IUB Journal of Social Sciences
ISSN 2790-6884 (E) & 2790-6876 (P)
DOI: 10.52461/ijoss.v7i1.2520
Vol. 7, No. 1, 2025, Pages: 1-15

Unlocking E-Commerce Potential in SMEs: The Role of National, Organizational, and Industry Readiness

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Keywords:
Industry Readiness, Organizational Readiness, National Readiness, Perceived Strategic Value, E-commerce Adoption

Article History:
Received: January 31, 2024
Revised: June 28, 2025
Available Online: June 30, 2025

a Gold Open Access Journal

ABSTRACT

The study explores the determinants of e-commerce adoption by small and medium-sized enterprises (SMEs) in Pakistan regarding organizational, industry, and national readiness, the mediating role of perceived strategic value. This was done with a quantitative study utilizing structural equation modeling (SEM) to test the hypothesized conceptual model by using the data obtained in a sample of SME managers. The results show that the three dimensions of readiness have significant and positive impacts on the adoption of e-commerce, where national readiness plays the most significant impact. In addition, perceived strategic value was discovered to privately moderate the interrelations between organizational and national preparedness and e-commerce adoption. These findings illustrate the importance of managerial perceptions in converting readiness to adoption choices and provide practical guidelines to make SME managers and policymakers in emerging economies more successful in establishing an environment of digital transformation.

How to cite this paper?
Faisal, U., Shabbir, L. R., Ahmad, M. A. & Kausar, S. (2025). *Unlocking E-Commerce Potential in SMEs: The Role of National, Organizational, and Industry Readiness. IUB Journal of Social Sciences, 7*(1), 1-15.

1 Introduction

Electronic commerce (EC) or e-commerce is a key component of the global economy, a revolution that has changed the way companies do business and connect with consumers (Yadav & Pavlou, 2020). The dynamic growth of digitalization, including the availability of the internet, smartphones, and secure payment platforms has helped companies target a larger audience and lower business expenses and improve the convenience of the customers (Sharma, Srivastva, & Fatima, 2023; Verma & Dixit, 2023). The change has become crucial to small and medium-sized enterprises (SMEs),

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which depend on versatile and cost-effective options to provide cross-border continuity and develop their business on the local and global front (Fan, Wang, & Ying, 2023).

In developing economies, such as Pakistan, SMEs are a key pillar of the economy, contributing an equivalent amount of almost 40 percent to the country GDP and more than three-quarters of the non-agricultural labor force (Ahmed et al., 2025). These enterprises continue to struggle with some impediments, one of them being limited market access, lack of adequate capital, skills, and insufficient technological facilities (Indrawati, Caska, & Suarman, 2020). These structural issues inhibit them in taking up such innovative digital solutions as e-commerce although they could move to streamline any un competitiveness and inefficiency. A more favorable climate regarding conducting business online has developed as a result of a positive policy framework in the form of the Digital Pakistan Vision and supportive policies related to expanding the coverage of broadband and improving digital literacy (Nizam et al., 2020). However, actual e-commerce penetration in Pakistan remains low, accounting for just 1.3 percent of the retail sector despite over 140 million internet users, which indicates untapped growth potential (Sapkota & Kaur, 2024).

The significance of e-commerce adoption among Pakistani SMEs goes beyond operational benefits. It has become central to inclusive economic growth and the ability to participate in the global value chains and resilience during the time of the economic disruption like the COVID-19 pandemic. According to the previous studies, however, there has been a noticeable lack of focus on the dynamics and characteristics of how South Asian economies receive technology compared to other larger-scale adoption models or developed economies (Alam, Uddin, Yazdifar, Shafique, & Lartey, 2020; Zhu, Wang, Pei, & Pardalos, 2020). There have been scarce research efforts to investigate the interactions of organizational readiness, industry readiness, and national readiness in the modalities of establishing an e-commerce adoption in emerging economies across the SMEs.

This study will help explore readiness factors in Pakistani SME industry, and adapting and using the concepts of Diffusion of Innovation (DOI) and Technology Organization Environment (TOE) theories to gain a deeper understanding of adoption behavior. Further, it also studies the mediating effect of the perceived strategic value and how perceived benefits of e-commerce turn readiness into practice. Using an innovative combination of theoretical insight and a critical yet underrepresented setting and offering empirical evidence and policy implications, this study can inform policymakers and managers of SMEs to support their ongoing expansion by means of digital transformation.

1.1 Research Objectives

1. To investigate the impact of organizational readiness, industry readiness and national readiness on the e-commerce adoption.
2. To investigate whether perceived strategic value mediates the relationship between organizational readiness and e-commerce adoption.
3. To investigate whether perceived strategic value mediates the relationship between industry readiness and e-commerce adoption.
4. To investigate whether perceived strategic value mediates the relationship between national readiness and e-commerce adoption.

