

# Individual Agency, Dynamic Contextual Factors and E-Commerce in SMEs

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## **Abstract**

This paper explains the role of dynamic contextual and agency factors in the adoption of electronic commerce (e-commerce) in small and medium-sized enterprises (SMEs) in Pakistan. The authors conducted eight multiple qualitative case studies which include 24 face-to-face semi-structured interviews and were analysed using NVivo. It was found that the Technology-Organization-Environment (TOE) and other extended micro-level (individual agency) factors significantly influenced the decision-making process of managers of Pakistani SMEs in adopting e-commerce practices. The managers should focus on factors such as being ready for digital, hiring ICT professionals, lack of customers to change their preference from the traditional selling approach to e-commerce, securing support from government and local institutions, and understanding the features and individual agency of their owner-managers. In addition to these factors, there is a need to enhance the information and communication technology (ICT) infrastructure to enable manager to prepare and adopt e-commerce practices in their firms. This article builds on Tornatzky and Fleischer's TOE framework with the micro-level factors of individual agency. Furthermore, this article offers some implications for policy makers, governments and local Small and Medium Enterprises (SMEs) development agencies.

**Keywords:** SMEs, E-commerce adoption, TOE framework, Individual agency factors, Emerging economies, Pakistan.

## **Introduction**

In the highly competitive global economy, enterprises try to improve their performance by moving beyond traditional marketing methods and looking for new opportunities to satisfy the needs of domestic and international customers (Kraus et al., 2020) using social media (Qalati et al., 2020) and electronic media (such as e-commerce) (Fan, 2019; Arsalan Nazir and Saleem Khan, 2022). Several studies (Daoud and Ibrahim, 2019; Innocenti and Zampi, 2019) have indicated that, in order to improve and to beat the competition, as the first step, SMEs' independent owner-managers (as individuals) and middle managers need to know the benefits of using e-commerce technology. Improved awareness can translate into benefits like 1) employing e-commerce as a primary tool in marketing (Qalati et al., 2020); Pathan, M. S. K. (2024); Pathan, M. S. K. (2024); Pathan, M. S. K. (2025); Pathan, M. S. K. (2021); Pathan, M. S. K. (2023); Pathan, M. S. K. (2022), 2) expanding foreign trade (particularly exports) by giving SMEs a platform to access the global market, 3) reducing regulatory and

*Individual Agency, Dynamic Contextual Factors and E-Commerce in SMEs*

administrative costs and barriers and 4) facilitating a quick response to customer demands (Wagner Mainardes, de Almeida and de-Oliveira, 2019; Kraus et al., 2020). However, majority of SMEs in emerging economies are unaware of these benefits either due to various internal and external dynamic Technology-Organization-Environment (TOE) factors (Molla and Licker, 2005; Kartiwi, H. and Suhaimi, 2018); Pathan, M. S. K. (2024); Pathan, M. S. K. (2024); Pathan, M. S. K. (2025); Pathan, M. S. K. (2021); Pathan, M. S. K. (2023); Pathan, M. S. K. (2022) or due to the existence of less developed manufacturing clusters with only basic facilities in the industry in their home countries (Nazir and Khan, 2022). This lack of awareness has led to low adoption of e-commerce in SMEs of emerging economies as compared to those in developed economies (Molla and Licker, 2005).

E-commerce adoption is well researched, generally, in the contexts of emerging economies (Kurnia et al., 2015; Daoud and Ibrahim, 2019); Pathan, M. S. K. (2024); Pathan, M. S. K. (2024); Pathan, M. S. K. (2025); Pathan, M. S. K. (2021); Pathan, M. S. K. (2023); Pathan, M. S. K. (2022) and developed economies (de Oliveira et al., 2015). But the literature (except for (Gilaninia et al., 2011; Ajao, Oyebisi and Aderemi, 2018) on e-commerce adoption in the context of SMEs in emerging economies is very limited (Molla and Licker, 2005). Thus, the studies conducted in developed economies and their subsequent findings/strategies are less applicable in the context of emerging economies in the South Asia (Molla and Licker, 2005). The main reason for this inapplicability is that the emerging economies in the South Asia are distinct "heterogeneous economies" in the sense that they are different in terms of culture, business environment and government regulations (Lawrence and Tar, 2010) and require more culturally relevant strategies (Lim and Trakulmaykee, 2018).

Previous research has questioned the application of theories which do not match the phenomena and context (Baker and Welter, 2018; Welter, Bakar and Wirsching, 2019) of emerging economies (Bruton, Ahlstrom and Obloj, 2008; Scott et al., 2020); Pathan, M. S. K. (2024); Pathan, M. S. K. (2024); Pathan, M. S. K. (2025); Pathan, M. S. K. (2021); Pathan, M. S. K. (2023); Pathan, M. S. K. (2022) however, little efforts were made to understand why these theories are not applicable in the emerging context. In Pakistan as well as in the world, most of SMEs are owned and managed by individual owner-managers. As the individual attributes of innovative owner-managers (Ghobakhloo and Tang, 2013) have a significant impact on the setting of strategic direction and smooth functioning of day-to-day operations for SMEs; therefore, the present study suggests that the micro-level 'individual agency' context should be considered to better comprehend the e-commerce adoption by SMEs.

Earlier research on adoption of e-commerce in SMEs were conducted in Ghana (Awiagah, Kang and Lim, 2016), Malaysia (Kartiwi, H. and Suhaimi, 2018), Brazil (Wagner Mainardes, de Almeida and de-Oliveira, 2019), South Africa (Molla and Licker, 2005), and Indonesia (Rahayu and Day, 2015). However, few studies such as (Seyal et al., 2004; Abbas, Abdullah and Saad, 2018) Pathan, M. S. K. (2024); Pathan, M. S. K. (2024); Pathan, M. S. K. (2025); Pathan, M. S. K. (2021); Pathan, M. S. K. (2023); Pathan, M. S. K. (2022) have been conducted in South Asian countries; but all these studies ignored the dynamic TOE contextual

*Individual Agency, Dynamic Contextual Factors and E-Commerce in SMEs*

factors and individual agency in the explanation of e-commerce adoption. Likewise, there have been some studies focused on challenges to growth (Hyder and Lussier, 2016; Dar, Ahmed and Raziq, 2017; Zafar and Mustafa, 2017) which were more focused on the macro level i.e. institutions and other contextual factors such as social relations and regulatory framework. In this regard, the present study takes into account the micro level contexts and micro relations between small firms as contextual factors in e-commerce adoption in an emerging country.

