: 04/04/2026

Revised: 16/06/2026

Accepted: 13/07/2026

Published: 25/07/2026

DOI: <https://doi.org/10.69980/9f5hvm81>

Volume:12, Issue:03, July, 2026

Abstract

The adoption of digital technology is more and more being influenced by organizational capacity, value, constraints of implementation and external competition. This study proposes a multivariable analysis that investigates how organizational readiness, perceived value, cost barriers, complexity barriers, and complementary behavioral and contextual determinants affect digital technology adoption. A quantitative secondary-data design was implemented based on 327 complete responses from organizational surveys, and the operationalization of the digital technology adoption was through the adoption intention measured in five-point Likert scales. Construct reliability, descriptive statistics, Pearson correlations, multiple regression, hierarchical regression, multicollinearity diagnostics, and robustness checks were performed. The core model accounted for 19.4% of the variance in adoption, and the extended model explained 26.1% of the variance. The strongest and most stable independent predictor in the fully adjusted model was the competitive pressure. In the core model, perceived value was an important contributor and when it was introduced within the given hierarchical sequence it had the greatest incremental effect upon the model, but its individual contribution to the model declined after the introduction of the wider predictors. Cost barriers showed a smaller positive association, while complexity and organizational readiness did not retain independent significance after simultaneous adjustment. The results highlight the need to consider the adoption of digital technology from a more integrated, multivariable approach, where organizational, perceptual, barrier-related, behavioral, and contextual factors act in conjunction and not separately. The framework offers a statistically grounded basis for evaluating adoption decisions across technologically evolving organizational environments.

Keywords: Digital technology adoption; organizational readiness; perceived value; adoption barriers; competitive pressure; multivariable analysis

1. Introduction

Digital technologies have grown to be fundamental to the competitiveness and operational efficiency of organizations, service innovation and their ability to adapt over time. The development of AI, automation, data analysis, cloud-based solutions, and service technologies that have digital capabilities is changing the way organisations coordinate activities, allocate resources, engage with customers and adapt to changing environmental conditions. The use of advanced technologies doesn't always reflect its successful organizational implementation, however. The adoption of digital technologies is driven by a mix of technology, organizational, behavioral, and environmental factors that affects the value and feasibility of the technology to the firm and how the technology fits with the current capabilities. Recent evidence thus highlighted the importance of perspectives on digital technology adoption other than single factor (Faiz et al., 2024). Organizational readiness represents one of the most important internal conditions influencing technology adoption. It represents the degree of an organization's capability to acquire the required resources, infrastructure, managerial support, strategic orientation and institutional arrangements for introducing and maintaining new technologies. For organizations that are more ready, there is a greater likelihood they can more easily dedicate financial resources, restructure workflows, build employee capacity, and address implementation challenges. Research on digital transformation also shows that readiness is not just a technical issue but also an organisational process, human capability and governance and strategic preparedness (Uren & Edwards, 2023). As such, readiness assessment is starting to gain significance as a tool to uncover organizational strengths and weaknesses prior to embarking on a large-scale digital transformation effort (Silva et al., 2022). A more recent approach has proposed that digital organisational readiness can also significantly affect the impact of technology-enabled transformation on the delivery of meaningful outcomes from digital transformation (Silva et al., 2025).

Perceived value is also an important factor when making decisions about technology adoption. Technology adoption is more likely to occur when it is viewed as a means to achieve measurable gains in productivity, efficiency, service quality, decision making, or operational effectiveness, for organizations and users. Perceptions of usefulness and organizational value can therefore shape the willingness to accept new technological systems and commit resources to their implementation. The findings from the new digital technologies indicate that perceived organizational value is closely related to adoption intentions, especially if potential adopters are aware of the clear operational, and strategic, benefits (Jalo & Pirkkalainen, 2024). This perceived benefit of technology then needs to be assessed in conjunction with the organizational context necessary to achieve that benefit.

However, there can be significant barriers to the adoption of technology. Programs with high implementation costs, technical complexity, integration issues, resistance to change, lack of expertise, and doubts about the outcomes may decrease adoption of new technologies. For organisations with fewer resources, financial cost is a critical aspect, while complexity can increase implementation demands and perceived operational risk (Satar & Alarifi, 2022). Evidence of technology adoption also shows that there are some factors that are common across various contexts in organizations, such as compatibility, complexity, relative advantage, organizational resources, and environmental pressures, as noted by Zamani (2022). The diffusion of emerging digital technologies is also influenced by multiple enabling opportunities and structural barriers at the macro level, suggesting that the diffusion of digital technologies depends on multiple interacting conditions rather than the isolated influence of individual factors (Xiao et al., 2024).

