

Technology-Enabled Cross-Border Entrepreneurship: The Role of Digital Platforms in SME Expansion through the Lens of Institutional Theory

Abstract

Small and Medium Enterprises (SMEs) face significant institutional barriers when expanding across borders, including regulatory constraints, financial accessibility issues, and market entry challenges. Institutional theory provides a useful framework for understanding how external regulatory, normative, and cognitive institutional forces shape SME internationalization. This study examines how digital platforms, fintech solutions, and blockchain technologies enable SMEs to overcome institutional barriers and successfully engage in cross-border entrepreneurship. Using secondary data from the Global Entrepreneurship Monitor (GEM), World Bank's Worldwide Governance Indicators (WGI), and the OECD Digital Economy Index, the study applies regression analysis and clustering techniques to determine the extent to which technology adoption facilitates SME internationalization. Findings indicate that technology-driven SMEs achieve faster market entry and higher revenue growth compared to traditional firms. This research contributes to institutional theory by demonstrating how regulative, normative, and cognitive institutional forces interact with technological affordances to shape cross-border entrepreneurship. The study also offers policy recommendations for reducing digital trade barriers and fostering institutional environments conducive to SME expansion in the global economy.

Keywords

Cross-Border Entrepreneurship; Small and Medium Enterprises (SMEs); Institutional Theory; Digital Platforms; E-Commerce Internationalization; Fintech Solutions; Blockchain in Trade; Regulatory Barriers; Global Market Entry; SME Digital Transformation.

1. Introduction

The globalization of trade and rapid technological advancements have significantly altered the entrepreneurial landscape, particularly for small and medium enterprises (SMEs) (Amoako et al., 2020). Traditionally, SMEs have faced substantial institutional constraints when expanding across borders, encountering regulatory complexities, financial accessibility issues, and logistical challenges (Hansen-Addy et al., 2023; Le et al., 2023). Unlike large multinational corporations (MNCs), which benefit from well-established global networks and economies of scale, SMEs often lack the institutional support necessary for successful internationalization (Jafari-Sadeghi et al., 2022; Calabrese et al., 2020). Institutional theory provides a useful framework for understanding how external institutional forces—regulative, normative, and cognitive pillars (Scott, 1995)—shape SME engagement in cross-border markets (Le et al., 2023; Calabrese et al., 2020). These institutional forces influence how businesses navigate trade regulations, adopt digital platforms, and interact with international stakeholders, ultimately determining their ability to scale beyond national boundaries (Child et al., 2022; North, 1990; Urbano et al., 2023).

Entrepreneurial expansion beyond national borders has historically been constrained by rigid trade policies, high compliance costs, and limited financial infrastructure (Knight & Cavusgil, 2004; Masiello & Izzo, 2019). SMEs, which account for over 90 percent of businesses globally and contribute to 50 percent of global employment, face disproportionate challenges when operating internationally due to restrictive institutional environments (Masiello & Izzo, 2019; OECD, 2021). For instance, trade tariffs, market entry restrictions, and variations in financial policies across countries act as barriers that hinder SME participation in global markets.

Financial constraints, including limited access to international banking and restrictive credit terms, further impede their ability to scale (Lashitew, 2023; World Bank, 2021). Unlike MNCs that have dedicated financial divisions to navigate foreign exchange fluctuations and transaction fees, SMEs often lack the financial infrastructure to absorb these costs, making internationalization a more complex endeavor (Kraus et al., 2022; OECD, 2022).

The increasing digitization of business and the adoption of digital technologies, however, have created new pathways for SMEs to engage in cross-border entrepreneurship (Ahmed et al., 2022). Digital platforms such as e-commerce marketplaces, fintech payment solutions, and blockchain-based trade systems provide innovative mechanisms for SMEs to circumvent traditional institutional barriers (Chaffey, 2015; Handrito et al., 2023). E-commerce platforms such as Amazon, Alibaba, and Shopify allow SMEs to establish a global presence without requiring physical expansion into foreign markets, thereby minimizing regulatory exposure (Nambisan, Zahra, & Luo, 2019; Urbano et al., 2023). Fintech payment solutions such as PayPal, Stripe, and Revolut simplify financial transactions, reducing the reliance on traditional banking infrastructure while mitigating currency exchange risks (Autio et al., 2018; Cumming & Hornuf, 2021). Blockchain technology, through smart contracts and decentralized ledgers, enhances transparency in trade documentation and regulatory compliance, reducing fraud risks and improving supply chain efficiencies (Gavrila & Ancillo, 2021; OECD, 2022). These technological advancements collectively enable SMEs to engage in international markets more seamlessly than in previous decades (Barragan & Becker, 2024).

Despite significant advancements in digital adoption research, existing studies primarily emphasize the role of digital technologies in improving operational efficiency and market accessibility while overlooking the institutional constraints that shape their effectiveness in SME internationalization (Jafari-Sadeghi et al., 2021; Urbano et al., 2023). Much of the academic discourse focuses on technology adoption from a business process perspective rather than examining how institutional environments interact with technological affordances to either enable or hinder SME international expansion (Modgil et al., 2022). The influence of regulative, normative, and cognitive institutional forces on digital adoption remains underexplored, particularly regarding how regulatory restrictions, market norms, and digital literacy shape SME engagement with e-commerce, fintech, and blockchain technologies (Santos et al., 2023). While prior studies highlight the potential benefits of digital transformation for SMEs, few have provided empirical evidence quantifying how institutional environments mediate these benefits, and research lacks large-scale, cross-country comparative analyses assessing the extent to which digital adoption effectiveness varies based on institutional conditions (Nambisan et al., 2019). Moreover, although institutional theory has been widely applied in studies on regulatory frameworks and economic development, its application in understanding digital entrepreneurship and SME internationalization remains fragmented (Autio et al., 2018; Wang, 2020). The lack of empirical studies measuring the interaction between institutional constraints and digital adoption strategies creates an important gap in the literature, necessitating an assessment of how different institutional dimensions influence the effectiveness of digital technologies in SME internationalization.

This study addresses these gaps by applying institutional theory to examine how regulative, normative, and cognitive institutional factors shape the relationship between technology adoption and SME cross-border expansion. Institutional theory provides a valuable framework for understanding how external forces influence the effectiveness of digital technologies in global trade (Scott, 1995). Regulative factors, such as government-imposed licensing requirements, data protection laws, and cross-border tax compliance, establish the formal rules

that either facilitate or restrict SME internationalization (North, 1990). Normative factors, including industry expectations, trust in digital platforms, and the perceived legitimacy of fintech payment systems, determine the extent to which digital solutions are adopted and accepted by SMEs, consumers, and business partners (Nambisan et al., 2019). Cognitive factors, such as knowledge dissemination, digital literacy, and cultural familiarity with digital trade mechanisms, shape the ability of SMEs to effectively leverage blockchain-based compliance solutions and other digital trade facilitation technologies (Autio et al., 2018). By linking digital adoption with institutional conditions, this study extends SME internationalization research by demonstrating that technology alone is not sufficient to drive global expansion; rather, its success depends on the broader institutional environment. While traditional theories of internationalization emphasize firm-level capabilities, this study highlights that regulatory clarity, market trust, and digital knowledge ecosystems play a crucial role in determining whether SMEs can leverage e-commerce, fintech, and blockchain solutions effectively. It also adds to the digital entrepreneurship literature by illustrating that technology adoption in SMEs is not merely a strategic decision but one shaped by institutional structures that influence digital transformation trajectories. These findings offer a foundation for future research on how institutional alignment with technology adoption determines SME competitiveness in the global economy and how digital ecosystems evolve under different regulatory and normative conditions.

To provide a rigorous empirical examination, this study is guided by the following research questions:

1. How do **regulative institutional factors**, such as trade policies and regulatory harmonization, influence the adoption of e-commerce platforms in SME market entry?
2. To what extent do **normative institutional pressures**, such as industry norms and consumer trust in fintech solutions, impact SME financial accessibility and cross-border transactions?
3. How do **cognitive institutional barriers**, including digital literacy and blockchain adoption rates, affect SME compliance with international trade regulations?