Pakistan represents a semi-industrialized, rapidly evolving economy in South Asia, characterized by both structural challenges and significant growth potential. With a population exceeding 220 million, it ranks among the most populous nations globally and reflects a dynamic yet uneven economic landscape. Despite a relatively modest per capita income, the country's economic fabric is strongly driven by its small and medium-sized enterprises (SMEs), which account for nearly 99% of all business establishments and contribute substantially to national output.

Recognizing the strategic importance of SMEs, the Government of Pakistan established the Small and Medium Enterprises Development Authority (SMEDA) to strengthen this sector through policy formulation, financial facilitation, and entrepreneurial capacity building. While these institutional efforts have provided a foundational support system, SMEs across multiple industries continue to encounter persistent barriers that limit their growth and competitiveness.

One of the most critical yet underutilized avenues for expansion is e-commerce adoption. Although internet penetration has grown steadily, a significant proportion of SMEs remain reluctant or unable to integrate digital platforms into their business models. This disconnect highlights a deeper structural and behavioral gap, where technological availability does not necessarily translate into technological adoption. The present study is motivated by this gap and seeks to examine the underlying constraints shaping e-commerce adoption among SMEs in Pakistan, with particular emphasis on both contextual influences and individual-level decision-making dynamics.

### **Research Contribution**

This study advances the existing body of knowledge by proposing an extended and contextually grounded framework that integrates the Technology–Organization–Environment (TOE) model with micro-level perspectives related to individual agency and owner-manager characteristics. By bridging structural conditions with human decision-making processes, the research offers a more nuanced understanding of technology adoption in emerging economies.

Given Pakistan's scale and complexity as a developing market, this qualitative inquiry not only contributes to theoretical development but also generates actionable insights for policymakers, business support institutions, and entrepreneurs. The findings aim to inform more targeted interventions that can accelerate digital transformation within the SME sector.

## **Literature Review**

### **Theoretical Perspectives on E-Commerce Adoption**

Scholarly discourse on e-commerce adoption has been shaped by several foundational models, most notably the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT), and the Technology–Organization–Environment (TOE) framework. While TAM and UTAUT primarily emphasize individual perceptions and behavioral intentions, the TOE framework adopts a broader lens by incorporating organizational and environmental contexts alongside technological considerations.

Empirical evidence increasingly suggests that e-commerce adoption is influenced by a combination of technological readiness, organizational capacity, and external environmental pressures. Studies conducted within Pakistan and comparable emerging markets have demonstrated the significant role of these multidimensional factors, particularly in shaping digital engagement among SMEs. However, a substantial portion of prior research has remained narrowly focused on individual-level intention, thereby limiting its explanatory depth and contextual applicability.

In contrast, the TOE framework offers a more comprehensive analytical structure by integrating both micro-level and macro-level determinants. It captures firm-specific characteristics such as size and resources, while also accounting for external influences including regulatory support and market dynamics. Moreover, the framework enables exploration of the interactions between internal actors and external conditions, which are often overlooked in more linear adoption models.

Building on this strength, the present study extends the TOE framework by embedding an individual agency perspective, thereby acknowledging the critical role of owner-managers in shaping strategic decisions within SMEs. This integrated approach provides a richer and more context-sensitive explanation of e-commerce adoption behavior.

### **Technological Dimension**

The technological context constitutes a foundational pillar in understanding e-commerce adoption. Prior research identifies several critical enablers within this dimension, including perceived credibility, technological readiness, and relative advantage.

Perceived credibility reflects users' confidence in the reliability and integrity of digital platforms Pathan, M. S. K. (2024); Pathan, M. S. K. (2024); Pathan, M. S. K. (2025); Pathan, M. S. K. (2021); Pathan, M. S. K. (2023); Pathan, M. S. K. (2022). It is largely shaped by concerns related to privacy and security, both of which remain significant barriers in the adoption process. The fear of data misuse, unauthorized access, and transactional insecurity continues to discourage both businesses and consumers from fully embracing online commerce.

Technological readiness, on the other hand, refers to the availability and adequacy of

*Individual Agency, Dynamic Contextual Factors and E-Commerce in SMEs*

technological infrastructure required to support digital operations. This includes not only internal capabilities such as hardware and software systems but also external factors like internet connectivity and digital ecosystems. Firms with higher levels of technological preparedness are better positioned to integrate e-commerce into their operations and leverage its potential benefits.

The third key factor, relative advantage, captures the extent to which e-commerce is perceived as offering superior benefits compared to traditional business practices. When decision-makers recognize clear advantages, such as increased market reach, cost efficiency, and improved customer engagement, they are more likely to commit resources toward digital transformation.

Collectively, these technological factors shape both the feasibility and attractiveness of e-commerce adoption. Their influence is further amplified when aligned with organizational readiness and supportive environmental conditions.

### **Organizational Dimension**

Organizational characteristics play a decisive role in shaping the adoption of e-commerce within SMEs Pathan, M. S. K. (2024); Pathan, M. S. K. (2024); Pathan, M. S. K. (2025); Pathan, M. S. K. (2021); Pathan, M. S. K. (2023); Pathan, M. S. K. (2022). Key internal determinants include firm size, organizational structure, and the level of financial commitment. These elements collectively define a firm's capacity to allocate resources, implement technological systems, and sustain digital operations.