Environmental and behavioral factors further strengthen the multidimensional nature of digital adoption. Competition could push organizations to roll out new technologies to maintain market share, and trust, attitudes, and perceived ease of use can shape the reactions of decision makers and organizational employees to technological change. Empirical evidence from organizational technology adoption indicates that organizational readiness, relative advantage, perceived complexity, and competitive pressure can be examined simultaneously within integrated multivariable adoption frameworks (Hmoud et al., 2023). Digital organizational culture and knowledge acquisition also enable the companies to translate technological opportunities into significant transformation benefits (Jewapatarakul & Ueasangkomsate, 2024).

This is a multi-variable approach that is required to determine the independent and joint roles of organizational readiness, perceived value, adoption barriers, and complementary determinants of digital technology adoption. This can help to explain the relative significance of the individual predictors, and the simultaneous effects of other organizational, perceptual, behavioral, and contextual factors.

Objectives of the Study

1. To examine the effects of organizational readiness, perceived value, and adoption barriers on digital technology adoption.
2. To compare the relative influence of organizational readiness, perceived value, cost barriers, and complexity barriers on digital technology adoption using multivariable statistical analysis.
3. To develop and evaluate a multivariable statistical framework for explaining digital technology adoption by integrating organizational readiness, perceived value, adoption barriers, and complementary behavioral and contextual determinants.

2. Methodology

2.1 Research Design and Data Source

The quantitative secondary data research design was used to study the determinants of digital technology adoption under a multivariable analysis framework. The analysis was performed using a publicly available survey dataset containing responses from organizational personnel who had been exposed to advanced digital service technologies (Panigrahi & Mukherjee, 2025). There were 327 complete observations in the secondary data available for analysis, which were publicly accessible. Five-point likert scales were used to measure the variables, which included organizational, perceptual,

behavioral, and contextual aspects pertinent to technology adoption. All numerical coding was left as is during the analysis to indicate greater endorsement of the construct for a higher score.

2.2 Measurement and Operationalization of Constructs

The indicator for digital technology adoption was operationalized as respondents' intentions for the adoption of advanced digital technology in the organizational setting. The outcome construct included four items related to willingness, favorability, and prospective adoption intention.

Organizational readiness was assessed by three items reflecting organizational preparedness, financial capability, and supportive internal arrangements for the implementation of technology. The perceived value was measured as perceived usefulness, which refers to the degree to which the respondents believed the technology would improve the efficiency, performance, and work-related results.

Adoption barriers were analyzed in two different dimensions. Cost barriers included four items related to technology acquisition, integration, implementation, and process-adjustment costs. The 3 items that made up the complexity barriers included learning difficulty, technological complexity, and challenges of technology incorporation into existing organizational operations. Separating cost and complexity allowed the independent effects of these factors on adoption to be evaluated.

Perceived ease of use, trust, attitude toward adoption and competitive pressure were also used as complementary explanatory variables as they are other behavioral and contextual explanations for technology acceptance.

2.3 Data Preparation and Construct Scoring

Data was checked for completeness, coding consistency and valid response values prior to statistical analysis. There were no missing values or answers beyond the limited five point scale. Construct level scores were computed by calculating the arithmetic mean of the item level scores that make up that construct, therefore keeping the same metric, but reducing the dimensionality of the items.

Cronbach's alpha was used as an indicator of internal consistency for each construct. Coefficient of 0.70 and higher was taken to be acceptable for reliability purposes. All composite variables were finally subjected to descriptive statistics, such as means, standard deviations, minimum and maximum scores. Pearson correlation coefficients were calculated between each pair of constructs to measure the direction and strength of association between the constructs.

2.4 Multivariable Statistical Analysis

To meet the first objective, the effects of organizational readiness, perceived value, cost barriers, and complexity barriers on digital technology adoption were estimated using multiple linear regression analysis. Unstandardized coefficients were used to determine the impact of a unit change in each predictor on the adoption outcome and standardized coefficients were used to compare the relative impact of each predictor.

For the second objective, the importance of the predictors was assessed using standardized regression coefficients, confidence intervals, significance levels, and partial contributions to the model. To check the intercorrelation of predictors and to avoid distortion of the estimated effects due to high intercorrelations, variance inflation factors were computed. The unique contribution of each predictor was calculated as the differences in R² before and after the removal of the predictor from the corresponding multivariable model.

