# Overcoming Barriers to Adopting Electronic Commerce by SMEs in Developing Countries

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**Abstract**: This study indicates that e-commerce presents a promising avenue for organizations to navigate the challenges of an increasingly dynamic and competitive environment. Despite its potential, SMEs in developing countries remain hesitant and slow in adopting e-commerce technologies, often due to skepticism and structural limitations. Internal barriers—such as lack of awareness, skills, and strategic planning—can typically be addressed within the organization. In contrast, external barriers—such as inadequate infrastructure, policy gaps, and regulatory challenges—require intervention from government bodies or collaborative efforts among SMEs.

This paper introduces a conceptual model for overcoming these barriers, developed through a synthesis of existing literature, exploratory pilot studies, and a comprehensive survey. In addition to identifying the key obstacles, the research highlights the types of support SMEs require to successfully transition toward e-commerce adoption. The methodology and initial findings provide valuable insights into the digital readiness of SMEs in developing economies and offer a foundation for future policy and strategic interventions.

**Keywords**: Adoption, e-commerce adoption, SME, Internet related technologies, Developing countries, Internal barriers, External barriers, Conceptual model.

## 1. INTRODUCTION

Small and medium enterprises (SMEs) have long been recognized as vital contributors to economic growth and innovation. Yet, when it comes to adopting and integrating electronic commerce (e-commerce) technologies into their operations, many SMEs continue to face a wide range of challenges. Numerous studies have explored these barriers (MacGregor & Vrazalic, 2005a; Scupola, 2003; Ihlstrum et al., 2003), revealing a persistent and evolving set of issues that hinder progress. Interestingly, research suggests that many of the obstacles identified in the late 1990s remain relevant today (MacGregor & Vrazalic, 2004; Ihlstrum et al., 2003), highlighting the enduring nature of these challenges.

Against this backdrop, the aim of this paper is to contribute to the ongoing conversation around e-commerce adoption in SMEs. Specifically, it seeks to answer a fundamental question: Are the barriers faced by SMEs in adopting and assimilating e-commerce technologies consistent across different contexts, or do they vary significantly? To explore this, the paper draws on a comprehensive literature review and a survey of key studies that have shaped understanding in this field [1].

While large organizations have generally embraced IT and e-commerce, SMEs—particularly those in developing countries—have lagged behind [16]. This disparity suggests that SMEs encounter unique and often more complex challenges. Research in developed countries has examined these issues from various angles, including organizational, managerial, and environmental perspectives [2]. However, studies focusing on developing countries are fewer

and tend to emphasize the specific technological, organizational, and socio-economic factors that act as inhibitors [3].

Importantly, the differences between developed and developing countries—such as infrastructure availability, cultural norms, and economic conditions—mean that findings from one context cannot be easily generalized to another. SMEs in developing countries often face more pronounced and localized barriers. To truly understand the slow or limited uptake of e-commerce in these regions, it is essential to examine the environments in which these businesses operate [4].

Barriers to adoption can be broadly categorized into two groups: *Internal Barriers*: These arise within the organization and may include limited technical expertise, financial constraints, or lack of strategic direction. *External Barriers*: These stem from the broader environment and encompass infrastructural limitations, regulatory challenges, and socio-cultural factors [5].

While internal barriers may be addressed through organizational change and capacity building, external barriers often require systemic interventions, including government support and policy reform. Understanding both sets of barriers is crucial for enabling SMEs in developing countries to harness the full potential of e-commerce [6].

This paper begins by reviewing current research on overcoming e-commerce adoption barriers in SMEs, with a focus on developing countries. It then discusses how previous studies have categorized these barriers and introduces a new framework developed through this research. The methodology used for the empirical study is outlined, followed by a discussion of preliminary findings. Finally, the paper presents conclusions, acknowledges

limitations, and suggests directions for future research.

## 2. LETRETURE REVIEW

The adoption of e-commerce by SMEs has been widely studied across different regions and contexts, revealing a complex interplay of technological, organizational, and environmental factors. This section synthesizes key findings from notable research to better understand the barriers and enablers of e-commerce adoption.