Firm size and structural configuration directly influence the availability of financial, human, and technical resources required for technological integration. Smaller enterprises, particularly in developing economies, often operate with constrained budgets and limited access to specialized IT expertise Pathan, M. S. K. (2024); Pathan, M. S. K. (2024); Pathan, M. S. K. (2025); Pathan, M. S. K. (2021); Pathan, M. S. K. (2023); Pathan, M. S. K. (2022). As a result, their ability to adopt and effectively utilize e-commerce platforms remains restricted. Evidence from emerging markets indicates that SMEs with more robust internal structures and resource endowments demonstrate a greater propensity to embrace digital transformation.

Financial commitment further reinforces this relationship by determining the extent to which firms are willing to invest in technological upgrades, training, and system maintenance. Organizations that prioritize strategic investment in digital infrastructure are more likely to overcome initial adoption barriers and realize long-term benefits. In contrast, limited financial capacity continues to act as a critical bottleneck, particularly for resource-constrained SMEs.

Overall, organizational readiness—manifested through adequate resources, supportive structures, and strategic investment—serves as a fundamental enabler of e-commerce adoption.

*Individual Agency, Dynamic Contextual Factors and E-Commerce in SMEs*

### **Environmental Dimension**

Beyond internal capabilities, external environmental conditions exert a significant influence on SMEs' decisions to adopt e-commerce. Competitive pressures, customer expectations, and supplier dynamics collectively shape the urgency and necessity of digital transformation. In increasingly competitive markets, businesses are compelled to adopt e-commerce solutions to maintain relevance and sustain market share Pathan, M. S. K. (2024); Pathan, M. S. K. (2024); Pathan, M. S. K. (2025); Pathan, M. S. K. (2021); Pathan, M. S. K. (2023); Pathan, M. S. K. (2022). Pressure from digitally engaged customers and technologically advanced competitors often accelerates this transition. Firms that fail to respond to such external demands risk losing both visibility and competitiveness.

However, among environmental factors, the role of government support and regulatory frameworks is particularly critical in emerging economies. Policies that promote digitalization, ensure cybersecurity, and facilitate access to technological infrastructure can significantly enhance adoption rates. Government-led initiatives, such as awareness campaigns, financial incentives, and infrastructure development, help reduce uncertainty and encourage SMEs to engage with e-commerce platforms. Creating a supportive ecosystem requires not only policy intervention but also alignment with local business needs. When regulatory frameworks are responsive and infrastructure is accessible, SMEs are better positioned to integrate digital technologies into their operations.

### **Revisiting the TOE Framework**

While the technological, organizational, and environmental (TOE) framework remains one of the most widely accepted models for studying technology adoption, it is not without critique. Some scholars argue that the framework does not sufficiently capture the influence of individual-level characteristics, particularly the role of decision-makers within SMEs. Nevertheless, the TOE framework continues to be valued for its adaptability and comprehensive scope. Its strength lies in its ability to incorporate multiple layers of influence, ranging from internal firm capabilities to broader environmental conditions. Importantly, it also allows for theoretical extension, making it suitable for capturing context-specific dynamics in emerging economies. Given the evolving nature of digital adoption, especially in developing markets, there is a growing need for flexible frameworks that can accommodate both structural and behavioral factors. In this regard, extending the TOE model provides a more holistic understanding of e-commerce adoption.

### **Extended Dimension: Individual Agency**

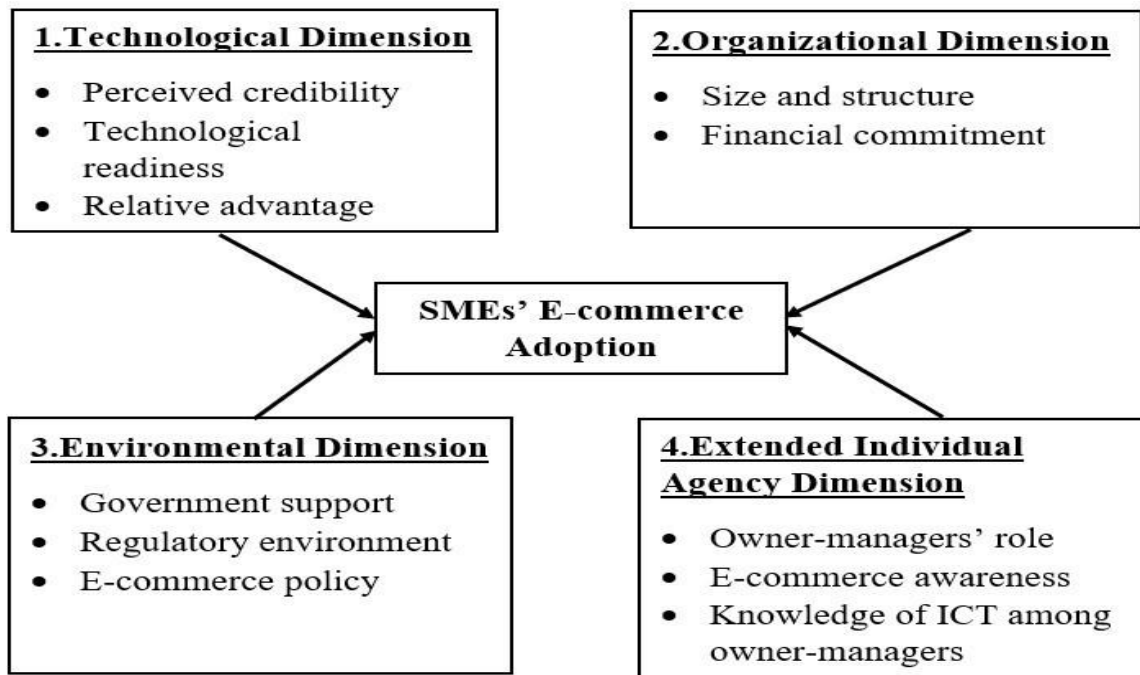
To address the limitations of traditional models, this study introduces an extended dimension focused on individual agency, emphasizing the role of owner-managers in SMEs. This perspective is particularly relevant in the context of Pakistan, where many SMEs operate as owner-driven enterprises with centralized decision-making structures. In such settings, strategic choices, including the adoption of e-commerce, are heavily influenced by the perceptions, competencies, and attitudes of individual decision-makers. Factors such as risk tolerance, technological awareness, prior experience, and cultural orientation significantly shape adoption behavior.