2.5 Hierarchical Model Development and Robustness Assessment

To meet the third objective and to examine the incremental explanatory contribution of the various groups of determinants, a hierarchical regression approach was developed. Organizational readiness was entered in the first stage, followed by perceived value, adoption barriers, and finally the complementary behavioral and contextual predictors: perceived ease of use, trust, attitude, and competitive pressure.

The coefficient of determination (R²), adjusted R², change in R², overall F statistics and significance levels were used to assess model performance. Regression assumptions were examined through residual behavior, collinearity diagnostics, and influence measures. A p value of less than 0.05 was considered statistically significant. A sensitivity analysis was also carried out to determine the robustness of the substantive findings in the event of excluding extreme low variance response patterns.

3. Results

3.1 Construct Reliability and Descriptive Statistics

The measures demonstrated strong internal reliability. As Table 1 presents, Cronbach's alpha ranged from 0.811 for competitive pressure to 0.905 for cost barriers, with all coefficients exceeding the recommended minimum value of 0.70. Perceived value had high level of internal consistency ($\alpha=0.884$), and organizational readiness ($\alpha=0.828$) and digital technology adoption also demonstrated satisfactory internal consistency ($\alpha=0.852$).

The mean construct scores are from 3.373 for complexity barriers to 3.739 for perceived value. The mean score for digital technology adoption was 3.502 (SD=0.928), which is considered as moderate to positive digital technology adoption orientation. The mean scores for perceived value (M=3.739) and perceived ease of use (M=3.734) were the highest, while the mean scores for trust (M=3.412) and attitude (M=3.424) were comparatively lower. The full 1-5 response range was attained for all constructs.

Table 1. Descriptive Statistics and Construct Reliability

Construct	Items	Mean	SD	Min	Max	Cronbach's α
Organizational Readiness	3	3.665	0.774	1.00	5.00	0.828
Perceived Value	4	3.739	0.916	1.00	5.00	0.884

Cost Barriers	4	3.665	0.880	1.00	5.00	0.905
Complexity Barriers	3	3.373	1.149	1.00	5.00	0.837
Perceived Ease of Use	4	3.734	0.853	1.00	5.00	0.849
Trust	4	3.412	0.863	1.00	5.00	0.851
Competitive Pressure	3	3.581	0.860	1.00	5.00	0.811
Attitude	4	3.424	0.902	1.00	5.00	0.871
Digital Technology Adoption	4	3.502	0.928	1.00	5.00	0.852

3.2 Correlation Patterns among Adoption Determinants

As Table 2 shows, digital technology adoption was positively correlated with all explanatory constructs. The strongest bivariate association occurred between competitive pressure and adoption ($r=0.440$, $p<0.001$), followed by cost barriers ($r=0.390$, $p<0.001$), perceived value ($r=0.351$, $p<0.001$), attitude ($r=0.315$, $p<0.001$), and perceived ease of use ($r=0.310$, $p<0.001$). Organizational readiness was positively but more weakly associated with adoption ($r=0.189$, $p<0.001$).

Correlations among explanatory variables were moderate rather than excessive. The largest association was observed between cost barriers and competitive pressure ($r=0.516$), followed by trust and attitude ($r=0.509$) and perceived value and cost barriers ($r=0.503$). These magnitudes indicated that the variables shared related information while retaining sufficient distinction for simultaneous multivariable estimation.

Table 2. Pearson Correlations among Study Constructs

Variable	1	2	3	4	5	6	7	8	9
1. Organizational Readiness	1								
2. Perceived Value	.346***	1							
3. Cost Barriers	.267***	.503***	1						
4. Complexity Barriers	.332***	.218***	.129*	1					
5. Perceived Ease of Use	.315***	.400***	.371***	.206***	1				
6. Trust	.233***	.484***	.425***	.124*	.289***	1			
7. Competitive Pressure	.366***	.413***	.516***	.296***	.424***	.363***	1		
8. Attitude	.208***	.422***	.441***	.222***	.330***	.509***	.325***	1	
9. Digital Technology Adoption	.189***	.351***	.390***	.181**	.310***	.284***	.440***	.315***	1

Note: * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

3.3 Core Multivariable Determinants of Digital Technology Adoption

The first multivariable model examined organizational readiness, perceived value, cost barriers, and complexity barriers simultaneously. As Table 3 presents, the model was statistically significant, $F_{4,322}=19.44$, $p<0.001$, and explained 19.4% of variation in digital technology adoption ($R^2=0.194$, adjusted $R^2=0.184$).