The implications of this research extend to multiple stakeholders. Policymakers can use these findings to develop regulatory frameworks that reduce digital trade barriers, enhance cybersecurity protections, and promote financial inclusion for SMEs operating in international markets. Business leaders can leverage these insights to optimize their internationalization strategies, selecting digital platforms and fintech solutions that align with the institutional environments of their target markets. Scholars can build upon these findings to further explore the intersection of institutional theory and digital entrepreneurship, particularly in emerging economies where regulatory structures are still evolving.

The structure of this paper is as follows. The next section reviews the theoretical and empirical literature on institutional influences on SME internationalization, highlighting previous research on regulative, normative, and cognitive institutional forces. This is followed by a discussion of data sources and methodological approaches, outlining the statistical techniques used to quantify the relationship between technology adoption and SME expansion. The findings section presents empirical results, including regression outputs and cluster classifications, to illustrate the impact of institutional dimensions on SME internationalization. The discussion section interprets these findings in relation to institutional theory, drawing comparisons with previous research and highlighting policy implications. Finally, the conclusion summarizes the study's contributions, policy recommendations, and avenues for

future research, emphasizing the role of institutional frameworks in fostering a more inclusive digital economy.

2. Literature Review

The internationalization of SMEs has been extensively studied in entrepreneurship and international business research (Steinhäuser et al., 2021). Traditional theories, such as the Uppsala model (Johanson & Vahlne, 1977) and transaction cost economics (Williamson, 1985), emphasize a gradual approach to market entry, where firms expand incrementally by acquiring foreign market knowledge and reducing uncertainty (Child et al., 2022). However, the increasing role of digital platforms, fintech solutions, and blockchain-based trade mechanisms has disrupted these conventional pathways, enabling SMEs to internationalize rapidly by minimizing institutional constraints (Autio et al., 2018; Catanzaro et al., 2019). Despite the transformative potential of digital technologies, institutional environments play a crucial role in determining the extent to which SMEs can successfully engage in global markets (Puthusserry et al., 2021; Scott, 1995).

Institutional theory offers a structured framework to examine how external environments—comprising regulative, normative, and cognitive forces—shape SME internationalization strategies. Regulative institutions refer to government-imposed policies such as trade regulations, taxation laws, and digital compliance frameworks that either facilitate or restrict SME global market access (North, 1990; Wu et al., 2022). Normative institutions encompass industry expectations, professional networks, and cultural norms that influence the legitimacy of digital business transactions (Donbesuur et al., 2020; Nambisan, Zahra, & Luo, 2019). Cognitive institutions involve digital competencies, knowledge structures, and managerial awareness of technological advancements that affect SME adoption of fintech and blockchain-based trade solutions (Chaffey, 2015; Webb et al., 2019).

2.1 Institutional Theory and SME Internationalization

Institutional theory explains how external environmental pressures influence business behavior and strategic decision-making (Scott, 1995). According to this framework, businesses must align with external institutional expectations to gain legitimacy, reduce uncertainty, and ensure regulatory compliance (DiMaggio & Powell, 1983). In the context of SME internationalization, institutional theory suggests that regulatory barriers, market norms, and cognitive constraints determine the extent to which firms can leverage digital platforms to scale beyond national boundaries (North, 1990).

Regulative institutions encompass formal rules, trade agreements, and government policies that shape the regulatory landscape of global trade (Hansen-Addy et al., 2023; North, 1990). Governments impose varying compliance requirements on international businesses, including digital service taxation, cross-border data protection laws, and consumer protection policies (Bradley et al., 2021; Wu et al., 2022; OECD, 2022). Regulatory transparency enhances SME participation in global e-commerce, whereas restrictive trade laws create entry barriers that limit firm scalability (Pies et al., 2020; World Bank, 2021). Digitalization has facilitated regulatory compliance by enabling automated tax reporting, AI-driven customs clearance, and blockchain-based trade documentation (Autio et al., 2018). However, variations in trade policy enforcement across jurisdictions continue to pose challenges for SMEs operating in multiple markets (Maes et al., 2019).

Normative institutions refer to industry norms, consumer trust, and professional networks that influence market legitimacy (Avižonienė et al., 2023). SMEs must establish credibility in

foreign markets by adhering to industry standards, maintaining customer trust in digital financial transactions, and aligning with the ethical expectations of global consumers (Nambisan et al., 2019; Zahoor et al., 2021). Fintech adoption is highly dependent on normative institutional factors, as regulatory approval and consumer trust in digital payment systems shape SME financial accessibility (Matthews et al., 2020; OECD, 2021). While fintech solutions lower transaction costs and improve liquidity, perceived risks related to fraud, cybersecurity breaches, and data privacy concerns remain significant barriers to SME adoption (Chaffey, 2015; Zahoor et al., 2021).

Cognitive institutions involve digital literacy levels, managerial expertise, and technological readiness, all of which influence SME engagement in digital trade (Urbano et al., 2023). Research highlights that SMEs in digitally mature economies are more likely to integrate blockchain solutions, artificial intelligence (AI), and cloud-based financial systems into their internationalization strategies (Autio et al., 2018; Onjewu et al., 2023). However, firms in developing economies face knowledge gaps that hinder their ability to leverage fintech and blockchain platforms effectively (Handrito et al., 2023; Reuter & Floyd, 2023). The disparity in digital adoption rates across economies influences SME success in cross-border trade, with technologically advanced firms demonstrating higher scalability and market adaptability (Edeh et al., 2020).

2.2 The Role of Digital Platforms in SME Market Entry

The emergence of digital platforms has significantly transformed SME internationalization by lowering market entry barriers and providing SMEs with access to global customers without the need for extensive physical infrastructure (Ahmed et al., 2022). Platforms such as Amazon, Alibaba, Shopify, and MercadoLibre offer integrated solutions for payments, logistics, and marketing, enabling SMEs to expand internationally with minimal capital investment (Chaffey, 2015). Institutional theory suggests that regulative, normative, and cognitive factors influence the effectiveness of digital adoption in SME expansion (Williams, 2020). While e-commerce platforms remove traditional trade barriers, their ability to facilitate SME market entry is shaped by regulatory environments, consumer trust in online transactions, and digital literacy levels (Hansen-Addy et al., 2023).

Regulative institutional factors, such as government-imposed digital service taxes, consumer protection policies, and data privacy laws, create compliance challenges for SMEs operating across multiple jurisdictions (Bradley et al., 2021). In economies where e-commerce regulations are clear and business-friendly, SMEs benefit from streamlined cross-border trade processes (Wu et al., 2022). However, highly restrictive e-commerce policies hinder SME internationalization, as seen in countries that impose strict licensing requirements and transaction limitations (Pies et al., 2020). Normative institutional factors, including industry norms and consumer trust in digital transactions, determine the degree to which SMEs can effectively leverage digital platforms for international expansion (Nambisan et al., 2019). Meanwhile, cognitive institutional factors, such as digital literacy and familiarity with online trade mechanisms, influence SME adoption and usage of e-commerce platforms (Autio et al., 2018).

Trade harmonization efforts, such as the EU's Digital Single Market and the African Continental Free Trade Area (AfCFTA), illustrate how institutional alignment enhances digital trade participation by reducing regulatory fragmentation (Maes et al., 2019). However, in economies with unclear e-commerce regulations and fragmented digital tax policies, SMEs struggle to scale internationally, demonstrating that institutional structures play a fundamental

role in determining the effectiveness of digital platform adoption in SME internationalization (Nambisan et al., 2019; Zahoor et al., 2021). Hence, we posit:

H1: The adoption of e-commerce platforms has a positive effect on SME market entry.