*Individual Agency, Dynamic Contextual Factors and E-Commerce in SMEs*

Unlike large organizations with formalized decision processes, SMEs often rely on intuitive and experience-based judgments. This makes the role of the owner-manager not only influential but, in many cases, decisive. Cultural and contextual nuances further amplify this effect, as social norms and local business practices interact with individual preferences. By integrating individual agencies into the TOE framework, this study provides a more nuanced and context-sensitive model that captures both structural conditions and human behavior. This extended framework addresses a critical gap in the literature and offers deeper insight into the drivers and barriers of e-commerce adoption in Pakistan’s SME sector.

Figure Reference

Figure 1: Conceptual framework illustrating the integrated TOE model with the extended individual agency dimension (Source: Authors).



Extended Dimension: Individual Agency (Refined)

The individual agency dimension captures the critical influence of owner-managers and key decision-makers on the adoption of e-commerce within SMEs. In many small and medium-sized enterprises, particularly in developing economies such as Pakistan, decision-making authority is highly centralized. As a result, the awareness, mindset, and technological orientation of owner-managers play a decisive role in shaping organizational strategies related to digital adoption.

*Individual Agency, Dynamic Contextual Factors and E-Commerce in SMEs*

E-commerce implementation is not solely a function of technological availability; rather, it is deeply influenced by the extent to which decision-makers understand and value its potential. Owner-managers who possess greater awareness of digital tools and their strategic benefits are more likely to initiate and support e-commerce integration. Conversely, limited exposure to digital technologies often results in hesitation or resistance toward adoption.

In addition to leadership influence, the technological competence of managers, executives, and employees is another important determinant. The effective use of e-commerce platforms requires a workforce equipped with adequate ICT skills, including basic computer literacy and the ability to operate digital systems. However, the acquisition of such competencies often involves substantial training costs, which can discourage SMEs from investing in skill development, particularly when financial resources are constrained.

Furthermore, given that many operational and strategic functions within SMEs remain under the direct supervision of owner-managers, their support for employee training becomes essential. Without managerial commitment to capacity building, the development of digital skills within the organization remains limited. Therefore, both individual capability and managerial support must be considered jointly to understand the broader dynamics of e-commerce adoption.

By incorporating this individual agency perspective, the study acknowledges the human element of technological transformation, emphasizing that successful adoption depends not only on systems and structures but also on the people who drive organizational change.

### **Research Methodology**

This study adopts a qualitative research design grounded in an interpretive paradigm, allowing for an in-depth exploration of participants' experiences and perspectives. Such an approach is particularly suitable for investigating complex phenomena like e-commerce adoption, where contextual understanding and subjective interpretation are essential.

A multiple case study strategy has been employed to enhance the rigor and credibility of the research. By examining several SMEs across diverse industry sectors, the study captures a broader range of experiences and reduces the risk of context-specific bias. This approach enables the identification of recurring patterns while also allowing for meaningful comparisons across cases.

Data were collected through semi-structured interviews conducted with representatives from eight SMEs. These interviews provided rich, detailed insights into organizational practices, decision-making processes, and challenges related to e-commerce adoption Pathan, M. S. K. (2024); Pathan, M. S. K. (2024); Pathan, M. S. K. (2025); Pathan, M. S. K. (2021); Pathan, M. S. K. (2023); Pathan, M. S. K. (2022). The use of multiple cases strengthens external validity and enhances the robustness of the findings by enabling cross-case analysis. Overall, the methodological design ensures a comprehensive and nuanced understanding of the factors influencing e-commerce adoption, offering both depth and analytical rigor.

*Individual Agency, Dynamic Contextual Factors and E-Commerce in SMEs*

*Table 1: Characteristics of participating SMEs (Source: Authors)*

SME Name	Start Date	Size and Sector	City* (K, L, I)	Total Staff	Interviewee Position	Education Level
1- KHIMANU SML	2009	Small; manufacturing	K	22	Owner-manager, Finance Officer, Field Marketing Manager	High school certificate, BA and B.com
2- ISBTICKS ML	2005	Small; ticketing and tourism	I	12	Owner-manager, Co-owner, Accounts Officer	BA, MBA and M.com
3- ISBMANU MED	1997	Medium-sized; manufacturing	I	51	Owner-manager, ICT Manager, Marketing Director	MBA, BBA and ICT university certificate
4- ISBTRVLS ML	2007	Small; travelling and tourism	I	12	Owner-manager, Finance and Admin Officer, Marketing Assistant	High school diploma, BA and B.com
5- ISBICTMED	2006	Medium-sized; ICT	I	56	Owner-manager, Finance Manager, Sales and Support Manager	BCS, M.com and BCS
6- KHITRVL MED	2002	Medium-sized; ticketing and tourism	K	90	Owner-manager, ICT Manager, Finance Manager	Bachelor's in business, MBA-IT and M.com
7- LHRHTLS ML	2007	Small; hospitality	L	21	Owner-manager, Accounts Officer, Admin Officer	High school diploma, B.com and B. A
8- LHRMANU MED	2003	Medium-sized; manufacturing	L	80	Owner-manager, Marketing Manager, Finance Manager	MBA, MSc and ACCA

\*Note: K= Karachi; L= Lahore; I= Islamabad

### Selection Criteria

A total of twenty-four participants were drawn from eight SMEs operating in the manufacturing, hospitality, tourism, and information technology sectors across Pakistan's key commercial hubs, Karachi, Lahore, and Islamabad. These cities were selected due to their strong industrial presence and accessibility to active SMEs.

The SMEs were purposively selected from a list of 150 firms provided by SMEDA (see Table 1). Only those organizations were included that were either actively engaged in e-commerce through the use of ICT infrastructure or were in the process of transitioning toward digital commerce. Preference was given to SMEs with established physical offices where owner-managers played an active role in operational and strategic decision-making.