The cost-barrier construct showed the largest standardized coefficient within the core model ($\beta=0.281$, $p<0.001$) and accounted for approximately 5.8% unique variance beyond the other principal determinants. Perceived value also showed a significant positive association with adoption ($\beta=0.181$, $p=0.003$), contributing approximately 2.3% unique explanatory variance. Complexity barriers showed a smaller positive coefficient ($\beta=0.099$), although the association did not reach the 0.05 significance threshold ($p=0.064$). Organizational readiness had little independent contribution after simultaneous adjustment ($\beta=0.018$, $p=0.748$).

Table 3. Core Multivariable Model Predicting Digital Technology Adoption

Predictor	B	SE	Standard ized β	95% CI for B	t	p	VIF	Unique R ² Contrib ution
Organizational Readiness	0.022	0.067	0.018	−0.110, 0.153	0.32	.748	1.25	0.000
Perceived Value	0.184	0.061	0.181	0.064, 0.304	3.01	.003	1.45	0.023
Cost Barriers	0.297	0.061	0.281	0.176, 0.418	4.83	<.001	1.36	0.058
Complexity Barriers	0.080	0.043	0.099	−0.005, 0.165	1.86	.064	1.14	0.009

Model: $R^2=0.194$; adjusted $R^2=0.184$; $F_{4,322}=19.44$, $p<0.001$.

The relative magnitudes in Table 3 indicate that the principal determinants did not contribute equally. Within the core model, the cost-barrier construct showed the largest independent statistical contribution, followed by perceived value, whereas complexity barriers and organizational readiness contributed comparatively little after simultaneous adjustment.

3.4 Hierarchical Development of the Multivariable Framework

The hierarchical analysis assessed changes in explanatory power as successive groups of determinants were incorporated into the model. As Table 4 presents, organizational readiness alone explained 3.6% of adoption variation ($R^2=0.036$, $p<0.001$). Adding perceived value increased explained variance to 12.8%, corresponding to an additional 9.2 percentage points ($\Delta R^2=0.092$, $\Delta F=34.36$, $p<0.001$).

The inclusion of cost and complexity barriers increased R^2 from 0.128 to 0.194, representing a further 6.6 percentage-point improvement ($\Delta R^2=0.066$, $p<0.001$). Finally, incorporating perceived ease of use, trust, attitude, and competitive pressure raised the total explanatory power to 26.1% ($R^2=0.261$, adjusted $R^2=0.242$). The final block contributed another 6.6 percentage points of explained variance ($\Delta F=7.12$, $p<0.001$).

Table 4. Hierarchical Model Development

Model	Predictor block added	R ²	Adjusted R ²	ΔR^2	F	ΔF	p for ΔF
Model 1	Organizational readiness	0.036	0.033	0.036	11.98	11.98	<.001
Model 2	+ Perceived value	0.128	0.123	0.092	23.78	34.36	<.001
Model 3	+ Cost and complexity barriers	0.194	0.184	0.066	19.44	13.29	<.001
Model 4	+ PEOU, trust, attitude, competitive pressure	0.261	0.242	0.066	14.01	7.12	<.001

Figure 1 represents the progressive increase in explanatory power. Within the specified hierarchical entry sequence, the largest incremental gain followed the inclusion of perceived value, while the barrier block and the complementary behavioral and contextual determinants each added approximately 6.6 percentage points.

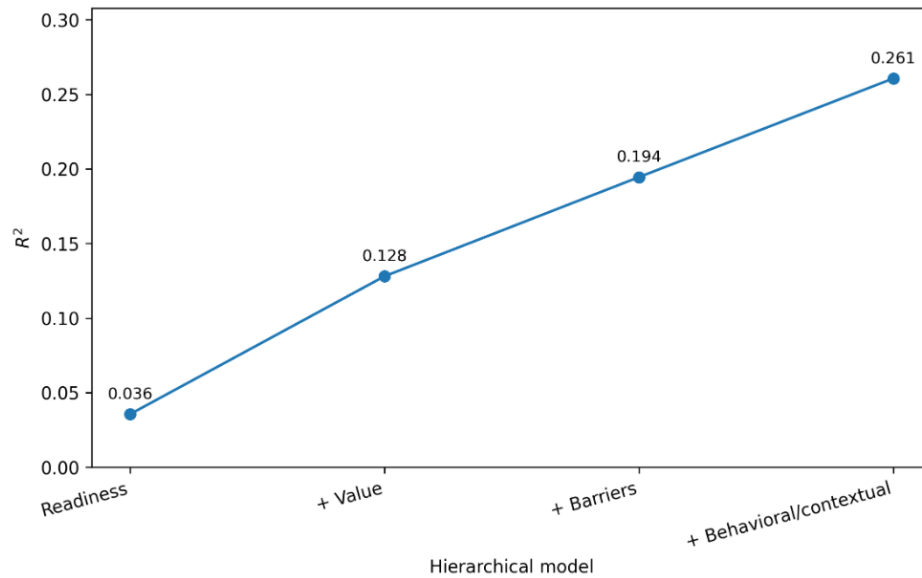


Figure 1. Incremental Explanatory Power Across the Hierarchical Multivariable Framework