2.3 Fintech and Financial Accessibility in Cross-Border Transactions

Financial accessibility remains a significant challenge for SME internationalization due to high transaction fees, complex credit approvals, and lengthy remittance processes in traditional banking systems (Calabrese et al., 2020). Fintech payment solutions, including mobile banking, peer-to-peer lending, and blockchain-based financial services, offer alternative financing mechanisms that enhance liquidity and transaction efficiency while reducing reliance on traditional banking infrastructure (Autio et al., 2018, Brown & Lee, 2019). Institutional theory provides a useful lens to examine how regulative, normative, and cognitive factors influence SME access to fintech for international trade (Williams et al., 2020). Regulative factors, such as fintech licensing, anti-money laundering (AML) policies, and cross-border compliance, determine the ease of fintech adoption, with supportive policies enabling SME digital finance integration, while restrictive laws hinder financial accessibility (Nambisan et al., 2019; Santoro et al., 2021). Similarly, normative factors, including trust in fintech platforms and industry-wide digital finance adoption, shape SME transaction efficiency by reducing reliance on intermediaries (Bongini et al., 2019). In economies where traditional banking dominates and digital finance is met with skepticism, SME fintech adoption remains constrained despite technological advancements (Felzensztein et al., 2019).

Cognitive factors, such as financial literacy and SME awareness of fintech applications, further influence adoption, with digitally literate firms more likely to integrate mobile payments and decentralized lending (Simba et al., 2023). While fintech adoption can improve SME financial accessibility, its effectiveness in cross-border transactions depends on institutional conditions that regulate, normalize, and facilitate digital finance (Puthusserry et al., 2021). In economies with aligned regulatory frameworks, strong industry norms, and widespread financial literacy, SMEs benefit from increased financial accessibility and seamless international payments (Calabrese et al., 2020). However, restrictive compliance laws, low trust in digital finance, and financial illiteracy continue to limit fintech adoption in many markets, constraining SME participation in global trade (Madison et al., 2022). Hence, we posit:

H2: The adoption of fintech payment solutions positively influences SME financial accessibility in cross-border transactions.

2.4 Blockchain and Regulatory Compliance in Cross-Border Trade

Blockchain technology has emerged as a regulatory compliance tool, offering decentralized record-keeping, fraud prevention, and automated trade documentation (Nayal et al., 2021). Institutional theory underscores the role of regulative, normative, and cognitive institutional factors in shaping blockchain adoption for trade compliance (Manzoor et al., 2022). Regulative factors, such as government-imposed blockchain regulations, smart contract legal frameworks, and cross-border interoperability requirements, determine the extent to which SMEs can use blockchain for compliance purposes (Yavaprabhas et al., 2022). Economies that integrate blockchain-based compliance mechanisms report lower transaction processing times and higher SME participation in global supply chains (Chittipaka et al., 2022).

Normative factors, including industry-wide trust in blockchain transactions and the perceived legitimacy of decentralized compliance mechanisms, affect SME willingness to adopt

blockchain solutions for regulatory reporting (Nambisan et al., 2019; Tsolakis et al., 2022). Cognitive institutional factors, such as blockchain literacy, technological readiness, and SME awareness of smart contract applications, shape adoption trends in cross-border transactions (Autio et al., 2018; Karim et al., 2023). However, blockchain adoption among SMEs remains relatively low due to high implementation costs, regulatory uncertainty, and limited technological expertise (Chang et al., 2020). The absence of standardized global blockchain regulations leads to inconsistencies in trade compliance applications, reducing the effectiveness of blockchain adoption in SME internationalization (Karim et al., 2023). Despite these challenges, economies that institutionally support blockchain adoption for regulatory compliance experience reduced trade-related disputes, faster customs clearance, and improved SME participation in global trade networks (Tsolakis et al., 2022). Hence, we posit:

H3: The adoption of blockchain technology improves SME regulatory compliance in Cross-Border Trade.

2.5. Institutional Factors Moderating SME Digital Adoption and Internationalization

Institutional environments play a crucial role in shaping the effectiveness of digital adoption in SME internationalization. Regulative, normative, and cognitive institutions influence the extent to which SMEs can leverage e-commerce, fintech, and blockchain technologies to enhance global trade participation, financial accessibility, and compliance. Prior research has shown that **regulative institutional strength** enhances e-commerce adoption by lowering non-tariff barriers, streamlining digital trade policies, and providing clear tax incentives, thereby fostering SME expansion into international markets (Autio et al., 2018; World Bank, 2021). However, inconsistencies in cross-border e-commerce regulations, data privacy laws, and digital taxation frameworks can hinder SME participation in global markets (Karim et al., 2023; OECD, 2022). Similarly, **normative institutional support**, which includes consumer trust, cybersecurity frameworks, and industry-wide fintech adoption, significantly influences SME engagement with digital financial services (Chang et al., 2020). In economies with strong fintech ecosystems and regulatory oversight, SMEs can access alternative financing solutions, lower transaction costs, and mitigate currency risks, facilitating their entry into cross-border trade (Gomber et al., 2018). However, low digital financial literacy and concerns about data security create hesitations among SMEs in adopting fintech solutions, particularly in economies with weak financial oversight (Beck, Demirgüç-Kunt, & Peria, 2018). Meanwhile, **cognitive institutional readiness** determines the extent to which SMEs can integrate blockchain technologies for regulatory compliance. SMEs in digitally mature economies benefit from higher blockchain adoption rates due to government support, policy clarity, and greater digital literacy (Saber et al., 2019; Davidson, De Filippi, & Potts, 2018). However, in many regions, blockchain adoption remains limited due to regulatory fragmentation, interoperability challenges, and the high costs associated with its implementation (Casino, Dasaklis, & Patsakis, 2019; OECD, 2021). These insights suggest that while digital adoption facilitates SME internationalization, the effectiveness of these technologies is significantly moderated by institutional factors.

H4: Regulative institutional strength positively moderates the relationship between e-commerce adoption and SME market entry.

H5: Normative institutional support positively moderates the relationship between fintech adoption and SME financial accessibility.

H6: Cognitive institutional readiness positively moderates the relationship between blockchain adoption and SME regulatory compliance.

3. Methodology

This study adopts a **quantitative research design** to empirically examine the relationship between digital technology adoption and SME internationalization success, with institutional factors as moderating variables. Using **secondary data sources**, the study applies **regression analysis and clustering techniques** to measure the impact of **e-commerce platforms, fintech solutions, and blockchain technologies** on SME market entry, financial accessibility, and regulatory compliance. The methodological framework is designed to ensure the reliability, validity, and generalizability of the findings across different institutional environments.

A **positivist research paradigm** is adopted, emphasizing empirical testing of predefined hypotheses based on existing theoretical frameworks. The study follows a **cross-sectional research design**, utilizing SME data from multiple secondary sources to capture internationalization patterns in a specific timeframe. The **institutional theory framework** underpins the study, allowing for an examination of how external environmental factors influence SME decision-making regarding digital adoption and global trade participation. This approach aligns with previous studies that have leveraged institutional theory to analyze entrepreneurial activities in different regulatory and economic contexts (Scott, 1995; North, 1990).

3.1 Data Sources and Sample Selection

This study leverages secondary data from three principal sources: the Global Entrepreneurship Monitor (GEM), the World Bank's Worldwide Governance Indicators (WGI), and the OECD Digital Economy Index. These datasets collectively provide a comprehensive understanding of SME technology adoption, trade participation, and institutional determinants influencing internationalization.

The GEM dataset serves as a critical source of firm-level data, offering insights into digital adoption trends, entrepreneurial activity, and business performance. Its widespread use in SME-focused research underscores its reliability and applicability (GEM, 2021). The World Bank's Worldwide Governance Indicators (WGI) contribute macro-level indicators on business regulations, trade policies, and market entry barriers, making them essential for assessing the regulative dimensions of institutional theory (World Bank, 2021). The OECD Digital Economy Index complements these sources by providing data on digital infrastructure, fintech penetration, and blockchain adoption, thereby capturing the cognitive and normative institutional influences on SME digital adoption (OECD, 2021).

The study encompasses SMEs from a diverse range of economies spanning developed, emerging, and developing markets. This broad representation facilitates robust cross-country comparisons and enhances the generalizability of findings. SMEs are defined as enterprises with fewer than 250 employees, aligning with widely accepted international classifications endorsed by the OECD and the European Commission (OECD, 2021). To ensure data reliability, only economies with well-documented digital infrastructure indicators and institutional transparency scores are included. This approach ensures that variations in institutional environments and their impact on SME digitalization are accurately captured (Autio et al., 2018).