Following a rigorous screening process and on-site verification visits, 16 SMEs were identified as meeting the study's inclusion criteria. These firms were then approached via telephone and invited to participate. Subsequent informal meetings were held with interested owner-managers to introduce the research objectives and build rapport. However,

*Individual Agency, Dynamic Contextual Factors and E-Commerce in SMEs*

eight SMEs declined participation due to time constraints and reluctance to share internal organizational information.

Ultimately, eight SMEs agreed to participate, four from Islamabad, two from Karachi, and two from Lahore (see Table 1). Each SME contributed between two and four participants, resulting in a total sample of 24 respondents.

The researcher conducted formal field visits to each selected SME and carried out in-depth interviews with owner-managers, departmental managers, and employees familiar with ICT and e-commerce systems. In addition, finance and accounts personnel were included due to their involvement in budgeting, procurement of technology, and their working knowledge of ICT tools and systems that support digital business operations. Their input also provided valuable insight into the financial readiness and technological capacity of the firms.

Collecting data from multiple organizational roles enhanced the reliability and depth of the findings. In line with established qualitative research principles, diverse perspectives within the same organization were treated as equally valid rather than hierarchically prioritized (Eisenhardt and Graebner, 2007; Yin, 2018).

#### **Data Collection Tool**

Prior to each interview, informed consent was obtained from all participants. Semi-structured, open-ended interviews lasting between 45 and 90 minutes were conducted. Data were recorded through handwritten field notes and, where permitted, audio recordings, which were later transcribed for analysis. Participants were also contacted via telephone when follow-up clarification or additional information was required.

#### **Research Protocol**

The qualitative data collection process followed a structured yet flexible protocol to ensure coverage of key thematic areas while encouraging participants to freely express their experiences. Open-ended questions were designed based on prior literature on e-commerce adoption and aligned with the study's research objectives.

To ensure content validity, all constructs were refined using established theoretical foundations and existing scholarly frameworks (Luarn and Lin, 2005); Pathan, M. S. K. (2024); Pathan, M. S. K. (2024); Pathan, M. S. K. (2025); Pathan, M. S. K. (2021); Pathan, M. S. K. (2023); Pathan, M. S. K. (2022). A pilot study was conducted with six participants selected from three SMEs across the cities and sectors studied. This pre-test helped refine question clarity, improve sequencing, and ensure contextual relevance for Pakistan's SME environment (Kumar, 2018).

The pilot interviews also assessed respondents' interpretation of questions and identified potential ambiguities. Participants were encouraged to discuss barriers to e-commerce adoption and reflect on organizational, environmental, and individual-level challenges, thereby validating the instrument's external applicability.

*Individual Agency, Dynamic Contextual Factors and E-Commerce in SMEs*

**The final interview guide was structured around four dimensions:**

1. Technological (structural) context: geographic location, sector, ICT infrastructure, and technological configuration
2. Organizational context: firm size, structure, and resource availability
3. Environmental context: influence of external agencies, government support mechanisms, and market-level enablers of e-commerce adoption
4. Micro-level (individual agency) context: managerial roles, employee ICT competencies, innovation awareness, and adoption-related barriers

Feedback from the pilot phase significantly enhanced the final data collection instrument and confirmed its contextual relevance within Pakistan's SME sector.

Following data collection, interview transcripts were systematically coded and categorized to extract latent themes corresponding to the conceptual framework. Emerging themes were cross-verified across datasets, ensuring consistency and completeness. Where discrepancies arose, follow-up telephone interviews were conducted for clarification. Finally, the findings were triangulated with existing literature to strengthen conceptual alignment.

**Data Analysis**

The study employed thematic analysis due to its flexibility and suitability for exploring complex qualitative datasets across varying sample sizes and theoretical frameworks (Rashid et al., 2019). This approach is widely recognized for enabling systematic identification, classification, and interpretation of recurring patterns within data Muhammad, S. K. P. (2023); Khan, M. S. (2019); Khan, M. S. (2021); Pathan, M. S. K. (2022); Pathan, M. S. K. (2021); (Saunders, Lewis and Thornhill, 2019).

NVivo software was utilized to support data management and analysis, enabling systematic coding and facilitating the identification of nuanced insights across interviews, open-ended responses, and documentary data. The tool further enhanced the transparency, organization, and rigor of the qualitative analysis process (Nazir and Roomi, 2021).

The analysis followed an inductive reasoning process comprising three key stages:

1. Intensive reading of SME transcripts to gain familiarity with the data
2. Generation of initial codes guided by the TOE framework, with iterative refinement of categories (Bazeley and Jackson, 2013)
3. Identification and refinement of emerging themes through thematic clustering

Themes were developed based on their conceptual significance (Braun and Clarke, 2006). For example, issues such as high internet costs, weak connectivity, and inadequate ICT infrastructure were grouped under the broader theme of technological contextual constraints. Firm-level and environmental factors were similarly analyzed and categorized within the TOE framework. During the iterative coding process, the initial thematic structure was refined to incorporate emerging sub-themes, particularly those related to micro-level individual agency factors, thereby expanding the analytical model (see Table 2).

Table 2: Thematic Matrix (Source: Authors)

*Individual Agency, Dynamic Contextual Factors and E-Commerce in SMEs*

Themes	Sub-themes	Codes	Description
<b>1. Technological Contextual Factors</b>	<i>Availability of the latest ICT infrastructure units</i>	Hardware Software ICT Infrastructure	Identifies what technological factors influence the adoption or non-adoption of e-commerce in SMEs
	<i>Quality of available broadband Internet connection</i>	Internet speed High Internet cost Poor Internet connectivity	
	<i>National digital readiness</i>	Physical and technical infrastructure Digital ICT facilities Costly and outdated facilities	
<b>2. Organizational Contextual Factors</b>	<i>Firm size and structure</i>	Owner decision Firm size Firm structure Manual services	Identifies what organizational factors influence the adoption or non-adoption of e-commerce in SMEs
	<i>Financial resources and skilled expertise</i>	Financial capacity Budget IT Skills and expertise Low-cost professionals Costs	
<b>3. Environmental Contextual Factors</b>	<i>Traditional business selling methods</i>	Client preferences Personal visits Traditional ways	Identifies what environmental factors influence the adoption or non-adoption of e-commerce in SMEs
	<i>Consumer (online) e-commerce trust</i>	Consumer trust Culture Cash payment Price negotiation	
	<i>Government and local business institutional support</i>	Interest Support Legal framework Affiliations Finance	
<b>4. Extended (Individual Agency) Contextual Factors</b>	<i>Individual characteristics of owner-managers</i>	Individual innovativeness Internal control Firm decisions Internal success	Identifies what individual agency factors influence the adoption or non-adoption of e-commerce in SMEs
		Technology reluctant Senior employees Online tools Individual preference	
		Individual staff training Profit Internal motivation Individual interest	