1.2 Research Significance

This research is of great importance in strengthening the knowledge on how small and medium-sized enterprises (SMEs) can utilize e-commerce to enhance organizational performance. In addition, this research examines the impact of some contextual and organizational factors on e-commerce adoption among SMEs in Pakistan.

The results of this study offer useful information for the owners of SMEs and top management, allowing them to learn and apply relevant tools and strategic measures required to ensure competitiveness in a more digitalized market. This study provides a significant extension of current knowledge by adding to the body of literature already in existence. It also acts as a catalyst to encourage the adoption of e-commerce in the Pakistani SME sector. In the end, it is essential to the wider spread of e-commerce activities in Pakistan.

2 Literature Review

2.1 Underpinning Theories

Rogers' Diffusion of Innovation theory is a framework for explaining the perception and adoption of e-commerce by small and medium-sized enterprises (SMEs) in Pakistan. The theory's core constructs, relative advantage, compatibility, and complexity, have a direct impact on adoption decisions. Resource-poor SMEs are more likely to postpone e-commerce adoption when perceived complexity is high or predicted benefits are unclear.

The Technology-Organization-Environment theory supports DOI by focusing on three key areas: technological preparedness, organization capability and external environment. South Asian countries use these dimensions to explain the adoption patterns. Technological infrastructure and organizational preparedness, for example, influence take-up, and institutional support and industry eco system mediates the effects. Current research using the TOE in SME contexts reiterates its applicability to examine e-commerce adoption in developing economies (Ahmed et al., 2025; Khsroo, Burhanuddin, Ali, & Shihab Ahmed, 2024).

According to one study on SMEs in Punjab, adoption costs and government support had a relatively minor impact on e-commerce usage, whereas top management support and competitive pressure had a significant impact (Nazir & Zhu, 2018). Additional research on Pakistani SMEs also identified perceived ease of use and perceived usefulness as primary drivers of e-commerce uptake, demonstrating that managerial perceptions strongly influence actual adoption behavior.

These findings reinforce the importance of examining readiness factors at organizational, industry, and national levels. Organizational factors such as managerial commitment and internal digital capabilities remain pivotal; industry factors, including competitive pressure and sectoral digital maturity, enhance motivation to adopt; while national-level infrastructure and policy frameworks shape the broader environment enabling adoption. Integrating these insights with the DOI and TOE frameworks strengthens the theoretical basis of the present study and situates it within the evolving digital transformation landscape of Pakistan's SME sector.

2.2 Hypotheses Development

2.2.1 Industry Readiness and E-commerce Adoption

In regards to e-commerce, it is industry readiness that makes it possible for e-commerce to be adopted by SMEs in general. This is where the term industry readiness is applied to refer to a given sector's level of possessing infrastructure, skills, competitive pressure and ecosystems alignment that would aid digital transformation (Molla & Licker, 2005). Typically, this means the industry is ready, the existence of enabling technologies, using standard practices and digital practices, other such logistics and payment systems, and a culture of innovation (Javaid, Haleem, Singh, & Sinha, 2024). This helps mitigate uncertainty and perceived risks in adopting e-commerce by SMEs and develops a more supportive environment for those SMEs wishing to become or deepen in a digital marketplace (Ballerini, Herhausen, & Ferraris, 2023).

Previous empirical studies exhibit that SMEs operating in digitally mature industry are greatly more chance to adopt e-commerce platforms since the industry expects for them and the peer influence (Ali Ghamdi, Nguyen). For instance, in the retail and hospitality industries where online presence and democracy of digital interaction with the customers have become normative for SMEs, SMEs are faced with competitive pressure to digitize and remain relevant. However, in the case of traditional or the low-tech industries, SMEs may not experience the same level of urgency and support, hence may experience slow or fragmented e-commerce adoption (Mmakhuthe, 2022).

On top of that, industry readiness usually includes access to shared services, the training programs and the digital ecosystems, or digital marketplaces, e-logistics providers, or fintech services that reduce the entrance barriers for SMEs (Zekos, 2021). This is why industry level support and alignment can greatly facilitate digital uptake and improve the performance, scale of the SMEs in the online space (Sharabati et al., 2024). It is therefore important to note that positive correlation between industry readiness and e-commerce adoption confirms the need for sector specific digital development strategies that focus on falling gaps in infrastructure and awareness as well as digital skills.

This relationship is supported by the TOE framework, which views industry conditions such as competitive pressure and sectoral digital infrastructure as critical environmental factors shaping

adoption decisions (Tornatzky, Fleischer, & Chakrabarti, 1990). In line with DOI theory, when SMEs observe widespread adoption within their industry, the perceived compatibility and relative advantage of e-commerce increases, further motivating adoption (Chatterjee, Neogi, Dwivedi, & Vashisht, 2024).

H1: Industry readiness positively affects E-commerce adoption among SMEs.