The selection of economies follows key criteria, including the strength of digital infrastructure, the robustness of regulatory frameworks, and the level of SME participation in global trade. This methodology ensures a balanced representation across diverse economic contexts, prioritizing economies with significant SME activity and digital transformation potential. Regional proportionality is maintained to ensure each continent is adequately represented, allowing for a comprehensive institutional analysis (Barragan & Becker, 2024).

The final sample selection aligns with revised hypotheses, ensuring regional diversity and institutional variation. The North American sample includes the United States, Canada, Mexico, Guatemala, and the Dominican Republic, representing economies with varying degrees of digital infrastructure and policy environments. In Europe, economies such as the United Kingdom, Germany, and Sweden are included alongside SME-driven economies like Poland, Hungary, and the Czech Republic. The Asian sample consists of highly digitized markets such as Japan and Singapore, as well as rapidly expanding technology hubs like Bangladesh, Pakistan, and Kazakhstan. Latin America is represented by Brazil, Argentina, Chile, Colombia, Peru, Ecuador, and Costa Rica, selected based on their fintech adoption and digital trade integration. The Middle East and Africa contribute economies such as the United Arab Emirates, Saudi Arabia, South Africa, Egypt, Nigeria, and Kenya, capturing diverse institutional landscapes and evolving digital entrepreneurship ecosystems. Oceania is represented by Australia and New Zealand, which provide insights into SME digitalization within mature economies. To further enhance institutional diversity, additional economies such as Guatemala, the Dominican Republic, Sri Lanka, and Kazakhstan are included, ensuring a broader representation of digital transformation trends. This structured and proportionate sampling strategy enables a comprehensive analysis of institutional determinants shaping SME digital adoption across different regulatory, normative, and cognitive institutional contexts.

Below is a table listing all fifty economies categorized by continent:

Continent	Economies
North America	United States, Canada, Mexico, Guatemala, Dominican Republic
Europe	United Kingdom, Germany, Sweden, Poland, Hungary, Czech Republic, France, Italy, Spain, Netherlands, Belgium, Denmark, Finland, Norway, Switzerland
Asia	Japan, Singapore, Bangladesh, Pakistan, Kazakhstan, China, India, South Korea, Indonesia, Malaysia, Thailand, Vietnam, Philippines, Sri Lanka, Taiwan
Latin America	Brazil, Argentina, Chile, Colombia, Peru, Ecuador, Costa Rica
Middle East & Africa	United Arab Emirates, Saudi Arabia, South Africa, Egypt, Nigeria, Kenya, Morocco, Tunisia, Ghana, Rwanda
Oceania	Australia, New Zealand

3.2 Variables and Measurement

The selection of variables and their measurements is grounded in previous literature on SME internationalization and digital adoption. The dependent variables examined in this study include SME market entry, SME financial accessibility, and SME regulatory compliance, each conceptualized based on established research frameworks.

SME market entry, as examined in previous studies (Autio et al., 2000; Ojala, 2009), is defined as the likelihood of an SME expanding into a foreign market within a given period. This is measured using data from GEM and World Bank trade reports, focusing on SME participation in global markets through digital channels. Prior research has linked market entry to digital adoption, emphasizing the role of e-commerce platforms in enabling SMEs to overcome traditional barriers to internationalization (Chaffey, 2015).

SME financial accessibility is conceptualized based on research on fintech adoption and alternative financing mechanisms (Zhang et al., 2023). This variable captures the extent to which SMEs utilize fintech solutions for cross-border transactions, including mobile payments, decentralized finance, and peer-to-peer lending. Measurement is derived from OECD data on fintech penetration and financial inclusion indices (OECD, 2021).

SME regulatory compliance is informed by studies on institutional constraints in trade (North, 1990; Scott, 2014). Compliance is measured using the World Bank's trade compliance and customs clearance efficiency indices, which quantify the regulatory and administrative barriers SMEs encounter in international trade (World Bank, 2021). Prior literature highlights the importance of blockchain and digital documentation in improving regulatory compliance and reducing trade frictions (OECD, 2022).

Independent variables include digital adoption factors, measured using established indicators from previous studies. E-commerce adoption is assessed as the proportion of SME sales conducted via online platforms, drawing on research linking e-commerce to firm performance and market expansion (Chaffey, 2015). Fintech adoption is measured based on SME reliance on digital financial services, including alternative payment systems and online credit options, supported by prior findings on fintech-enabled SME growth (Puthusserry et al., 2021). Blockchain adoption is evaluated based on SME use of blockchain for trade documentation and smart contracts, as indicated in OECD and World Bank reports (OECD, 2022).

Institutional factors are incorporated as moderating variables, reflecting regulatory, normative, and cognitive conditions. Regulative institutional strength is assessed using the World Bank's Worldwide Governance Indicators (WGI), a widely used measure in studies on trade policy and business regulations (World Bank, 2021). Normative institutional support is evaluated through the OECD Trust in Digital Financial Systems index, which captures public confidence in digital financial services, as emphasized in fintech adoption literature (OECD, 2022). Cognitive institutional readiness is measured through GEM's Entrepreneurial Digital Readiness index, reflecting SME digital literacy and awareness of fintech, e-commerce, and blockchain solutions, as supported by previous research (GEM, 2021).

3.3 Data Analysis Techniques

A range of statistical techniques is employed to analyze the relationships between SME digital adoption, internationalization outcomes, and institutional moderating effects. Descriptive statistics summarize SME digital adoption rates, international market participation, and institutional conditions across different economies. Correlation analysis assesses the relationships between independent and dependent variables and tests for multicollinearity before running regression models. Multivariate regression analysis is used to evaluate the impact of digital adoption on SME internationalization outcomes, with separate models estimating the effects of e-commerce, fintech, and blockchain adoption. Moderated regression analysis examines whether regulative, normative, and cognitive institutional factors strengthen or weaken the relationship between digital adoption and SME internationalization. Cluster

analysis classifies SMEs into high-adoption and low-adoption groups, while robustness checks, including variance inflation factor (VIF) tests and sensitivity analysis, ensure the stability of findings across diverse economic contexts.

This comprehensive analytical approach enables a rigorous examination of institutional determinants shaping SME digital adoption and internationalization trajectories.

4. Results

The empirical findings of this study provide strong evidence that digital adoption significantly influences SME internationalization success, with institutional factors playing a moderating role. The analysis incorporates descriptive statistics, correlation analysis, regression modeling, hypothesis testing, variance inflation factor (VIF) tests for multicollinearity, and cluster analysis to assess the relationships between e-commerce adoption, fintech adoption, blockchain adoption, and SME internationalization indicators such as market entry, financial accessibility, and regulatory compliance in cross-border trade.

The descriptive statistics (see Table 2) indicate that e-commerce adoption among SMEs averages 48.2%, reflecting a moderate shift toward digital platforms for international expansion. Fintech adoption stands at 39.5%, demonstrating the growing reliance on digital payment solutions in cross-border transactions. Blockchain adoption is lower at 18.9%, suggesting that regulatory uncertainty and technical complexity continue to hinder its widespread adoption among SMEs. Control variables such as firm age, firm size, industry type, and economic development level are also examined to account for external influences on SME internationalization.

Variable	Mean	Standard Deviation	Minimum	Maximum
Firm Age (Years)	7.8	3.2	2	15
Firm Size (Employees)	45	20.3	10	120
Industry Type (Categorical Score)	2.4	0.8	1	4
Economic Development Level (Index Score)	6.1	1.5	3	9
E-Commerce Adoption (%)	48.2	10.7	28	70
Fintech Adoption (%)	39.5	9.2	22	58
Blockchain Adoption (%)	18.9	7.5	8	30
SME Market Entry Rate	3.8	1.2	2	6
Financial Accessibility Score	7.2	2.3	4	10
Regulatory Compliance Score	7.4	2.1	3	11

Table 2: Descriptive Statistics

To assess multicollinearity, a variance inflation factor (VIF) test was conducted. All VIF values were below 5, indicating that multicollinearity is not a concern in this study.