Initially, themes were developed through interview transcripts that describe each respondent's discussion and contribution to a specific area, and then the statements of specific discussions were categorized and taken into consideration. Most frequent words were detected as technology, organization, environment, SMEs, e-commerce, adoption, customers and innovation. Figure 2 depicts the available themes derived from the interviews.

*Individual Agency, Dynamic Contextual Factors and E-Commerce in SMEs*



Figure 2: Available themes derived from the cases

### **Member Checking Procedure**

Following transcription, interview narratives were returned to the respective participants for validation. They were requested to review the content and report any inaccuracies, misinterpretations, or missing information within a three-week period. This member-checking process strengthened the credibility and trustworthiness of the findings Muhammad, S. K. P. (2023); Khan, M. S. (2019); Khan, M. S. (2021); Pathan, M. S. K. (2022); Pathan, M. S. K. (2021); (Creswell and Creswell, 2017).

### **Findings**

As presented in Table 2, the identified sub-themes influencing SMEs' intention to adopt e-commerce in Pakistan are organized under the four dimensions of the extended TOE framework. The key findings are discussed below.

#### **Technological Contextual Factors – Structural Level**

Three major determinants emerged within the technological domain.

### **1. Availability and Quality of ICT Infrastructure**

Respondents consistently emphasized that the availability and quality of ICT infrastructure play a decisive role in e-commerce adoption. Many SMEs reported inadequate access to modern hardware and software systems. Due to their relatively small scale and less formalized organizational structures, ICT systems remain underdeveloped and technologically outdated.

#### **One participant noted:**

“Regarding the ICT infrastructure of the firm (hardware and software), we would like to integrate e-commerce in our firm in the near future, but this does not seem compatible with our way of doing things here...” [SME1]

Another stated:

“The systems are not fully developed... most departments still rely on obsolete technological equipment that requires urgent upgrading.” [SME6]

### **2. Internet Quality and Connectivity**

Poor internet speed and unreliable connectivity were identified as significant barriers to e-commerce implementation. Many SMEs reported that weak bandwidth restricts them to basic communication functions rather than enabling full-scale digital transactions.

A large proportion of respondents (91%) also criticized the high cost and inconsistent service quality provided by dominant telecom operators.

#### **For example:**

“Pakistan Telecommunication Limited (PTCL)’s monopoly has increased costs, while poor connectivity continues to restrict e-commerce operations.” [SME3]

“Internet service is unpredictable, sometimes fast, sometimes extremely slow, and often disconnected.” [SME4]

### **3. National Digital Readiness**

A substantial proportion of responses (74%) indicated that Pakistan’s overall digital infrastructure remains underdeveloped. High-speed internet, modern networking tools, and ICT facilities are either unavailable in many areas or remain financially inaccessible, particularly in rural regions.

Participants highlighted systemic constraints:

“Even in urban areas, infrastructure is a major limitation. In rural regions, SMEs are still struggling with basic ICT facilities.” [SME2]

“The cost of ICT equipment is too high and most systems are outdated and unaffordable for small firms.” [SME5]

“Given these technical constraints, implementing e-commerce effectively is simply not feasible.” [SME7]

## **Organizational Contextual Factors – Firm Level**

### **1. Firm Size and Structural Limitations**

Approximately 83% of respondents highlighted firm size and organizational structure as key determinants of e-commerce readiness. SMEs generally lack formal ICT departments, structured communication systems, and adequate financial or human resources.

Decision-making remains highly centralized, primarily controlled by owner-managers.

For instance:

“We do not have formal systems or departments to support digital communication or e-commerce operations.” [SME4]

“Most decisions depend entirely on the owner, who manages operations manually rather than through digital systems.” [SME7]

### **2. Financial Constraints and ICT Expertise**

Financial limitations and a shortage of skilled ICT professionals were repeatedly identified as major barriers. SMEs struggle to invest in digital infrastructure, develop websites, or hire qualified technical staff.

Highly skilled ICT professionals are expensive and in high demand, making them inaccessible for most SMEs.

### **Participants noted:**

“We simply do not have the budget for IT development.” [SME3]

“We cannot afford advanced ICT systems required for e-commerce operations.” [SME8]

“There is a serious shortage of affordable and skilled ICT professionals in our sector.” [SME7]

“Instead of investing further, we have abandoned the idea of e-commerce due to rising costs.” [SME6]

## **Environmental Contextual Factors – External Level**

### **1. Traditional Business Practices**

SMEs highlighted that conventional business practices remain dominant in Pakistan. These include face-to-face negotiations, personal relationships, and word-of-mouth marketing.

Respondents explained:

“Customers prefer direct interaction, especially for negotiating group deals and discounts.” [SME6]

“Clients insist on visiting physically to discuss packages—online systems are not trusted for such transactions.” [SME7]

Traditional communication channels such as telephone and fax were also seen as barriers to digital transformation.

### **2. Consumer Trust in Online Transactions**

A widespread lack of trust in online transactions was observed across all SMEs. Participants referred to concerns about fraud, misrepresentation, and product inconsistency.

Cash on delivery (COD) and in-person verification remain dominant preferences among customers.