Chong (2001) explored how Australian SMEs perceive and implement Internet-based e-commerce, using Rogers' (1995) innovation diffusion model. The study identified several factors influencing successful adoption, positioning e-commerce as a novel innovation requiring strategic alignment and readiness. [12]

Cloete (2001) investigated South African SMEs' perceptions of e-commerce benefits and barriers. The study revealed that while businesses recognized the potential of the Internet, adoption was limited by infrastructural challenges and a lack of government support—issues less prevalent in developed countries. [10]

Titi (2005) explored the willingness of Jordanian SMEs to adopt e-commerce. The research identified specific barriers—such as cost, lack of awareness, and limited infrastructure—that influenced decision-making. [11]

Kapurubandara (2006) developed a comprehensive model of barriers to ICT and e-commerce adoption in Sri Lanka. Drawing from literature and pilot studies, the research emphasized the need for support mechanisms tailored to SMEs in developing countries [18].

El-Nawawy et al. (1999) studied Egyptian SMEs and found that non-adoption stemmed from a mix of infrastructural, educational, legal, and psychological factors. The role of government and market readiness were also highlighted as critical components. [8]

Schmid et al. (2001) compared e-commerce issues in Argentina and Egypt, identifying common barriers such as awareness, infrastructure, and cost. Their findings suggest that SMEs in developing countries often face similar challenges, regardless of geographic location. [9]

This paper uses the Internal vs. External Barriers framework to analyze how SMEs in developing countries adopt new technologies. By organizing the challenges into these two categories, we aim to clarify the landscape and highlight practical strategies that SMEs can use to overcome these obstacles.

## 3. THEORETICAL FRAMEWORK

Across these studies, a consistent pattern emerges: SMEs face a dual set of challenges—internal and external barriers—that shape their ability to adopt e-commerce technologies. Internal Barriers: include lack of technical expertise, Limited financial resources, Resistance to change, low strategic prioritization. External Barriers: encompass Poor infrastructure (telecommunications, banking, logistics), Inadequate legal and regulatory frameworks, Cultural and behavioral resistance, Limited government support.

This paper adopts this Internal vs. External Barriers framework to analyze the adoption landscape for SMEs in developing countries. By categorizing the barriers, we aim to provide a clearer understanding of the challenges and identify actionable strategies for overcoming them.

## 4- RESEARCH MEHODOLOGIES

Given the limited empirical research on e-commerce adoption among SMEs in developing countries, this study adopted an exploratory approach that integrates both qualitative and quantitative methods. This mixed-method strategy was chosen to capture the complexity of the issue and provide a richer, more nuanced understanding of the barriers and support mechanisms involved.

The research focused on SMEs located in the Colombo District, which has the highest concentration of companies utilizing ICT in Sri Lanka. This region was selected as the base for investigation due to its relative technological maturity and diversity in SME operations. To ensure relevance and consistency, participating SMEs were defined as businesses with 10 to 250 employees—large enough to have some ICT exposure, yet still facing typical SME constraints. The study was conducted in two stages: Preliminary pilot interviews with SME representatives and intermediary support organizations. A structured survey followed by semi-structured interviews to gather deeper insights [7].

The pilot interviews played a crucial role in shaping the research model and survey instrument. These conversations helped identify key barriers and contextual factors, which were then validated and expanded upon through the literature review. Following this, the main data collection phase involved face-to-face, semi-structured interviews with SME support organizations. This method was chosen for its flexibility and depth, allowing researchers to explore emerging themes and clarify responses in real time—something not easily achieved through questionnaires or remote interviews. [3]

As Mingers (2000) and others have noted, using multiple methods enhances the validity and richness of research findings. It also reflects the multidimensional nature of real-world problems, especially in dynamic and resource-constrained environments like those faced by SMEs in developing countries. See Figure 1. Model – Developing Strategy to Adoption Electronic Commerce by Small and Medium-sized Enterprises in Countries [13][14][17].
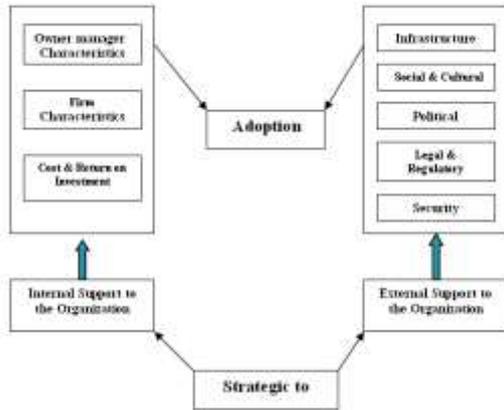
Figure 1. Model – Developing Strategy to Adoption Electronic Commerce by Small and Medium-sized Enterprises In Countries.