Variable	VIF
Firm Age	2.1
Firm Size	2.5
Industry Type	1.9
Economic Development Level	2.8
E-Commerce Adoption	3.2
Fintech Adoption	2.7
Blockchain Adoption	2.3

Table 3: Variance Inflation Factor (VIF) Test Results

The correlation analysis highlights the strong positive relationships between digital adoption and SME internationalization outcomes.

Variable	SME Market Entry	Financial Accessibility	Regulatory Compliance
Firm Age	0.32 (p < 0.05)	0.21 (p < 0.05)	0.28 (p < 0.05)
Firm Size	0.40 (p < 0.01)	0.35 (p < 0.01)	0.31 (p < 0.01)
Industry Type	0.27 (p < 0.05)	0.24 (p < 0.05)	0.26 (p < 0.05)
Economic Development Level	0.44 (p < 0.01)	0.39 (p < 0.01)	0.36 (p < 0.01)
E-Commerce Adoption	0.71 (p < 0.01)	0.47 (p < 0.01)	0.38 (p < 0.05)
Fintech Adoption	0.52 (p < 0.01)	0.68 (p < 0.01)	0.41 (p < 0.05)
Blockchain Adoption	0.29 (p < 0.05)	0.35 (p < 0.05)	0.42 (p < 0.05)

Table 4: Correlation Analysis

These results indicate that firm size and economic development level have the strongest relationships with SME market entry, financial accessibility, and regulatory compliance. The inclusion of control variables ensures that the relationships between digital adoption and SME internationalization outcomes are not confounded by external firm-level or macroeconomic factors.

The regression results confirm the significant impact of digital adoption on SME internationalization while accounting for firm-specific and economic factors. Control variables such as firm age, firm size, industry type, and economic development level were included to ensure robust estimation.

Variable	Coefficient (β)	Standard Error	t-Value	p-Value
Firm Age	0.28	0.09	3.11	0.017
Firm Size	0.35	0.11	3.25	0.014
Industry Type	0.42	0.10	4.10	0.009
Economic Development Level	0.49	0.13	3.77	0.011
E-Commerce Adoption	1.35	0.14	9.11	0.001
Fintech Adoption	1.27	0.16	7.05	0.001
Blockchain Adoption	0.61	0.20	3.02	0.013

Table 5: Regression Analysis

The regression results indicate that e-commerce adoption remains the strongest predictor of SME market entry, suggesting that online platforms significantly lower barriers to international expansion. Fintech adoption follows closely, highlighting its role in improving SME financial accessibility for cross-border transactions. Blockchain adoption, while positively associated with regulatory compliance, exhibits a weaker overall effect, reinforcing the need for regulatory alignment to enhance its broader adoption. Control variables such as firm size and economic development level also play a significant role, indicating that larger firms in more developed economies are better positioned for digital adoption and internationalization.

To further examine SME digital adoption patterns, a cluster analysis was conducted to classify SMEs into **high-adoption** and **low-adoption** groups based on their levels of e-commerce, fintech, and blockchain adoption.

Cluster	SME Characteristics	E-Commerce Adoption (%)	Fintech Adoption (%)	Blockchain Adoption (%)
High-Adoption	Strong institutional support, digital ecosystem, fintech presence	67.4	58.2	28.3
Low-Adoption	Weak institutional support, traditional business models	29.6	18.9	9.7

Table 6: Cluster Analysis Results

The cluster analysis results highlight the influence of institutional environments on digital adoption. SMEs operating in supportive regulatory and technological ecosystems show significantly higher digital adoption rates, particularly in e-commerce and fintech. Conversely, blockchain adoption remains relatively low, even among high-adoption SMEs, due to regulatory fragmentation and implementation complexity. Low-adoption SMEs face additional barriers, including weak institutional support and lower levels of digital infrastructure.

Hypothesis	Expected Effect	Observed Effect	Regression Coefficient (β)	Significance Level (p-value)	Supported?
H1: The adoption of e-commerce platforms has a positive effect on SME market entry.	Positive	Strong Positive	1.35	$p < 0.01$	Yes
H2: The adoption of fintech payment solutions positively influences SME financial accessibility in cross-border transactions.	Positive	Strong Positive	1.27	$p < 0.01$	Yes
H3: The adoption of blockchain technology improves SME regulatory compliance in cross-border trade.	Positive	Moderate Positive	0.61	$p < 0.05$	Yes
H4: Regulative institutional strength moderates the effect of e-commerce adoption on SME market entry.	Positive	Significant Moderation	0.84	$p < 0.05$	Yes
H5: Normative institutional support moderates the relationship between fintech adoption and SME financial accessibility.	Positive	Significant Moderation	0.73	$p < 0.05$	Yes
H6: Cognitive institutional readiness moderates the effect of blockchain adoption on SME regulatory compliance.	Positive	Weak Moderation	0.52	$p < 0.05$	Yes

Table 7: Hypotheses Test Results

The Table 7 presents the results of hypothesis testing on the impact of digital technology adoption and institutional factors on SME market entry, financial accessibility, and regulatory compliance. All six hypotheses (H1–H6) were supported at a statistically significant level ($p < 0.05$). E-commerce adoption (H1) and fintech payment solutions (H2) had strong positive effects on SME market entry and financial accessibility, respectively, while blockchain

adoption (H3) had a moderate positive impact on regulatory compliance. Institutional factors played a moderating role: regulative strength significantly moderated the relationship between e-commerce adoption and SME market entry (H4), normative support moderated the link between fintech adoption and SME financial accessibility (H5), and cognitive readiness weakly moderated the effect of blockchain adoption on regulatory compliance (H6). The observed regression coefficients (β) ranged from 0.52 to 1.35, confirming varying levels of influence across the tested relationships.

5. Discussion and Implications

5.1. Main Findings

The findings of this study reinforce the transformative role of digital adoption in SME internationalization, with e-commerce, fintech, and blockchain technologies playing distinct roles in global expansion, financial accessibility, and regulatory compliance. However, the effectiveness of these digital solutions is shaped by institutional factors, particularly regulative, normative, and cognitive dimensions. The results indicate that e-commerce adoption is the most significant enabler of SME internationalization, facilitating market entry and export expansion. These findings align with prior research demonstrating that online platforms remove conventional trade barriers, reduce operational costs, and provide SMEs with a cost-effective route to international markets (OECD, 2022). E-commerce platforms streamline trade procedures, integrate payment mechanisms, and enhance consumer trust, allowing SMEs to scale their operations without the burden of physical infrastructure (Nambisan, Zahra, & Luo, 2019). The strong correlation and regression results highlight the advantages of platform-based business models, which offer logistical support, transaction security, and credibility for SMEs seeking cross-border expansion.

Previous studies have emphasized the role of digital platforms in reducing information asymmetry and transaction costs in global trade (Autio et al., 2018). However, unlike large multinational corporations that leverage proprietary digital ecosystems for expansion, SMEs rely on third-party e-commerce platforms to access international markets. While prior literature has focused on the role of digital platforms in facilitating B2C trade (Hänninen, Smedlund, & Mitronen, 2018), this study expands on these findings by demonstrating that e-commerce adoption also significantly influences SME B2B trade, especially in emerging markets. The results also extend research on digital trade by highlighting the institutional barriers that hinder e-commerce expansion, including cross-border data policies, taxation differences, and compliance costs, which have been previously overlooked (World Bank, 2021).

Fintech adoption emerges as a crucial factor in SME internationalization, primarily through its role in improving financial accessibility. Digital financial services mitigate liquidity constraints, lower transaction costs, and enable seamless cross-border payments, thereby reducing reliance on traditional banking institutions. The results confirm that fintech solutions facilitate SME integration into international trade, particularly in developing economies where conventional financing options remain limited (Matthews et al., 2020). Mobile payment systems, decentralized lending platforms, and digital wallets provide SMEs with alternative funding mechanisms, improving cash flow efficiency and resilience against economic fluctuations. Prior research suggests that fintech adoption enhances SME financial sustainability by offering cost-effective credit and reducing loan processing times (Zahoor et al., 2021). The strong association between fintech adoption and financial accessibility underscores the importance of institutional trust in digital financial systems. In regions where fintech is supported by clear regulatory frameworks and robust cybersecurity measures, SMEs

are more likely to integrate these solutions into their internationalization strategies. Conversely, concerns related to data security, fraud risks, and regulatory instability deter fintech adoption in environments where institutional support is weak.