2.2.2 Organizational Readiness and E-commerce Adaptation

Small and Medium Enterprises (SMEs), in particular, are affected by their internal factors of organizational readiness for successful adoption and integration of e-commerce technology. It basically entails a firm's capability in terms of financial capacity and technological infrastructure, digital skills, leadership commitment, and firm's readiness to manage the change (Mmakhuthe, 2022). An organization will be more ready in terms of its internal readiness for digital transformation in general, and especially of e-commerce, when it perceives the benefits of e-commerce positively and is willing to overcome the barriers of the digital transformation. It is known that the higher the levels of organizational readiness, the greater are the odds and the higher amount of e-commerce adoption (Chong & Ooi, 2008).

Organizational readiness reduces uncertainty and resistance to innovation in readiness by making sure there are the resources up front, ready to help innovate with, such as the IT staff and digital tools, and in an appropriate alignment to strategic decisions (Bozkus, 2024). Particularly helpful for digital change from within are leadership support and a culture were going digital is in vogue. Based on Tornatzky et al. (1990), technology adoption is influenced by three pillars: the internal organizational context that includes readiness being one of them. There are some firms that maybe not readier for implementation, employee may push back in terms of implementation, or there may be disruptions in service delivery during implementation.

According to the TOE framework, organizational readiness reflects internal capacities such as leadership commitment, financial resources, and digital skills, which directly influence the likelihood of adoption (Ahmed et al., 2025). DOI theory also suggests that organizations perceiving high relative advantage and low complexity in innovations are more likely to progress toward adoption (Lundblad, 2003)

H2: Organizational readiness positively affects E-commerce adoption among SMEs.

2.2.3 National Readiness and E-commerce Adaptation

The level of national readiness plays an important role in the rate and success of e-commerce adoption among businesses, especially for SMEs (Silalahi & Fachrurazi, 2020). National readiness refers to a country's readiness to face digital economic activities through infrastructure, policies, education, institutional support system, etc. (Yugo, Juanda, & Anggraeni, 2021). A more conducive environment for e- commerce is countries with advanced ICT infrastructure, spread internet access, supportive regulatory environment, and trained labor force. The World Bank (2020) reveals that effective e-commerce adoption is enhanced by presence of secure digital payment systems, reliable logistics networks, and consistent cyber laws that further build a business confidence and consumer trust (Paun, Ivascu, Olteteanu, & Dantis, 2024).

SMEs are more likely to breach the cost, risk and technological uncertainty barriers when national readiness is high. Al Hadwer, Tavana, Gillis, and Rezania (2021) believe that the national environment is a critical external factor that influences the organizational technology decisions. SMEs are more motivated and better equipped to do e-commerce in Countries where digital government service, broadband coverage and digital entrepreneurship programs are prevalent (Lukonga, 2020). Also, national readiness makes e-commerce more accessible, both nationally as well as globally, by tallying local practices with global standards of e-commerce, and enable inclusivity and competitiveness (Guglya & Maciel, 2020).

National readiness corresponds to the environmental dimension of the TOE framework, incorporating digital infrastructure, government policy, and regulatory support (Nguyen, Le, & Vu, 2022). DOI further posits that a supportive macro-environment reduces perceived complexity and enhances legitimacy, encouraging SMEs to adopt e-commerce (Hussain, Shahzad, & Hassan, 2020).

H3: National readiness positively affects E-commerce adoption among SMEs.

2.2.4 Perceived Strategic Value as Mediator

Moreover, the National Institutional Perspective accepts the notion that institution pressure (government policy, industry standard and cultural expectation) can be important influence on organizational behavior and technology adoption (Arshad, Farooq, Afzal, & Farooq, 2019). In this respect, national readiness is a legitimizing force directing e-commerce as a socially and economically viable growth strategy. For this reason, strengthening national readiness is necessary to facilitate digital transformation in developing economies aiming to empower SMEs via e-commerce (Huang, Huang, Huang, Xie, & Cai, 2022). The consistent linkage between readiness that is, between national, industry, and organizational dimensions of readiness and the successful adoption of EC technologies has been read.

However, the relationship reflects that it is indirect, mediated a firms' perceptions of the strategic value of e- commerce (Hussain et al., 2020). The first support for adoption is readiness, that is, the initial foundation of capabilities (such as infrastructure, skills, regulatory support) needed for adoption. In the end, it is the perception that e-commerce will provide competitive advantage, lower costs or create new markets that ultimately affect the decision making (Tang & Li, 2023).

In accordance with the Technology–Organization–Environment (TOE) framework and Diffusion of Innovation (DOI) theory, the choice of a firm to adopt new technologies is not the function of its technical capabilities but also the perceived benefits for the firm and alignment of the technology with the firm's strategic goals (Rogers, 2003). Even in this context, organizations will not invest in EC technologies unless they perceive the opportunity to help determine the way in which organizations can change market position, the way of operating, or the relationship with the customer (Castelli, 2022).