*Individual Agency, Dynamic Contextual Factors and E-Commerce in SMEs*

For example:

“Many customers have experienced online fraud where the delivered product did not match what was ordered.” [SME8]

“People prefer visiting stores, inspecting products, and paying in cash after negotiation.” [SME5]

### **3. Government and Institutional Support**

Around 79% of respondents reported insufficient government and institutional support for SME digitalization. Additionally, 84% believed that policy frameworks and financial incentives disproportionately favor large enterprises.

As a result, SMEs demonstrate limited engagement with regulatory bodies such as SMEDA, SECP, and chambers of commerce.

Illustrative responses include:

“There was no effective ICT policy support during that period to enable SMEs to adopt e-commerce.” [SME3]

“Government should strengthen digital infrastructure and update ICT policies to support SMEs.” [SME7]

“Institutional support is largely directed toward large firms, not small businesses like ours.” [SME4]

### **Individual Agency Context – Micro Level**

#### **1. Innovation Capacity of Owner-Managers**

The individual innovativeness of owner-managers emerged as a critical factor. Approximately 92% of respondents indicated resistance to technological change, often due to fear of losing control over traditional business systems or lack of awareness.

#### **Some participants stated:**

“The owner relies on traditional methods and does not allow new systems that may disrupt the established business model.” [SME3]

“He is skeptical about e-commerce and believes it may negatively affect the business.” [SME6]

#### **2. ICT Awareness Among Employees**

Employee-level ICT skills and awareness were generally limited, particularly among senior staff. While some younger employees demonstrated technical capability, older employees often preferred manual systems.

For example:

“Some departments are capable of using digital systems, but many senior employees are reluctant to adopt them.” [SME6]

“Older staff members lack technical knowledge and prefer traditional methods.” [SME1]

*Individual Agency, Dynamic Contextual Factors and E-Commerce in SMEs*

**3. Support for ICT Training**

Limited training opportunities were directly linked to low managerial interest and financial constraints. Around 76% of respondents reported insufficient investment in employee ICT development.

**One participant explained:**

“Training is only provided if the owner is interested, but in our case, awareness is very limited.” [SME4]

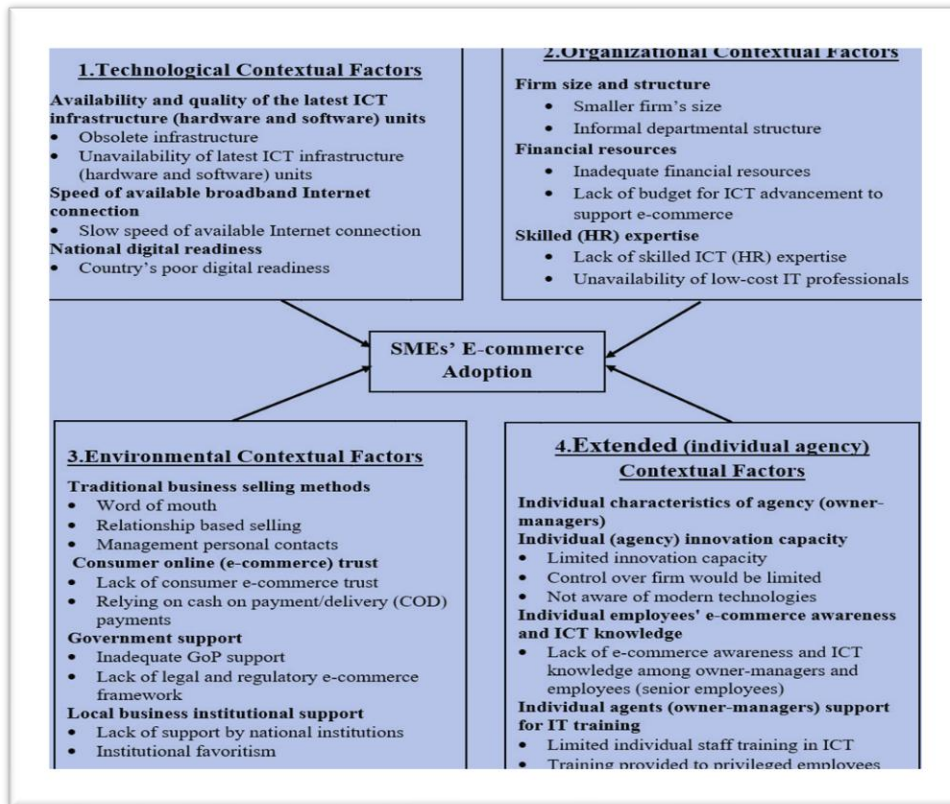
“ICT training is expensive, so only a few selected employees receive it.” [SME6]

Overall, findings suggest that innovative and forward-looking owner-managers are more likely to invest in training and promote e-commerce adoption within their firms.

**Conceptual Summary**

In summary, the findings demonstrate that SME adoption of e-commerce in Pakistan is shaped by a complex interaction of technological limitations, organizational constraints, environmental barriers, and individual-level agency factors.

Figure 3: Extended TOE Framework for E-commerce Adoption in Pakistani SMEs (Source: Authors)



### **Discussion and Conclusions**

Empirical evidence from this study demonstrates that e-commerce adoption among SMEs in Pakistan is shaped by a complex interplay of contextual influences across technological, organizational, environmental, and individual agency dimensions. Among these, micro-level individual agency factors, particularly the role of owner-managers, emerge as the most decisive force, as they both enable and constrain the influence of broader TOE-related conditions.

### **Technological Context**

The technological environment revealed three critical structural constraints hindering e-commerce adoption.

First, Pakistani SMEs significantly lag behind their counterparts in developed economies in terms of access to modern ICT infrastructure, including both hardware and software systems. The absence of up-to-date technological resources limits firms' ability to integrate digital business models effectively. Consistent with prior studies (Awiagah, Kang and Lim, 2016; Chau, Deng and Tay, 2020), the availability of adequate ICT infrastructure is confirmed as a foundational requirement for e-commerce diffusion. Findings further indicate that SMEs possessing relatively updated ICT systems demonstrate a higher propensity toward adoption.