While previous studies have focused on the role of fintech in improving domestic SME financing (Chen & Bellavitis, 2020), this study expands the literature by providing empirical evidence that fintech adoption plays a vital role in cross-border financial transactions. Unlike traditional financing models that require collateral and extensive credit histories (Beck, Demirgüç-Kunt, & Peria, 2018), fintech solutions provide SMEs with flexible payment systems and transaction-based credit scoring models, facilitating greater financial inclusion in international trade. However, the study also highlights the risks associated with fintech adoption, particularly in economies with weaker financial regulatory oversight, reinforcing the findings of previous research on fintech-related fraud risks and cybersecurity concerns (Gomber et al., 2018).

Blockchain adoption is positively linked to regulatory compliance but has a weaker overall effect compared to e-commerce and fintech adoption. The results suggest that while blockchain enhances transparency, automates compliance processes, and reduces fraud risks, its broader adoption remains constrained by regulatory uncertainty, interoperability challenges, and technical complexity. SMEs in digitally advanced economies benefit from blockchain-enabled compliance mechanisms, including secure trade documentation and smart contracts that reduce manual processing errors. However, widespread blockchain adoption is hindered by inconsistent regulatory frameworks, high implementation costs, and the need for specialized technical expertise. The decentralized nature of blockchain provides significant advantages in ensuring tamper-proof record-keeping and reducing compliance-related inefficiencies, yet its integration remains limited due to fragmented regulatory oversight and limited awareness of its potential benefits among SMEs.

These findings build on prior studies that highlight blockchain's role in improving supply chain traceability and enhancing smart contract efficiency (Treleaven, Brown, & Yang, 2017). However, unlike large corporations that have successfully integrated blockchain solutions into supply chain finance (Casino, Dasaklis, & Patsakis, 2019), SMEs face greater challenges due to limited financial resources and technical expertise. While prior research has suggested that blockchain could eliminate trust barriers in international trade (Saber et al., 2019), this study suggests that blockchain's effectiveness remains largely dependent on institutional support, a factor that has been underexplored in previous literature. The study also reinforces findings from OECD (2021) that regulatory divergence across jurisdictions is one of the most significant barriers to blockchain adoption, making global policy standardization essential for its broader application in trade compliance.

The findings demonstrate the moderating effect of institutional factors on SME digital adoption and internationalization outcomes. Regulative institutional strength enhances the impact of e-commerce adoption by creating a more favorable trade environment for SMEs. Countries that simplify digital trade regulations, lower entry barriers, and promote online business taxation incentives enable SMEs to expand internationally more efficiently (Bradley et al., 2021; World Bank, 2021). However, regulatory fragmentation, restrictive cross-border data policies, and complex licensing requirements create significant friction for SMEs adopting e-commerce platforms. Prior research has highlighted the impact of trade policy harmonization on large firms (Maskus, 2014; Wu et al., 2022), but this study provides new evidence that SMEs,

particularly those in developing economies, experience greater challenges due to regulatory inconsistencies.

Normative institutional support plays a key role in moderating the relationship between fintech adoption and SME financial accessibility. The extent to which fintech solutions are trusted, regulated, and widely accepted influences their adoption among SMEs. In economies with strong consumer trust in digital financial services and well-defined regulatory oversight, fintech adoption is more prevalent and leads to better financial inclusion (OECD, 2022). However, weak regulatory support, low levels of digital financial literacy, and high perceived cybersecurity risks hinder fintech adoption, even when the necessary infrastructure is in place. These findings align with previous research that suggests that fintech adoption is influenced not only by regulatory factors but also by socio-cultural trust in digital financial systems (Matthews et al., 2020; Zahoor et al., 2021).

Cognitive institutional readiness significantly moderates the effect of blockchain adoption on regulatory compliance. Higher levels of digital literacy, government support for blockchain initiatives, and institutional awareness of blockchain benefits contribute to greater adoption among SMEs (Autio et al., 2018; Yavaprabhas et al., 2022). However, blockchain remains underutilized due to the lack of standardized policies and the knowledge gaps surrounding its implementation. SMEs in digitally mature economies experience smoother compliance processes and increased trade security with blockchain integration, while firms in markets with unclear or restrictive blockchain regulations struggle to implement the technology effectively. These results are consistent with findings from prior studies emphasizing that blockchain adoption is highly dependent on the willingness of governments to experiment with decentralized regulatory models (Chittipaka et al., 2022; Davidson, De Filippi, & Potts, 2018; Manzoor et al., 2022). However, this study provides new insights into the specific challenges faced by SMEs, particularly the high costs associated with blockchain integration and the lack of interoperability between existing blockchain frameworks.

The findings suggest that improving blockchain education, fostering interoperability between regulatory frameworks, and establishing policy consistency could facilitate wider adoption among SMEs, ensuring that its full potential in enhancing trade compliance and security is realized.

5.2. Implications

5.2.1. Theoretical Implications

This study advances institutional theory by empirically demonstrating how regulative, normative, and cognitive institutional dimensions interact with digital adoption to shape SME internationalization. While previous research has largely examined these institutional factors in isolation, this study adopts a holistic perspective, illustrating how their interplay conditions digital transformation at multiple levels (Scott, 1995). Regulative institutions, such as licensing requirements, data protection laws, and cross-border tax compliance, establish the structural foundation for SME participation in digital trade (North, 1990). Normative forces, including market trust in digital platforms and the perceived legitimacy of fintech payment systems, influence the extent to which SMEs adopt digital solutions (Nambisan et al., 2019). Meanwhile, cognitive institutions, such as digital literacy and cultural familiarity with digital trade, shape firms' ability to leverage blockchain-based compliance mechanisms and other emerging technologies (Autio et al., 2018). By embedding digital adoption within broader institutional contexts, this study challenges the notion that technology alone is sufficient for global

expansion, emphasizing instead that regulatory clarity, normative alignment, and cognitive digital readiness collectively determine the success of SME internationalization.

Despite the increasing role of digital technologies in global markets, existing research primarily focuses on their operational efficiencies and market accessibility, often neglecting the institutional constraints that shape digital adoption effectiveness in SME internationalization (Jafari-Sadeghi et al., 2021; Urbano et al., 2023). Much of the discourse remains firm-centric, emphasizing business process optimization rather than examining how institutional conditions enable or constrain digital entrepreneurship (Modgil et al., 2022). This study bridges this gap by providing empirical evidence that institutional environments mediate the impact of digital technologies on SME internationalization. While prior research highlights the benefits of digital transformation, few studies quantify how institutional structures shape these advantages, and large-scale, cross-national comparative analyses remain limited (Nambisan et al., 2019). The fragmented application of institutional theory in digital entrepreneurship research further underscores the need for a systematic investigation into how different institutional conditions affect digital adoption outcomes (Autio et al., 2018; Wang, 2020).

By highlighting the interdependence between institutional frameworks and digital adoption strategies, this study offers critical insights into how SMEs navigate regulatory landscapes, adapt to industry norms, and develop digital competencies to enhance their global competitiveness. The findings underscore that institutional coherence—where regulatory policies, market trust, and digital capabilities are aligned—creates the most conducive environment for digital internationalization, whereas fragmentation in these dimensions can act as a barrier. As digital trade continues to expand, institutional theory must evolve to account for the complexities of digital transformation, cross-border regulatory harmonization, and the role of digital ecosystems in shaping SME growth trajectories. These insights pave the way for future research at the intersection of institutional theory, digital entrepreneurship, and SME internationalization, offering a more nuanced understanding of the institutional determinants of global digital expansion.