## 5. RESEARCK APPROACH

Empirical research in this area being limited, an exploratory investigation utilizing qualitative and quantitative evidence was considered most suitable. The research centered round SMEs in Colombo District with the highest density of companies using ICT. Colombo district was the base for investigations with SME selection necessitating employee strength of 10–250 employees; not totally immature but somewhat versatile in the use of ICT and e-commerce. The study was conducted in two stages: preliminary pilot interviews, a survey and interviews with SME intermediary support organizations [17]. The use of such multiple methods is widely accepted as providing increased richness and validity to research results, and better reflects the multidimensional nature of complex real-world problems. Besides, a multimethod approach allows for the combination of benefits of both qualitative and quantitative methods, and permits empirical observations to guide and improve the survey stage of the research. The preliminary pilot interviews brought in barriers imperative to SMEs with the model (Figure 1) and the survey instrument, forming outcome from interviews and observations supported by an extensive literature review [13][14].

The survey and interviews with intermediary support organizations followed. Face-to-face interviews were semi-structured to gather qualitative empirical data and provide flexibility [17], as they allow researchers to explore issues raised by respondents, generally not possible through questionnaires or telephone interviews.

## 6. RESULTS DISCUSSION
### 6-1 Barriers and Support for SMEs

Small and Medium-sized Enterprises (SMEs) face a complex landscape when adopting electronic commerce, shaped by both internal and external factors. The following discussion synthesizes the findings from Tables 1, 2, and 3, and integrates them with the Model – Developing Strategy to Adoption Electronic Commerce by Small and Medium-sized Enterprises in Countries. Figure 1.

**Table 1: Internal Barriers to using or extending use ICT & e-commerce**

| Internal Barriers | Mean | Std | N | % |
|---|---|---|---|---|
| Staff lack required skills | 3.88 | 1.35 | 120 | 66.6 |
| Security concerns with payments over the internet | 3.64 | 1.28 | 118 | 66.9 |
| e-commerce cannot give a financial gain | 3.64 | 1.24 | 108 | 62.0% |
| N= number of organisations | | | | |

**Internal Barriers** (Table 1): The top six internal barriers identified include:
- Lack of E-commerce Knowledge.
- Limited Financial Resources.
- Resistance to Change.
- Inadequate IT Infrastructure.
- Low Awareness of Benefits.
- Limited Skilled Personnel.

**External Barriers** (Table 2): External barriers are categorized into five dimensions:
- *Cultural*: Prevailing attitudes toward online business, trust issues, and consumer behavior.
- *Infrastructure*: Internet connectivity, logistics, and payment systems.
- *Political*: Government support, stability, and digital policy frameworks.
- *Social: Digital literacy*, education levels, and societal readiness.
- *Legal and Regulatory*: Data protection laws, e-commerce regulations, and enforcement mechanisms [18].

**Table 2: External Barriers to using or extending use of ICT & e-commerce**

| External Barriers | Mean | Std | N | % |
|---|---|---|---|---|
| **Cultural Barriers** | | | | |
| Lack of popularity for online marketing and sales | 3.56 | 1.28 | 120 | 62.5 |
| **Infrastructure Barriers** | | | | |
| Low internet penetration in the country | 3.78 | 1.89 | 125 | 71.2 |
| Inadequate quality and speed of lines | 3.81 | 1.88 | 130 | 78.8 |
| Inadequate infrastructure in the country | 3.52 | 1.22 | 125 | 62.4 |
| **Political Barriers** | | | | |
| Unstable economic climate in the country | 3.73 | .971 | 135 | 73.3 |
| Changing regulations with each government change | 3.72 | 1.12 | 135 | 71.9 |
| **Social Barriers** | | | | |
| Lack of information on e-commerce | 3.59 | 1.84 | 133 | 69.1 |
| No one-stop facility | 3.50 | 1.28 | 127 | 54.5 |
| No access to reliable expert help | 3.15 | 1.58 | 130 | 53.8 |
| Senior management in other sector lack ICT knowledge | 3.24 | 1.85 | 123 | 52.8 |
| **Legal & Regulatory Barriers** | | | | |
| Little support for SMEs from government and industry associations | 3.7 | .96 | 128 | 64.0 |
| Inadequate legal framework for business using e-commerce | 3.88 | .98 | 121 | 64.5 |
| No single procedures and guidelines | 3.87 | 1.10 | 128 | 65.6 |
| Lack of suitable software standards | 3.51 | 1.10 | 128 | 53.9 |
| N= number of organisations | | | | |