Second, ICT penetration remains uneven, particularly in rural and semi-urban regions where broadband connectivity and digital tools are either insufficient or entirely absent. This digital divide restricts firms' operational scalability and digital engagement.

Third, high costs associated with modern ICT equipment further discourage investment in digital transformation. Combined with unreliable and low-speed internet services, these constraints severely limit SMEs' capacity to conduct online transactions. These challenges are exacerbated by limited technical support, leading to operational inefficiencies in digital processes. Similar patterns have been observed in other emerging economies Muhammad, S. K. P. (2023); Khan, M. S. (2019); Khan, M. S. (2021); Pathan, M. S. K. (2022); Pathan, M. S. K. (2021); (Dwivedi, Papazafeiropoulos and Scupola, 2009; Kabango and Asa, 2015).

Overall, the technological context remains a fundamental determinant of e-commerce readiness in Pakistan.

### **Organizational Context**

From an internal firm perspective, organizational readiness plays a critical role in shaping adoption outcomes. Contrary to earlier findings (Mutula and van Brakel, 2006; Martins, Oliveira and Thomas, 2015), this study reveals that most SMEs in Pakistan lack formal ICT structures, dedicated digital departments, and sufficient internal resources to support e-commerce implementation.

Financial limitations and inadequate ICT expertise further compound this challenge. Many SMEs are unable to maintain digital infrastructure, develop online platforms, or recruit

*Individual Agency, Dynamic Contextual Factors and E-Commerce in SMEs*

skilled personnel. As ICT professionals are both scarce and costly, SMEs with constrained budgets are unable to compete in the labor market for technical expertise.

Consequently, successful e-commerce adoption in Pakistani SMEs depends heavily on the availability of skilled human capital and the strategic support of owner-managers.

**Environmental Context**

At the environmental level, deeply rooted traditional business practices remain a dominant barrier to digital transformation. Relationship-based selling, physical interaction, and negotiation-driven transactions continue to define market behavior. These findings align with earlier research on SME cultural practices (Lawrence and Tar, 2010; Khaskheli and Jun, 2016), reinforcing the persistence of informal and trust-based trade systems.

Additionally, consumer distrust in online transactions represents a major structural limitation. Widespread concerns regarding fraud, misrepresentation, and product inconsistency discourage online purchasing behavior. As a result, cash-on-delivery (COD) and physical verification remain the dominant transaction modes.

Institutionally, the absence of a robust regulatory framework and insufficient government support further constrains e-commerce diffusion. Respondents consistently reported that public sector initiatives are disproportionately oriented toward large enterprises, leaving SMEs underserved in digital policy, financial access, and ICT development. Although institutions such as SMEDA and SECP exist, their practical impact on SME digitalization remains limited.

Therefore, strengthening institutional frameworks, improving regulatory governance, and promoting digital trust mechanisms are essential for sustainable e-commerce growth.

**Individual Agency Context**

The most influential dimension emerging from this study is individual agency, particularly the role of owner-managers. Contrary to earlier findings (Seyal et al., 2004), this research confirms that managerial characteristics significantly shape e-commerce adoption decisions in SMEs.

Owner-managers exert direct control over financial resources, operational decisions, and technological investments. Their perceptions of innovation, risk tolerance, and openness to change strongly determine whether e-commerce is adopted or rejected.

A lack of awareness, combined with resistance to technological change, often results in continued reliance on traditional business practices. In contrast, innovation-oriented managers demonstrate greater willingness to experiment with digital tools and invest in transformation.

Employee-level ICT competence also plays a crucial role. While younger employees show

*Individual Agency, Dynamic Contextual Factors and E-Commerce in SMEs*

higher adaptability, senior staff often exhibit resistance due to limited digital literacy and reluctance to transition from manual systems. Furthermore, ICT training opportunities remain restricted due to financial constraints and managerial priorities.

Overall, ICT knowledge and managerial innovation capacity emerge as the most critical individual-level determinants of e-commerce adoption.

### **Generalization of Findings**

The TOE-related and individual agency factors identified in this study may also be applicable to SMEs in other emerging South Asian economies such as India, Bangladesh, and Sri Lanka, which share similar institutional, infrastructural, and cultural characteristics.

### **Theoretical Contribution**

This study extends the classical TOE framework (Tornatzky, Fleischer and Chakrabarti, 1990) by incorporating a refined micro-level individual agency dimension. This extension enhances the explanatory power of the model by capturing the behavioral and cognitive influence of owner-managers and employees, an area previously underexplored in SME e-commerce literature.

The findings demonstrate that technological innovation adoption in SMEs is not solely driven by external or organizational factors but is also significantly shaped by individual-level decision-making power and innovation orientation.

### **Practical Implications**

From a managerial perspective, this study highlights that e-commerce adoption is primarily an adaptive and strategic challenge rather than a purely technological one. Success depends heavily on leadership commitment, managerial awareness, and employee capability development. For policymakers, the findings underscore the urgent need for comprehensive digital policy frameworks tailored to SMEs. Government agencies such as SMEDA and SECP should strengthen institutional support through training programs, awareness campaigns, and SME-focused digital initiatives. Moreover, regulatory frameworks addressing online fraud, data security, and digital transactions must be strengthened to build consumer trust and promote digital commerce adoption. ICT service providers and consultants should also consider SME financial limitations and managerial competencies when designing e-commerce solutions, ensuring affordability and usability for small enterprises.

### **Limitations and Future Research Directions**

This study is limited by its sample size of eight SMEs located in three major urban centers of Pakistan across four sectors. Future research should expand the geographical scope to include rural SMEs and underrepresented regions to capture a more comprehensive national picture. Comparative studies across emerging economies could further validate the extended TOE framework and enhance generalizability. Additionally, future quantitative research could incorporate additional constructs such as cultural perceptions, digital trust, and behavioral readiness to enrich the extended model of e-commerce adoption.

*Individual Agency, Dynamic Contextual Factors and E-Commerce in SMEs*

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*Individual Agency, Dynamic Contextual Factors and E-Commerce in SMEs*

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