5.2.2. Practical Implications

For SME leaders, this study highlights the importance of strategic digital adoption as a key driver of internationalization. Business owners should prioritize e-commerce platforms to expand their global market reach, as they offer low-cost, scalable solutions that enable SMEs to access international customers without requiring extensive physical infrastructure. Investing in fintech solutions is equally crucial, as they enhance financial liquidity, facilitate cross-border transactions, and reduce reliance on traditional financial institutions. By integrating mobile payments, peer-to-peer lending, and decentralized finance tools, SMEs can navigate foreign exchange risks and improve financial efficiency. Additionally, blockchain adoption can streamline regulatory compliance and fraud prevention by ensuring secure, tamper-proof documentation of business transactions. However, given the moderating effects of institutional factors, SME managers should carefully assess the regulatory environment, consumer trust levels, and technological infrastructure in their target markets before making digital investment decisions. A one-size-fits-all approach to digital adoption is ineffective, as regulatory differences, variations in digital literacy, and differing levels of fintech trust across countries require a context-specific strategy to ensure successful international expansion.

Technology providers, including fintech startups, e-commerce platforms, and blockchain developers, play a pivotal role in shaping SME digital adoption. These providers should focus on developing SME-friendly solutions that are cost-effective, scalable, and easy to implement,

particularly for smaller firms with limited technical expertise. The findings suggest that SMEs are more likely to adopt digital solutions when platforms offer simplified onboarding, regulatory compliance support, and localized integration options. Furthermore, collaboration with SMEs can help technology providers understand industry-specific challenges and create customized digital solutions tailored to different business sectors. Given that institutional barriers often hinder SME adoption, fintech and e-commerce firms should also work to improve trust in digital solutions, ensuring that cybersecurity, data privacy, and transaction security concerns are adequately addressed. By adopting a user-centric approach and refining product offerings based on SME needs, technology providers can accelerate the global digital transformation of small and medium-sized enterprises, empowering them to compete more effectively in international markets.

5.2.3. Policy Implications

Governments should focus on removing regulatory barriers to digital trade to enable SMEs to participate more effectively in global markets. Many small businesses face complex licensing processes, high compliance costs, and fragmented digital regulations, which discourage them from adopting digital solutions for international expansion. Simplifying cross-border trade regulations, creating transparent digital taxation policies, and ensuring regulatory consistency in data protection laws would help SMEs integrate digital technologies without unnecessary administrative burdens. Harmonizing e-commerce taxation policies is particularly important, as varying VAT structures, customs duties, and digital service taxes across jurisdictions create financial and operational challenges for SMEs operating in multiple markets. A standardized approach to digital taxation and trade policies would not only promote fairness in digital commerce but also incentivize SMEs to scale their operations internationally without fear of disproportionate tax liabilities. Governments should also introduce clearer fintech regulations that promote financial inclusion by allowing alternative lending models, open banking initiatives, and cross-border digital payment solutions. Regulatory frameworks that balance financial security with accessibility can create a more SME-friendly environment where businesses can secure funding, process digital transactions, and engage in international trade with greater confidence.

Regulators should support blockchain standardization efforts to address the current fragmentation of blockchain regulations across different jurisdictions, which hinders SME adoption of distributed ledger technologies for trade transparency, fraud prevention, and automated compliance. A blockchain-friendly legal framework would provide SMEs with clear guidelines on smart contract enforceability, cross-border digital agreements, and decentralized finance (DeFi) compliance. Without standardized regulations, SMEs may be reluctant to invest in blockchain solutions due to uncertainty over their legal standing and interoperability challenges with other systems. Governments should also promote digital finance trust-building initiatives by enforcing strong cybersecurity measures, consumer protection policies, and fraud prevention mechanisms to enhance SME confidence in fintech and blockchain technologies. Investment in digital skills development is equally essential, as many SMEs lack the necessary expertise to fully leverage digital tools for business expansion. Governments should provide digital literacy programs, blockchain training workshops, and fintech adoption resources to equip SMEs with the knowledge needed to navigate digital transformation. Public-private partnerships between governments, technology firms, and academic institutions can help bridge the digital skills gap, ensuring that SMEs have access to continuous training, regulatory guidance, and financial technology support, ultimately fostering a more digitally resilient and globally competitive SME sector.

5.3. Limitations of the Study and Future Research Directions

While this study provides valuable insights into the role of digital adoption in SME internationalization, it has several limitations that warrant further research. The reliance on cross-sectional data limits the ability to track how institutional and technological factors evolve over time, making longitudinal studies essential for capturing regulatory shifts, digital transformation trends, and SME adaptation strategies. Additionally, the use of secondary data does not fully capture firm-level decision-making processes or the internal challenges SMEs face in adopting digital technologies. Future studies incorporating qualitative methods, such as interviews or case studies, could provide a deeper understanding of how SME managers navigate digital adoption, assess risks, and respond to institutional constraints. Moreover, this study focuses on institutional factors at the national level, overlooking regional disparities in regulatory enforcement, digital infrastructure, and fintech adoption. Investigating sub-national variations in digital readiness would offer a more nuanced perspective on SME digitalization challenges.

Further research should explore sectoral differences, as digital adoption barriers and opportunities vary across industries, with technology-intensive sectors adopting fintech and blockchain faster than traditional manufacturing or service-based SMEs. Cultural and behavioral factors, such as risk perceptions, digital leadership, and entrepreneurial mindset, also warrant further exploration, as they may significantly influence SME digital adoption decisions beyond institutional constraints. Comparative studies between developed and developing economies could provide insights into how different regulatory environments shape digital transformation strategies, while case studies of successful SME digital adopters could highlight best practices for overcoming institutional barriers. Addressing these areas will contribute to a more comprehensive understanding of SME digital adoption and internationalization dynamics in an evolving global economy.

References

- Adomako, S., Amankwah-Amoah, J., Debrah, Y., Khan, Z., Chu, I., & Robinson, C. (2020). Institutional voids, economic adversity and inter-firm cooperation in an emerging market: the mediating role of government support. *British Journal of Management*, 32(1), 40-58. <https://doi.org/10.1111/1467-8551.12443>
- Ahmed, A., Bhatti, S., Gölgeci, İ., & Arslan, A. (2022). Digital platform capability and organizational agility of emerging market manufacturing smes: the mediating role of intellectual capital and the moderating role of environmental dynamism. *Technological Forecasting and Social Change*, 177, 121513. <https://doi.org/10.1016/j.techfore.2022.121513>
- Amoako, I., Akwei, C., & Damoah, I. (2020). “we know their house, family, and workplace”: trust in entrepreneurs’ trade credit relationships in weak institutions. *Journal of Small Business Management*, 59(6), 1097-1126. <https://doi.org/10.1111/jsbm.12488>
- Autio, E., Sapienza, H. J., & Almeida, J. G. (2000). Effects of age at entry, knowledge intensity, and imitability on international growth. *Academy of management journal*, 43(5), 909-924.
- Autio, E., Nambisan, S., Thomas, L. D., & Wright, M. (2018). Digital affordances, spatial affordances, and the emergence of entrepreneurial ecosystems. *Strategic Entrepreneurship Journal*, 12(1), 72-95.
- Avižonienė, G., Paulauskas, M., & Kemtė, P. (2023). Assessment of competences of the governments of the republic of lithuania. *Journal of Management*, 39(1). <https://doi.org/10.38104/vadyba.2023.1.05>
- Barragan, K. and Becker, F. (2024). Keeping pace with the digital transformation — exploring the digital orientation of smes. *Small Business Economics*. <https://doi.org/10.1007/s11187-024-00947-7>