**Table 3: External support for SMEs to use or extend use of ICT & e-commerce**

| Internal Support | Mean | Std | N | % |
|---|---|---|---|---|
| Awareness and education | 3.91 | .87 | 132 | 79.9 |
| Guidance in overcoming risks associated with implementation | 3.86 | .92 | 129 | 78.0 |
| Guidelines for appropriate hardware and software | 3.78 | .88 | 134 | 72.4 |
| Advice and direction for ICT and e-commerce | 3.70 | .91 | 135 | 70.4 |
| N= number of organisations | | | | |

| External Support | Mean | Std | N | % |
|---|---|---|---|---|
| Improve national infrastructure | 4.04 | .76 | 130 | 84.6 |
| Provide financial assistance | 3.97 | .81 | 135 | 78.5 |
| Provide tax incentives | 3.97 | .92 | 132 | 80.3 |
| Improve ICT diffusion | 3.95 | .83 | 130 | 80.8 |
| Government & industry sector to take leadership/promotion role | 3.91 | .91 | 134 | 75.4 |
| Improve collaboration among SMEs | 3.86 | 1.04 | 133 | 69.1 |
| Improve low bank account and credit card penetration | 3.83 | .81 | 123 | 72.4 |
| Enforce suitable software standards | 3.8 | .97 | 132 | 74.3 |

N= number of organizations

The survey results clearly indicate that lack of skills, limited awareness of benefits, and uncertainty about return on investment are among the most significant internal barriers preventing SMEs from adopting ICT and e-commerce technologies. This is strongly supported by the finding that nearly 90% of respondents identified awareness and education as the most critical form of support needed—an unsurprising outcome in a developing country like Sri Lanka, where digital transformation is still in its early stages.

These internal challenges are compounded by the low overall use of ICT in the country, which contributes to a perception that e-commerce is not well-suited for local business transactions. This perception reinforces hesitation and slows down adoption .On the external front, "lack of popularity in online marketing" and "low internet penetration" emerged as top barriers. These issues are closely tied to the broader problem of inadequate ICT diffusion. The survey also highlighted infrastructure limitations, with SMEs calling for significant improvements in national infrastructure—particularly in electricity and telecommunications. High costs and unreliable service delivery continue to hinder SME operations.

While the government has taken steps to improve telecommunications—such as breaking the telecom monopoly—policy inertia and the absence of a robust legal and regulatory framework remain major obstacles. Policy reforms have often favored large, export-oriented firms, leaving SMEs with fragmented support and ad-hoc policy prescriptions [14].

The bureaucratic nature of the regulatory system further exacerbates delays and increases operational costs for SMEs. A more streamlined and SME-focused legal framework is essential to ensure a level playing field. Social barriers also play a role. For example, the concept of a one-stop shop—successfully implemented for export-oriented foreign direct investments (EOFDI) by the Board of Investments (BOI)—could be adapted to support SMEs by providing centralized access to information, technology, markets, and credit.

Another critical issue is the lack of ICT knowledge among senior management, which directly impacts operational efficiency. Addressing this requires targeted awareness and training programs, delivered through collaboration between government, academia, and industry. These programs should be tailored to the needs of SMEs at the grassroots level.

Finally, the survey reveals that SMEs place heavy reliance on external advice and support, yet such support is often unavailable or inaccessible. Bridging this gap is essential for enabling SMEs to participate meaningfully in the digital economy.

## 6-2 SMEs Level of Sophistication

The level of IT sophistication within SMEs is a critical indicator of their readiness to adopt and benefit from e-commerce. IT sophistication refers to how effectively an organization integrates information technology into its internal and external business processes [15], encompassing the interaction between people. See figure 2.
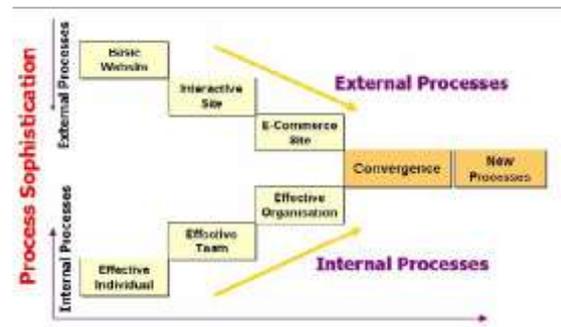


Figure 2. e-transformation Road Map for SMEs [15]

Two new stages emerged from the analysis: "No Computer" for external processes and "Manual" for internal ones. These reflect the reality in Sri Lanka, where many businesses—especially small ones—have yet to adopt computers. Some fear that hiring computer-literate staff will drive up wages or disrupt trusted workflows by replacing long-serving employees.