In the fully adjusted model, presented in Table 5, competitive pressure emerged as the strongest independent predictor of digital technology adoption ($\beta=0.264$, $B=0.285$, $p<0.001$). Its unique contribution to explained variance was approximately 4.2%. The cost-barrier construct retained a smaller positive independent association ($\beta=0.130$, $p=0.040$). Perceived value remained positively related to adoption but was attenuated after behavioral and contextual variables were introduced ($\beta=0.102$, $p=0.105$).

Attitude ($\beta=0.094$, $p=0.120$) and perceived ease of use ($\beta=0.077$, $p=0.177$) also showed positive but statistically nonsignificant adjusted coefficients. Organizational readiness, complexity barriers, and trust did not demonstrate independent associations after simultaneous adjustment.

Table 5. Fully Adjusted Multivariable Model

Predictor	B	SE	Standardized β	95% CI for B	p	VIF	Unique R^2 Contribution
Organizational Readiness	-0.046	0.066	-0.039	-0.177, 0.084	.485	1.31	0.001
Perceived Value	0.103	0.064	0.102	-0.022, 0.228	.105	1.69	0.006
Cost Barriers	0.138	0.067	0.130	0.006, 0.269	.040	1.73	0.010
Complexity Barriers	0.031	0.043	0.038	-0.054, 0.115	.477	1.21	0.001
Perceived Ease of Use	0.083	0.062	0.077	-0.038, 0.205	.177	1.38	0.004
Trust	0.020	0.065	0.018	-0.109, 0.148	.763	1.59	<0.001
Attitude	0.097	0.062	0.094	-0.025, 0.218	.120	1.56	0.006
Competitive Pressure	0.285	0.067	0.264	0.153, 0.417	<.001	1.65	0.042

Model: $R^2=0.261$; adjusted $R^2=0.242$; $F_{8,318}=14.01$, $p<0.001$.

As Figure 2 illustrates, competitive pressure had the largest standardized coefficient in the fully adjusted model. The cost-barrier construct showed the second-largest statistically significant coefficient, while the confidence intervals for the remaining determinants crossed zero.

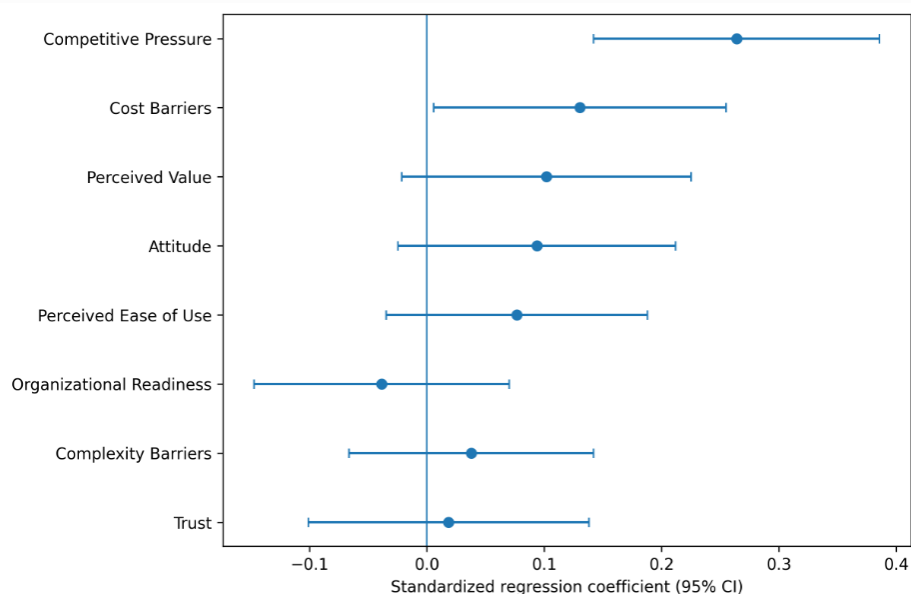


Figure 2. Standardized Effects of Determinants in the Fully Adjusted Model

3.5 Model Diagnostics and Robustness Assessment

Multicollinearity did not materially affect the regression estimates. As Tables 3 and 5 show, all variance inflation factors remained below 1.73, indicating low levels of collinearity among predictors. The Breusch–Pagan test did not indicate significant heteroscedasticity ($p=0.225$), supporting the conventional ordinary least-squares variance assumptions.