Alshamaila, Papagiannidis, and Li (2013) observed that ICT infrastructure and also skilled personnel of firms conducting electronic commerce through cloud solutions is more likely to adopt the solutions, if these tools are considered to be a strategic advantage for the organization. SMEs' perceptions of e- commerce's strategic importance are the gap bridge between environmental readiness and the actual behavior of adoption (Amaglo, 2020). Consequently, it is perceived strategic value that serves as a key mediating role, which translates latent capacity (readiness) into action (adoption). The importance of this mediation to policy makers and practitioners seeking to promote e-commerce uptake is that it points to the importance of doing more than just building the infrastructure, and also communicating the strategic benefits of e-commerce to the business (Rauniar, Rawski, Cao, & Shah, 2024).

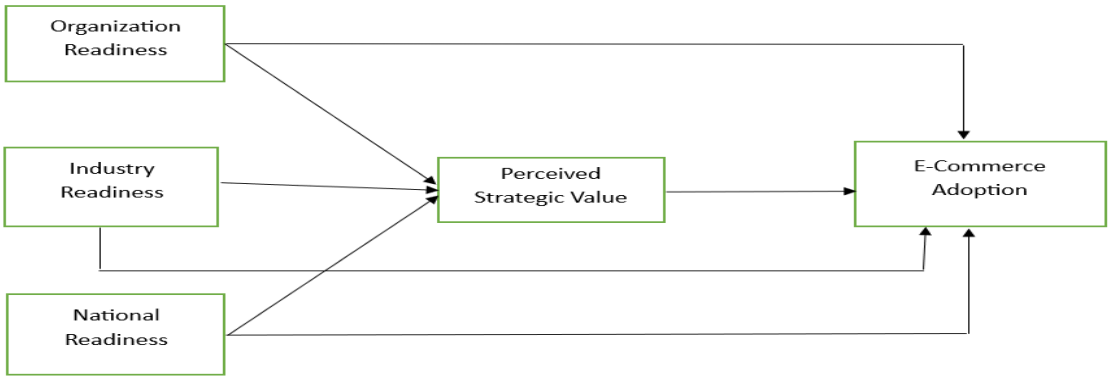
Both TOE and DOI highlight that perceptions play a crucial role in transforming readiness into adoption behavior. While readiness provides the capability and supportive conditions, adoption ultimately depends on whether SMEs perceive e-commerce as strategically beneficial for competitiveness, cost efficiency, or market expansion (Alshamaila et al., 2013; Rauniar et al., 2024).

H4a: Perceived strategic value mediates the relationship between organizational readiness and E-commerce adoption.

H4b: Perceived strategic value mediates the relationship between industry readiness and E-commerce adoption.

H4c: Perceived strategic value mediates the relationship between national readiness and E-commerce adoption

Figure 1: Conceptual Framework



3 Methodology

This study adopts a positivist research philosophy, emphasizing objective and quantifiable analysis to investigate the influence of organizational, industry, and national readiness on e-commerce adoption among SMEs in Pakistan. The research design is quantitative and cross-sectional, using a structured online survey to collect data at a single point in time from SME decision-makers across multiple sectors.

Data were gathered using a pre-tested, self-administered questionnaire featuring Likert-scale items aligned with the study constructs. A purposive sampling technique was employed to target key organizational representatives, such as IT managers and operations executives, who could provide informed responses. The sample comprised SMEs from diverse sectors including retail (28%), manufacturing (25%), IT services (20%), logistics (15%), and others (12%). Geographically, responses were obtained from major SME clusters in South Punjab (40%), Central Punjab (35%), Sindh (15%), and KP/Balochistan (10%). This distribution enhances the generalizability of the findings across different economic zones in Pakistan. A total of 325 valid responses were collected, exceeding the minimum sample size required for structural equation modeling (SEM). Data analysis was conducted using SPSS and Smart PLS 3.0, applying descriptive statistics and Partial Least Squares-SEM to evaluate both the measurement and structural models

4 Analysis

To assess the proposed research model, a detailed statistical analysis was conducted using data collected from 325 SMEs operating in various sectors across Pakistan. The analysis aimed to evaluate the reliability and validity of the constructs and to test the hypothesized relationships among organizational, industry, and national readiness, perceived strategic value, and the adoption of e-commerce technology. Structural Equation Modeling (SEM) using SmartPLS 3.0 was employed to analyze both the measurement and structural models, ensuring a robust examination of the direct and indirect effects within the framework.

4.1 Correlation

The Pearson correlation coefficients of the four predictors of the E-Commerce Adoption have been illustrated in Table 2.