To reflect this, the roadmap was extended to include these new stages. In some cases, a single stage encompassed multiple sub-stages. Most organizations were found to fall within the two middle stages, while only a few were at either the most basic or most advanced ends of the spectrum.

Figure 3 illustrates the updated roadmap tailored for SMEs in Sri Lanka, and Figure 4 breaks down the sub-stages within a single level.
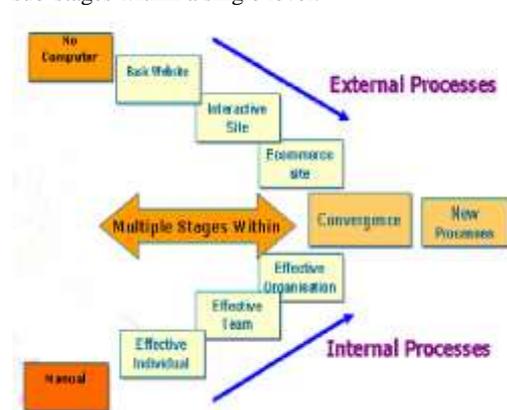


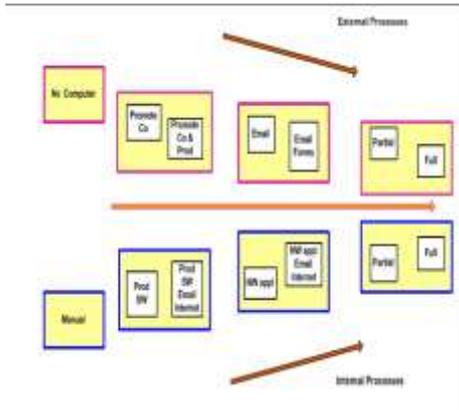Figure 3: Modified e-transformation Road Map for SMEs in Developing Countries

Figure 4: Detailed e-transformation Road Map with multiple stages within

## 6-3 Stages of the E-Transformation Roadmap

No Computer (External Processes): Organizations conduct all external business processes without computers. Manual (Internal Processes): Internal operations are managed manually, with no digital tools. *Basic Computerization*: Introduction of computers for simple tasks (e.g., word processing, spreadsheets). No integration or automation. *Standalone Applications*: se of individual software applications for specific functions (e.g., accounting, payroll). Limited or no connectivity between applications. *Internal Integration*: Different software systems within the organization are connected. Data can be shared internally, improving efficiency. External Integration: Systems are connected with external partners (suppliers, customers) via the Internet. E-commerce activities begin (e.g., online ordering, email communication). Full *E-Transformation*: Comprehensive use of ICT and e-commerce across all business processes. Real-time data exchange, online transactions, and digital collaboration with all stakeholders. See Table: 4.

**Table 4: Stages of the e-transformation roadmap**

| External Stages | Stages within |
|---|---|
| No Computer | |
| Basic Web Site | Promote company |
| | Promote company and products |
| Interactive Website | Has email link to contact company (one way) |
| | Has 2 way communication, email and facility for structured queries |
| E-commerce Site | Some e-commerce excluding financial transactions |
| | Full fledged e-commerce site |
| **Internal Stages** | **Stages within** |
| Manual | |
| Effective Individual | Use of Productivity Software |
| | Use of Productivity Software and email /Internet |
| Effective Team | Use of Networked applications, share databases |
| | Use of Networked applications, share databases, use email / Internet |
| Effective Enterprise | Some enterprise wide integrated applications |
| | Full use of enterprise wide integrated applications |

## 6-4 Challenges facing SMEs

Challenges Facing SMEs This study aimed to explore and assess the significance of both internal and external barriers faced by SMEs, as well as the types of support needed to overcome them. The findings reveal that external barriers pose a particularly strong challenge, significantly hindering SME growth and digital transformation. Furthermore, there is a clear and urgent demand for both internal and external support to help businesses navigate these obstacles.