Influence diagnostics identified no observations with Cook's distance approaching 1, although a small number exceeded the conservative $4/N$ screening threshold. A sensitivity analysis excluding the nine observations exhibiting complete straight-line response patterns retained 318 observations. The overall conclusions remained stable, with the model explaining approximately 25.1% of the variance in adoption ($R^2=0.251$, adjusted $R^2=0.231$, $p<0.001$). Competitive pressure remained strongly associated with adoption ($\beta=0.263$, $p<0.001$), while the cost-barrier construct retained a smaller association ($\beta=0.129$, $p=0.045$). The directions and approximate magnitudes of the remaining coefficients were largely unchanged.

To add to the robustness checks, heteroscedasticity-consistent HC3 standard errors were explored for the fully adjusted model. Competitive pressure remained clearly significant, whereas the statistical evidence for the cost-barrier construct became weaker under this more conservative variance estimator. This indicates that the cost-related association should be interpreted as comparatively modest, while the competitive-pressure effect was more stable across alternative inferential specifications.

In summary, the results of the multivariable analysis reveal that the model incorporating the organizational, perceived-value, barrier, behavioral, and contextual dimensions explained better the adoption of digital technology than the organizational readiness dimension alone. Perceived value was a significant variable at the intermediate modelling stage and competitive pressure had the greatest and most consistent independent contribution in the fully adjusted model.

4. Discussion

The results show that adoption of digital technology is affected by organizational, perceptual, barrier, behavioral and contextual factors, but none of these factors alone. The core multivariable model accounted for 19.4% of the variation in adoption with the extended framework accounting for 26.1% of the variation in adoption. This improvement suggests that organizational readiness, perceived value, and adoption barriers are significant factors in explaining adoption and that their impact is more meaningful in conjunction with behavioral and environmental conditions. The increasing level of explanatory power in the hierarchical models further validates a multidimensional perspective on organizational technology adoption.

Competitive pressure emerged as the strongest independent determinant in the fully adjusted model. Even when organizational readiness, perceived value, cost, complexity, perceived ease of use, trust and attitude were taken into account, its positive association was statistically strong. This implies that organisations can react to digital technology not just due to their internal readiness or anticipated gains but also because there is external pressure to remain relevant and competitive because of market conditions. Similarly, other evidence indicates that competitive pressure can reinforce an organization's intention to digitalize, especially if it feels that digitalization is essential to maintaining its market position against the competition (Kwarteng et al., 2024). The present findings extend this reasoning by showing that competitive pressure retained its explanatory importance even after several internal and behavioral dimensions were accounted for. External competitive conditions may thus serve as an important trigger to shift the general awareness of technological opportunities to a higher level of orientation for adoption.

Perceived value also played an important role, although its effect changed across model specifications. It was highly related to adoption in the core multivariable model, and accounted for the greatest incremental variance in the specified hierarchical sequence. With the addition of other behavioral and contextual factors, however, its independent coefficient

was reduced to nonsignificance. This attenuation indicates that the impact of perceived value may extend to general perceptions of technology and organizational reaction rather than be independent. Evidence from cloud-computing adoption also indicates that relative advantage, organizational readiness, environmental pressures, and other contextual factors interact in determining adoption decisions (Aligarh et al., 2023). For this reason, it can be important to recognize the usefulness or operational value of a technology, but not all technologies are equally adopted because of external pressures and implementation conditions, even when they have benefits.

The cost-barrier construct showed a positive and statistically significant association in the conventional multivariable model, although its effect was more modest in the fully adjusted analysis and less stable under the conservative robustness specification. This pattern should therefore be interpreted cautiously. This does not mean that the cost of the technology is directly responsible for the increase in adoption, but rather may be due to the complexity of the perceived-cost evaluation in organizational decision making. Businesses that are thinking about implementing more complex digital systems could also be aware of the high cost of implementation and significant strategic value. Research has shown that perceived cost can have complex mediating and moderating relationships with organizational readiness and technology-adoption intention rather than acting only as a straightforward constraint (Salim et al., 2022). The present finding supports the importance of considering cost perception in the context of a wider decision process in which the expected benefits, readiness, competition and implementation requirements are examined together.