Table 1: Correlations

	0_R	I_R	N_R	P_S_V
Organizational Readiness	1			
Industry Readiness	0.670**	1		
National Readiness	0.729**	0.750**	1	
Perceived Strategic Value	0.736**	0.685**	0.805**	1

** Correlation is significant at the 0.01 level (2-tailed).

Correlations are all positive and reach statistical significance at 0.01 level, implying close relationships between constructs. Organizational Readiness shows a strong relation with National Readiness (r = 0.729) and Perceived Strategic Value (r = 0.736) which indicates that the more an organization is ready, the more they perceive the strategic value of e-commerce. The strongest relationship is with Perceived Strategic Value and National Readiness (r = 0.805), indicating that the national infrastructure and the environment were found to have a strong influence on the perceived benefits of implementing e-commerce. These large correlations indicate that the four factors are mutually aligned and that they might have collective effects on the adoption of e-commerce.

4.2: Multicollinearity (VIF and Tolerance Values)

Table 2: Coefficients

Construct	Collinearity Statistics	
	Tolerance	**VIF**
Organization Readiness	0.386	2.588
Industry Readiness	0.399	2.505
National Readiness	0.264	3.786
Perceived Strategic Value	0.300	3.336

a. Dependent Variable: E-Commerce Adoption

Table 2 checks multicollinearity amongst the independent variables by determining values of the Variance Inflation Factor (VIF) and Tolerance. VIF values vary between 2.505 and 3.786, with all the Tolerance values greater than the critical value of 0.1, a crucial level at which multicollinearity is deemed as a key issue in the regression analysis process. The VIF of National Readiness (3.786) is less than the widely regarded cut-off of 5, which means that its levels of collinearity are acceptable. Such findings contribute towards inclusion of all the predictors in a multiple regression model without fear of redundancy or exaggeration of standard errors.

Pure coincidence supports this notion as well because the total number of components extracted with eigenvalues exceeding 1 is 9 (with the 9th component accounting 2.587% of variance), which suggests that data structure is the one of multifactorially with latent variables assumed to exist in theory as well. This further confirms the strength and the discriminant validity of the model. Principal Component Analysis and interpretation of eigenvalues reconfirm that there is no strong single factor, which can explain much of the variance. This lowers the fear of the fact that the outcomes are artificially high at the expense of the method of measurement (e.g. self-reports or the like scale forms). To conclude, the Harman single factor test indicates that the impact of common method variance is of no great threat to this study. It adds strong evidence that the data supports a multifactor structure in the way the constructs are measured, and that the results on the organizational, industry, and national readiness, perceived strategic value, and e-commerce adoption can be better read with increased confidence about their validity and reliability.

As illustrated in Figure 2, the structural model indicates that readiness constructs strongly predict e-commerce adoption.

4.3 Common Method Bias (CMB)

Table 3: Group Statistics

Construct	N	Mean	St. Deviation	Std. Error Mean	Levene's Test for Equality of Variances	
					F	**Sig**
Organization Readiness	170	3.48	0.510	0.053	1.471	0.227
	155	3.36	0.638	0.082		
Industry Readiness	170	3.73	0.751	0.078	0.932	0.336
	155	3.62	0.869	0.112		

National Readiness	170	3.53	0.612	0.064	0.325	0.570
	155	3.50	0.662	0.085		
Perceived Strategic Value	170	3.52	0.537	0.056	2.242	0.136
	155	3.44	0.672	0.087		
E-Commerce Adoption	170	3.56	0.659	0.069	1.761	0.186
	155	3.45	0.763	0.099		

Table 3 provides the results of the common method bias (CMB) assessment through the Levene's test for equality of variances. The analysis reveals that for all constructs, the F-statistics are insignificant (p-values > 0.05), indicating that there is no significant difference in variances across groups. This suggests that common method bias does not pose a threat to the validity of the data collected, and thus the responses can be treated as free from systematic measurement errors related to the method of data collection.

4.4 Measurement Model (Outer Model)

4.4.1 Construct Items and their Loadings

Table 4: Construct Items and their Loadings

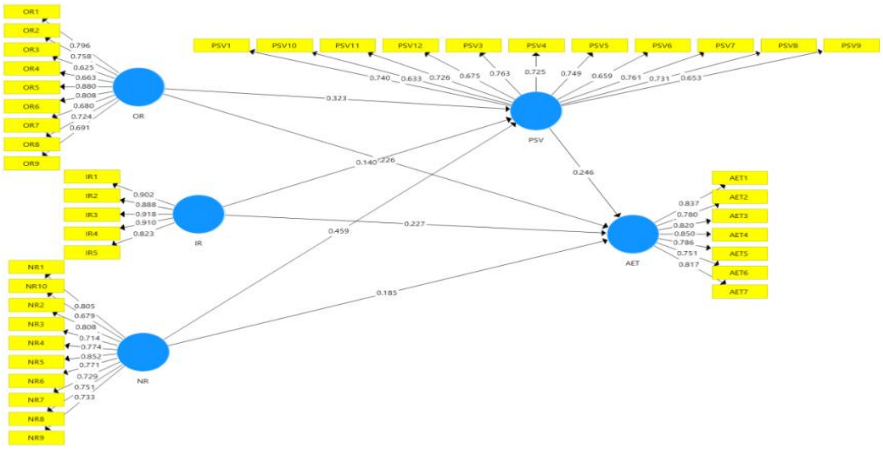
Construct	Item code	Item loadings
E-Commerce Adoption	AET1	0.837
	AET2	0.780
	AET3	0.820
	AET4	0.850
	AET5	0.786
	AET6	0.751
	AET7	0.817
Perceived Strategic Value	PSV1	0.740
	PSV3	0.763
	PSV4	0.725
	PSV5	0.749
	PSV6	0.659
	PSV7	0.761
	PSV8	0.731
	PSV9	0.653
	PSV10	0.633
	PSV11	0.726
	PSV12	0.675
Organization Readiness	OR1	0.796
	OR2	0.758
	OR3	0.625
	OR4	0.663
	OR5	0.880
	OR6	0.808
	OR7	0.680
	OR8	0.724
	OR9	0.691
Industry Readiness	IR1	0.902
	IR2	0.888
	IR3	0.918
	IR4	0.910
	IR5	0.823