A key insight from the research is the contrast between adoption patterns in developed and developing countries. In developed nations, support systems are generally available—it's a matter of identifying and accessing the right resources. In contrast, developing countries often lack structured support, leaving SMEs without the guidance or tools they need to progress.

Another major challenge in developing contexts is the state of national infrastructure, particularly telecommunications, which limits the ability of SMEs to adopt digital solutions effectively.

This research contributes by highlighting the absence of a coordinated approach between government and industry to support SMEs. It also points out that many issues remain unaddressed at the grassroots level. As a step forward, the study proposes an initial framework for transforming SMEs in developing countries, which can be trialed and refined through further validation.

## 7- CONCLUSION

This study offers valuable insights into the challenges SMEs face when adopting e-commerce in developing countries. By assessing current levels of ICT and e-commerce maturity, it highlights the barriers to adoption and identifies the types of support needed for successful digital transformation.

A key contribution of the research is the development of a conceptual model that outlines both internal and external limitations, while also mapping out the support mechanisms required to overcome these obstacles.

The findings are particularly relevant to SME owners and managers, as well as policymakers and industry leaders. They provide a foundation for informed, strategic decision-making around ICT and e-commerce adoption. Importantly, the study confirms that while SMEs are aware of the support they need, such support is often unavailable or inaccessible. This gap must be addressed through coordinated efforts by governments and intermediaries. A more proactive and engaged approach is needed to tackle external barriers—especially by improving infrastructure and regulatory frameworks.

Internally, SMEs can benefit from clustering and collaboration, which foster trust, skill-sharing, and access to broader markets. However, this concept remains underdeveloped and sporadic in countries like Jordan and Sri Lanka. To change this, targeted policy interventions, along with active involvement from the private sector and donor organizations, are essential (White Paper, 2002).

The government must take the lead in creating a supportive environment—enhancing infrastructure, promoting ICT education, and facilitating regulatory reforms. As the research progresses, it will explore geographic and sector-specific differences, offering a clearer picture of e-commerce activity across various regions and industries.

# 8- RECOMMENDATIONS

Adopting e-commerce in developing countries is a complex process that requires coordinated efforts from governments, businesses, and individuals. To encourage widespread use of the Internet and e-commerce, the following recommendations should be taken seriously:

1. Government Policy and Legal Framework: Governments must invest in projects that attract businesses to the digital economy and enforce legal protections against fraud and misuse. Legislation should ensure legal security, consumer protection, and technological neutrality, covering areas such as: Electronic contracts and signatures, Data protection and privacy, Cybersecurity and computer crimes, Equal treatment of electronic and traditional transactions.

2. Strategic Planning for E-Commerce: Poor planning is a major cause of e-commerce failure. SMEs should adopt strategic models tailored to their specific needs and market conditions. Effective strategies must be based on a clear understanding of the costs, benefits, and competitive advantages of e-commerce.

3. Infrastructure and Accessibility: Developing countries face significant infrastructure challenges. Governments must: Improve national telecommunications and digital infrastructure, ensure affordable and reliable Internet access for all citizens, Enhance ISP services and secure hosting options.

4. Education and Training: E-commerce success depends on digital literacy. Governments and businesses should: Promote awareness of e-commerce benefits, provide ongoing training for SME employees in Internet and e-commerce technologies, Educate programmers, technicians, and business professionals in IT skills, Support research and development in communication technologies.

5. International Cooperation: Developed countries should support developing nations by: Sharing technical expertise, including them in global forums on IT and e-commerce, adjusting international agreements to be more inclusive and flexible.

6. SME Support and Incentives: SMEs need financial and technical support to overcome barriers. Governments should: Offer loans and incentives for e-commerce adoption, encourage clustering and collaboration among SMEs to share resources and access wider markets, promote mutual trust and cooperation to improve competitiveness.

7. Security and Trust: Privacy and security concerns are major barriers. Continuous investment in data protection solutions is essential. Laws must address cybercrime, intellectual property violations, and ensure consumer trust in online transactions.

8. Government Leadership: Governments must lead by example, integrating e-commerce into public services such as: Customs and taxation, National elections, Public procurement.

9. Attracting Investment: Policies should aim to attract foreign capital to develop local IT industries in both software and hardware sectors. Support for the private sector, especially SMEs, is crucial for long-term digital transformation.

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