At the bivariate level, complexity barriers were positively associated with adoption, while at the simultaneous level, the association was not statistically significant. This indicates that perceived complexity could be a correlate of technology adoption but may not add significantly to the unique explanatory power of the other determinants. Typical organizational technology barriers include a lack of technical knowledge, budgetary issues, implementation challenges, and employee skills. Research conducted on the adoption of Industry 4.0 has also revealed that barriers are multi-faceted and resource and competence constraints can act synergistically instead of separately (Kumar et al., 2023). Thus, complexity can be a secondary or an interacting factor rather than a major independent factor.

Organizational readiness displayed a comparable pattern. It was found to be positively correlated with adoption and significantly accounted for 3.6% of the variation in adoption when entered alone, but its coefficient decreased when perceived value, barriers, and complementary variables were added. This does not indicate that organizational readiness is irrelevant. Instead, readiness can set the groundwork for the capacity to adopt, but other more immediate perceptual and contextual factors can account for whether or not that capacity will lead to adoption intention. In the reviews on the adoption of Industry 4.0, it has been emphasized that all barriers of organizational, technological, financial and environmental are deeply intertwined and the importance of each barrier varies from context to context (Elhusseiny & Crispim, 2022). Readiness can thus be viewed as an enabling condition, but with its apparent direct effect decreasing if one takes into account more proximal factors.

The incorporation of perceived ease of use, trust, attitude and competitive pressure further enhanced the model by an additional 6.6 percentage points, further substantiating the importance of an expanded multivariable model. Although perceived ease of use, trust, and attitude did not show significant independent coefficients in the fully adjusted model, their inclusion together with competitive pressure added behavioral and contextual information that enhanced overall explanatory power. Digital transformation studies also highlight the importance of integrating the technological resources with managerial understanding, organizational capacities, employee engagement and actual technology usage (Kraft et al., 2022). This is a possible reason for the variation in adoption, as neither organizational readiness nor perceived value alone was enough.

Overall, the findings support a layered interpretation of digital technology adoption in which organizational capacity, expected value, barriers, behavioral perceptions, and competitive conditions interact within the same decision environment. The modest amount of explanatory power for the final model also suggests that other factors impact adoption beyond those explored here. However, the multivariable approach offers a more informative representation than any of the separate determinant models as it separates factors that are correlated with adoption from factors that remain independent in explaining adoption given the other factors in the model.

There are a few caveats to be noted: The cross-sectional design limits the ability to make temporal interpretations and the adoption of digital technology was operationalized as adoption intention instead of observed adoption behavior. The empirical context was organizational personnel assessing an advanced digital service technology, so there may be some restrictions for generalizing to other industries and technology types. Respondent-level demographic controls were unavailable for the multivariable analysis, and the final model accounted for 26.1% of the variance in adoption, suggesting that organizational and environmental factors influencing adoption are not completely captured in the study. Future research should evaluate the framework using longitudinal, multi-sector data and direct measures of realized technology adoption.

5. Conclusion

The adoption of digital technology is a result of the interaction of organizational capability, perceived value, barriers of implementation, behavioral responses and external competitive conditions. The multivariable analysis of the core determinants of organizational readiness, perceived value, cost barriers, and complexity barriers explained a meaningful proportion of the variance in digital technology adoption. The addition of perceived ease of use, trust, attitude, and competitive pressure further enhanced the explanatory power of the model.

The strongest and most stable independent predictor was competitive pressure in the fully adjusted model, suggesting that competitive market forces can be key in bolstering organizational adoption intentions. However, perceived value made a significant contribution, especially at the intermediate modelling phase, but its independent influence weakened when

additional behavioral and contextual factors were incorporated. Cost barriers demonstrated a smaller and less robust association, suggesting that financial considerations should be interpreted within a broader strategic context rather than as isolated constraints. The effects of complexity and organizational readiness were weak when the variables were adjusted simultaneously, suggesting that their impact might be mediated by complex and interacting organizational and perceptual processes.

The results corroborate the adoption of a multi-layered multidimensional model of digital technology adoption. This enables researchers to differentiate between factors that are correlated with adoption and factors that still have explanatory value when the effects of other factors are controlled. Realistically, organizations need to assess the adoption decision across the whole spectrum of factors and considerations, including the internal readiness, anticipated technological benefits, implementation limitations, and competitive pressures. This framework could be expanded to include other sectors, technologies and organizational contexts, as well as using longitudinal data to identify how these relationships change over time.