National Readiness	NR1	0.805
	NR2	0.808
	NR3	0.714
	NR4	0.774
	NR5	0.852
	NR6	0.771
	NR7	0.729
	NR8	0.751
	NR9	0.733
	NR10	0.679

Measurement model (outer model) measures the reliability and validity of each construct in the study basing on the specific factor loading of an item. A factor loading is the covariance between a variable that is observed and the latent construct. They show high loadings (all should be >0.70) that means the items are representative of the construct they are supposed to approximate.

Table 4 reports the item loadings for all constructs as part of the measurement model assessment. The results indicate that all items exhibit factor loadings above the acceptable threshold of 0.6, with most items exceeding 0.7, demonstrating strong indicator reliability. This implies that each item adequately represents its underlying latent construct, thus supporting the reliability of the measurement model. Notably, the highest loadings are observed for Industry Readiness items, which further strengthens confidence in the measurement quality of this construct. Although a few items, such as PSV8 and PSV10, exhibited loadings below the conventional threshold of 0.65, they were retained due to their theoretical importance and contribution to content validity. Removing these items resulted in only marginal improvements in AVE and CR values, and their presence ensures a comprehensive measurement of the construct's dimensions.

Figure 2: Measurement Model Assessment



4.4.2 Construct Reliability and Validity

Table 5: Construct Reliability and Validity

Construct	Alpha	CR	AVE
E-Commerce Adoption	0.91	0.929	0.65
Industry Readiness	0.933	0.949	0.79
National Readiness	0.92	0.933	0.582
Organization Readiness	0.895	0.915	0.548
Perceived Strategic Value	0.902	0.918	0.507

Note: CR= Composite Reliability

AVE= Average Variance Extracted

Table 5 indicates the values of internal consistency, compositional reliability (CR), and average variance extracted (AVE) of all constructs. Cronbach Alpha values are high (between 0.895 and 0.933) and signify that all constructs demonstrate very good internal consistency. All constructs

have the CR values above the recommended value of 0.7 indicating the high reliability of the latent variables.

Moreover, the average variance extracted of all the constructs is above 0.5 which is an indicator of proper convergent validity with at least 50 percent of variance explained by individual construct. Despite the AVE value (0.507) of Perceived Strategic Value which is the lowest but still satisfies the requirement, it proves the reliability and convergent validity of the measurement model.

4.4.3 Discriminant Validity

Table 6: Discriminant Validity (HTMT Ratio of Correlation)

Construct	AET	IR	NR	OR	PSV
E-Commerce Adoption					
Industry Readiness	0.743				
National Readiness	0.774	0.812			
Organization Readiness	0.762	0.737	0.802		
Perceived Strategic Value	0.778	0.752	0.862	0.823	

Heterotrait-Monotrait Ratio (HTMT) Discriminant validity was calculated by using the Heterotrait-Monotrait Ratio (HTMT), and all inter-construct values were lower than the conservative figure of 0.90. This implies that the constructs are empirically differentiated.

The largest shown on HTMT is Perceived Strategic Value and National Readiness (0.862) which is acceptable and implies that the measures are relatively close, but do not overlap. This aids the discriminative validity of the model in which the researcher can be sure to make interpretations on the individual effects of each variable.

4.5 Structural Model (Inner Model)

4.5.1 Direct Paths

The structural model identifies a strong direct influence among the key variables. The three components namely Industry Readiness (0.227), National Readiness (0.185) and Organizational Readiness (0.226) show a positive and significant path to E-Commerce Adoption and are therefore predictive. Also, every readiness construct has a significant effect on Perceived Strategic Value, with the greatest effect being National Readiness (beta = 0.459). Also, Perceived Strategic Value is a significant predictor of E-Commerce Adoption (beta =0.246). All these findings reaffirm the idea of the proposed model and underline core importance of readiness and strategic perception as the driving force behind e-commerce implementation.

Table 7: Direct Paths

Paths	Beta	SD	t-values	p-values	CI LL/UL
IR -> AET	0.227	0.076	2.999	0.003	0.075/0.372
IR -> PSV	0.14	0.067	2.087	0.037	0.012/0.278
NR -> AET	0.185	0.089	2.088	0.037	0.004/0.345
NR -> PSV	0.459	0.106	4.331	0.000	0.239/0.650
OR -> AET	0.226	0.078	2.891	0.004	0.066/0.369
OR -> PSV	0.323	0.084	3.86	0.000	0.156/0.489
PSV -> AET	0.246	0.098	2.504	0.012	0.042/0.425

Note: SD = Standard Deviation

CI= Confidence Interval Lower Limit/Upper Limit

4.5.2 Indirect Paths

Table 8: Indirect Paths

Paths	Beta	SD	t-values	p-values	CI LL/UL
IR -> PSV -> AET	0.034	0.022	1.572	0.116	0.004/0.099

NR -> PSV -> AET	0.113	0.056	2.025	0.043	0.024/0.246
OR -> PSV -> AET	0.08	0.036	2.198	0.028	0.019/0.163

Note: SD = Standard Deviation

CI= Confidence Interval Lower Limit/Upper Limit

The indirect impacts show the mediating role of Perceived Strategic Value in the relationships of readiness constructs with E-Commerce Adoption. Indirect effects are found in both cases with National Readiness (β = 0.113) and Organizational Readiness (β = 0.08) being statistically significant with a partial mediator role through Perceived Strategic Value.

But, its influence on E-Commerce Adoption is relatively direct, since the indirect route of Industry Readiness to Perceive Strategic Value is not statistically significant (p = 0.116). The findings also highlight the significance of the perceived strategic value as a vehicle, reflecting the national and organizational readiness culminates into the real adoption habits.

4.5.3 Coefficient of determination (R2) and Predictive relevance (Q2)

Table 9: Coefficient of determination (R^2) and Predictive relevance (Q^2)

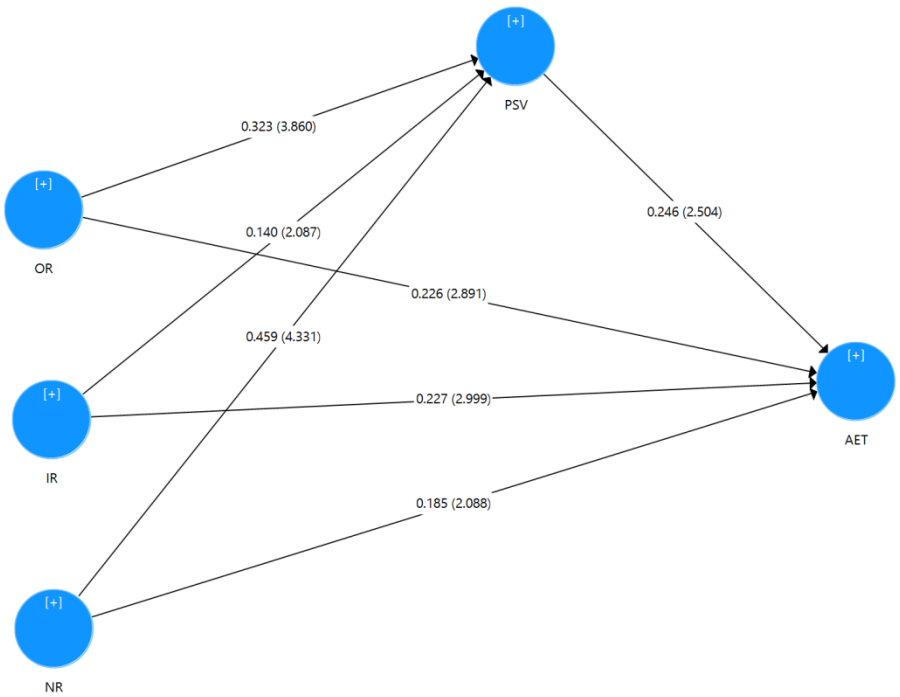
Construct	Coefficient of determination	Predictive relevance
E-Commerce Adoption	0.626	0.371
Perceived Strategic Value	0.710	0.323

Table 9 shows that the model has a significant explanatory capacity. The R2 of E-Commerce Adoption is 0.626 implying that 62.6% of its variance has been explained by Industry, National and Organizational Readiness and Perceived Strategic Value. The Perceived Strategic Value scores even higher at R 2=0.710 indicating that the readiness constructs are remarkably influential on strategic perception.

The predictive relevance (Q2) values of E-Commerce Adoption and Perceived Strategic Value are 0.371 and 0.323 respectively, indicating that the model is not overfitted, has extremely high predictive accuracy.