References

1. IEAligarh, F., Sutopo, B., & Widarjo, W. (2023). The antecedents of cloud computing adoption and its consequences for MSMEs' performance: A model based on the Technology-Organization-Environment (TOE) framework. *Cogent Business & Management*, 10(2), 2220190.
2. Elhousseiny, H. M., & Crispim, J. (2022). SMEs, Barriers and Opportunities on adopting Industry 4.0: A Review. *Procedia Computer Science*, 196, 864-871.
3. Faiz, F., Le, V., & Masli, E. K. (2024). Determinants of digital technology adoption in innovative SMEs. *Journal of Innovation & Knowledge*, 9(4), 100610.
4. Hmoud, H., Al-Adwan, A. S., Horani, O., Yaseen, H., & Al Zoubi, J. Z. (2023). Factors influencing business intelligence adoption by higher education institutions. *Journal of Open Innovation: Technology, Market, and Complexity*, 9(3), 100111.
5. Jalo, H., & Pirkkalainen, H. (2024). Effect of user resistance on the organizational adoption of extended reality technologies: A mixed methods study. *International Journal of Information Management*, 75, 102731.
6. Jewapatarakul, D., & Ueasangkomsate, P. (2024). Digital organizational culture, organizational readiness, and knowledge acquisition affecting digital transformation in SMEs from food manufacturing sector. *Sage Open*, 14(4), 21582440241297405.
7. Kraft, C., Lindeque, J. P., & Peter, M. K. (2022). The digital transformation of Swiss small and medium-sized enterprises: insights from digital tool adoption. *Journal of Strategy and Management*, 15(3), 468-494.
8. Kumar, S., Raut, R. D., Aktas, E., Narkhede, B. E., & Gedam, V. V. (2023). Barriers to adoption of industry 4.0 and sustainability: a case study with SMEs. *International Journal of Computer Integrated Manufacturing*, 36(5), 657-677.
9. Kwarteng, M. A., Ntsiful, A., Diego, L. F. P., & Novák, P. (2024). Extending UTAUT with competitive pressure for SMEs digitalization adoption in two European nations: a multi-group analysis. *Aslib Journal of Information Management*, 76(5), 842-868.
10. Panigrahi, R., & Mukherjee, S. (2025). Revised data set for publication in Data in Brief (Version 1) [Data set]. Mendeley Data. <https://doi.org/10.17632/rxtx7jcxvt.1>
11. Salim, T. A., El Barachi, M., Mohamed, A. A. D., Halstead, S., & Babreak, N. (2022). The mediator and moderator roles of perceived cost on the relationship between organizational readiness and the intention to adopt blockchain technology. *Technology in Society*, 71, 102108.
12. Satar, M. S., & Alarifi, G. (2022). Factors of E-Business Adoption in Small and Medium Enterprises: Evidence from Saudi Arabia. *Human Behavior and Emerging Technologies*, 2022(1), 2445624.
13. Silva, R. P., São Mamede, H., & Santos, V. (2025). A new proposed model to assess the digital organizational readiness to maximize the results of the digital transformation in SMEs. *Journal of Innovation & Knowledge*, 10(1), 100644.
14. Silva, R. P., Saraiva, C., & Mamede, H. S. (2022). Assessment of organizational readiness for digital transformation in SMEs. *Procedia Computer Science*, 204, 362-369.
15. Uren, V., & Edwards, J. S. (2023). Technology readiness and the organizational journey towards AI adoption: An empirical study. *International Journal of Information Management*, 68, 102588.
16. Xiao, J., Xu, Z., Xiao, A., Wang, X., & Skare, M. (2024). Overcoming barriers and seizing opportunities in the innovative adoption of next-generation digital technologies. *Journal of Innovation & Knowledge*, 9(4), 100622.
17. Zamani, S. Z. (2022). Small and Medium Enterprises (SMEs) facing an evolving technological era: a systematic literature review on the adoption of technologies in SMEs. *European Journal of Innovation Management*, 25(6), 735-757.

EPH – International Journal of Mathematics and Statistics
<https://ejjms.com/index.php/ms/index>



This work is licensed under a Creative Commons Attribution 4.0 International License. The authors retain ownership of the copyright for their article. You are free to: Share — copy and redistribute the material in any medium or format for any purpose, even commercially. To see the complete license contents,

please visit <http://creativecommons.org/licenses/by/4.0/>.