Table 9 supports this, with R^2 values of 0.626 and 0.710 for E-Commerce Adoption and Perceived Strategic Value, respectively, highlighting robust explanatory power.

Figure 3: Structural Model Assessment



5 Conclusion

This study set out to investigate the factors influencing the adoption of e-commerce among SMEs by examining the roles of organization readiness, industry readiness, and national readiness, along with the mediating effect of perceived strategic value. The results confirmed that all three readiness dimensions have significant direct impacts on e-commerce adoption, highlighting that both internal capabilities and external contextual factors are vital enablers for digital transformation. Furthermore, the findings revealed that perceived strategic value partially mediates the relationships between organizational and national readiness and the adoption of e-commerce, reinforcing the idea that managerial perceptions of strategic benefits are critical in translating readiness into actual implementation. By integrating insights from the Diffusion of Innovation theory and national institutional perspectives, this research provides a more comprehensive understanding of the complex dynamics that shape technology adoption in developing country contexts. The indirect path from Industry Readiness to E-Commerce Adoption through Perceived Strategic Value was found to be statistically insignificant. This is in line with (Chatterjee et al., 2024), whose work established that national readiness has a strong effect on strategic value perceived by SMEs. But in contrast to Goh and Blake (2021), who established a more robust mediation effect of perceived value on all the dimensions of readiness, this research established a less robust relationship for industry readiness, implying variations in context between developing economies.

In summary, this research expands the understanding of e-commerce adoption for SMEs by providing theoretically and practically significant outputs for researchers, policymakers, and business practitioners alike. It indicates the need for organizations to build internal readiness, as well as tapping into supportive industry networks and national infrastructure to extract their full potential digitally. In addition, by providing support for strategic value as a mediating driver, this research highlights the need for decision-makers to foster positive strategic perceptions towards an effective adoption outcome. As a result, this study establishes the basis for future research regarding the interplay of contextual readiness and managerial cognition in regards to digital transformation in emerging economies.

These findings are important not only for SME managers and policy makers, but they also add to the previous work by combining organizational, industry, and national readiness in a single framework while retaining similar factors from previous frameworks. Unlike previous literature, which has generally focused on discrete factors or relied on developed economy contexts, this study presents novel evidence from an emerging economy and shows how macro-level national readiness and managerial perceptions interact to influence e-commerce adoption. This contribution to the literature enhances theoretical developments in understanding adoption behavior and provides a framework that can be adjusted and utilized in similar economies experiencing digital transformations.

5.1 Policy and Practical Implications

This study revealed that national readiness and perceived strategic value are the key factors that influence e-commerce adoption by SMEs. This study also provides important implications for policymakers and regulators. Beyond building digital infrastructure, there is a need for comprehensive support policies that foster trust in online systems, promote cybersecurity awareness, and simplify regulatory processes related to digital transactions. Special attention should be given to underrepresented regions like South Punjab, where SMEs may lack exposure to national-level e-commerce initiatives. Government-led awareness campaigns, training programs, and subsidies for digital tools can help bridge readiness gaps and encourage broader participation in the digital economy.

For SME managers and industry associations, the study highlights the importance of building internal strategic clarity around the value of e-commerce. Industry bodies must go beyond infrastructure support and offer targeted sector-specific programs that demonstrate how e-commerce can be leveraged to improve operational efficiency, customer access, and market competitiveness. SME leaders should be encouraged to foster a culture of innovation, invest in digital skills training, and integrate e-commerce into their long-term strategic planning. Ultimately, the perceived benefits of e-commerce must be clearly communicated and aligned with organizational goals to convert digital readiness into meaningful adoption.

5.2 Limitations and Future Directions

The study has its limitations in spite of what it offers. Initially, the study focused on SME operating in Pakistan, which could be a limitation to the applicability of the study results in other industries, larger companies, or other countries including those with different cultures, or economically superior countries. In order to compare contextual influences on the adoption of e-commerce future research could replicate this framework in other developed and developing nations furthermore it will increase the generalizability of study as well. Second, it has a cross-sectional survey design, which limits the possibilities of bringing out causal inferences about the connections between the variables over a period of time. Longitudinal research designs can be used to monitor the effects of national policy changes, industry dynamics, and organizational preparedness on adoption decisions over time. Third, there was a possibility of common problem bias introduced by use of self-reported measures. Also, the analysis of the study revolved around mainly organizational, industry, and national consequences of readiness with other possible correlates of e-commerce adoption, competitive forces, turbulence, customer readiness, etc. To gain a deeper understanding of adoption behavior, researchers are also encouraged to include additional pertinent factors like customer readiness, technological turbulence, or competitive pressure Lastly, the study was based on perceptual data of managerial respondents who may not denote the full picture of operational and technical situations in firms. Mixed-method approaches, such as qualitative interviews with various stakeholders, may provide deeper insights into the perceptions and operational realities that influence the adoption of e-commerce.

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