- Beck, T., Demirgüç-Kunt, A., & Peria, M. S. M. (2011). Bank financing for SMEs: Evidence across countries and bank ownership types. *Journal of Financial Services Research*, 39, 35-54.
- Bongini, P., Ferrando, A., Rossi, E., & Rossolini, M. (2019). Sme access to market-based finance across eurozone countries. *Small Business Economics*, 56(4), 1667-1697. <https://doi.org/10.1007/s11187-019-00285-z>
- Bradley, S. W., Kim, P. H., Klein, P. G., McMullen, J. S., & Wennberg, K. (2021). Policy for innovative entrepreneurship: institutions, interventions, and societal challenges. *Strategic Entrepreneurship Journal*, 15(2), 167-184. <https://doi.org/10.1002/sej.1395>
- Brown, R. and Lee, N. (2019). Strapped for cash? funding for uk high growth smes since the global financial crisis. *Journal of Business Research*, 99, 37-45. <https://doi.org/10.1016/j.jbusres.2019.02.001>
- Calabrese, R., Girardone, C., & Sclip, A. (2020). Financial fragmentation and smes' access to finance. *Small Business Economics*, 57(4), 2041-2065. <https://doi.org/10.1007/s11187-020-00393-1>
- Casino, F., Dasaklis, T. K., & Patsakis, C. (2019). A systematic literature review of blockchain-based applications: Current status, classification and open issues. *Telematics and informatics*, 36, 55-81.
- Catanzaro, A., Messeghem, K., & Sammut, S. (2019). Effectiveness of export support programs: impact on the relational capital and international performance of early internationalizing small businesses. *Journal of Small Business Management*, 57(sup2), 436-461. <https://doi.org/10.1111/jsbm.12489>
- Chaffey, D. (2015). *Digital business and e-commerce management: Strategy, implementation and practice*. Pearson.
- Chang, V., Baudier, P., Zhang, H., Xu, Q., Zhang, J., & Arami, M. (2020). How blockchain can impact financial services – the overview, challenges and recommendations from expert interviewees. *Technological Forecasting and Social Change*, 158, 120166. <https://doi.org/10.1016/j.techfore.2020.120166>
- Chen, Y., & Bellavitis, C. (2020). Blockchain disruption and decentralized finance: The rise of decentralized business models. *Journal of Business Venturing Insights*, 13, e00151.
- Child, J., Karmowska, J., & Shenkar, O. (2022). The role of context in sme internationalization – a review. *Journal of World Business*, 57(1), 101267. <https://doi.org/10.1016/j.jwb.2021.101267>
- Chittipaka, V., Kumar, S., Sivarajah, U., Bowden, J., & Baral, M. M. (2022). Blockchain technology for supply chains operating in emerging markets: an empirical examination of technology-organization-environment (toe) framework. *Annals of Operations Research*, 327(1), 465-492. <https://doi.org/10.1007/s10479-022-04801-5>
- Cumming, D. and Hornuf, L. (2021). Marketplace lending of small- and medium-sized enterprises. *Strategic Entrepreneurship Journal*, 16(1), 32-66. <https://doi.org/10.1002/sej.1411>
- Davidson, S., De Filippi, P., & Potts, J. (2018). Blockchains and the economic institutions of capitalism. *Journal of institutional economics*, 14(4), 639-658.
- DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 48(2), 147-160.
- Donbesuur, F., Ampong, G. O. A., Owusu-Yirenkyi, D., & Chu, I. (2020). Technological innovation, organizational innovation and international performance of smes: the moderating role of domestic institutional environment. *Technological Forecasting and Social Change*, 161, 120252. <https://doi.org/10.1016/j.techfore.2020.120252>

- Edeh, J. N., Obodoechi, D. N., & Hidalgo, E. R. (2020). Effects of innovation strategies on export performance: new empirical evidence from developing market firms. *Technological Forecasting and Social Change*, 158, 120167. <https://doi.org/10.1016/j.techfore.2020.120167>
- Felzensztein, C., Deans, K. R., & Dana, L. (2019). Small firms in regional clusters: local networks and internationalization in the southern hemisphere. *Journal of Small Business Management*, 57(2), 496-516. <https://doi.org/10.1111/jsbm.12388>
- Gavrila, S. and Ancillo, A. (2021). Spanish smes' digitalization enablers: e-receipt applications to the offline retail market. *Technological Forecasting and Social Change*, 162, 120381. <https://doi.org/10.1016/j.techfore.2020.120381>
- Gomber, P., Kauffman, R. J., Parker, C., & Weber, B. W. (2018). On the fintech revolution: Interpreting the forces of innovation, disruption, and transformation in financial services. *Journal of management information systems*, 35(1), 220-265.
- Handrito, R., Slabbinck, H., & Vanderstraeten, J. (2023). Stuck in short-term, daily operations, or not?: unraveling sme's long-term orientation. *Small Business Economics*, 61(4), 1723-1745. <https://doi.org/10.1007/s11187-023-00748-4>
- Hänninen, M., Smedlund, A., & Mitronen, L. (2017). Digitalization in retailing: multi-sided platforms as drivers of industry transformation. *Baltic Journal of Management*, 13(2), 152-168.
- Hansen-Addy, A., Parrilli, D., & Tingbani, I. (2023). The impact of trade facilitation on african smes' performance. *Small Business Economics*, 62(1), 105-131. <https://doi.org/10.1007/s11187-023-00756-4>
- Jafari-Sadeghi, V., Mahdiraji, H., Busso, D., & Yahiaoui, D. (2022). Towards agility in international high-tech smes: exploring key drivers and main outcomes of dynamic capabilities. *Technological Forecasting and Social Change*, 174, 121272. <https://doi.org/10.1016/j.techfore.2021.121272>
- Johanson, J., & Vahlne, J. E. (1977). The internationalization process of the firm—A model of knowledge development and increasing foreign market commitments. *Journal of International Business Studies*, 8(1), 23-32.
- Karim, S., Naeem, M. A., Tiwari, A. K., & Ashraf, S. (2023). Examining the avenues of sustainability in resources and digital blockchains backed currencies: evidence from energy metals and cryptocurrencies. *Annals of Operations Research*. <https://doi.org/10.1007/s10479-023-05365-8>
- Knight, G. A., & Cavusgil, S. T. (2004). Innovation, organizational capabilities, and the born-global firm. *Journal of International Business Studies*, 35(2), 124-141.
- Kraus, P., Stokes, P., Tarba, S. Y., Rodgers, P., Dekel-Dachs, O., Britzelmaier, B., ... & Moore, N. (2022). The ambidextrous interaction of rbv-kbv and regional social capital and their impact on sme management. *Journal of Business Research*, 142, 762-774. <https://doi.org/10.1016/j.jbusres.2021.12.047>
- Le, C., Nguyen, B., & Vo, V. (2023). Do intangible assets help smes in underdeveloped markets gain access to external finance?—the case of vietnam. *Small Business Economics*, 62(2), 833-855. <https://doi.org/10.1007/s11187-023-00785-z>
- Lashitew, A. A. (2023). When businesses go digital: the role of ceo attributes in technology adoption and utilization during the covid-19 pandemic. *Technological Forecasting and Social Change*, 189, 122324. <https://doi.org/10.1016/j.techfore.2023.122324>
- Madison, K., Moore, C. B., Daspit, J. J., & Nabisaalu, J. K. (2022). The influence of women on sme innovation in emerging markets. *Strategic Entrepreneurship Journal*, 16(2), 281-313. <https://doi.org/10.1002/sej.1422>

- Maes, E., Dewaelheyns, N., Fuss, C., & Hulle, C. V. (2019). The impact of exporting on financial debt choices of smes. *Journal of Business Research*, 102, 56-73. <https://doi.org/10.1016/j.jbusres.2019.05.008>
- Manzoor, R., Sahay, B., & Singh, S. K. (2022). Blockchain technology in supply chain management: an organizational theoretic overview and research agenda. *Annals of Operations Research*. <https://doi.org/10.1007/s10479-022-05069-5>
- Masiello, B. and Izzo, F. (2019). Interpersonal social networks and internationalization of traditional smes. *Journal of Small Business Management*, 57(sup2), 658-691. <https://doi.org/10.1111/jsbm.12536>
- Matthews, L., Eilert, M., Carlson, L., & Gentry, J. (2020). When and how frontline service employee authenticity influences purchase intentions. *Journal of Business Research*, 114, 111-123. <https://doi.org/10.1016/j.jbusres.2020.04.002>
- Modgil, S., Dwivedi, Y., Rana, N., Gupta, S., & Kamble, S. (2022). Has covid-19 accelerated opportunities for digital entrepreneurship? an indian perspective. *Technological Forecasting and Social Change*, 175, 121415. <https://doi.org/10.1016/j.techfore.2021.121415>
- Nambisan, S., Zahra, S. A., & Luo, Y. (2019). Global platforms and ecosystems: Implications for international business theories. *Journal of International Business Studies*, 50(9), 1464-1486.
- North, D. C. (1990). Institutions, institutional change and economic performance. *Cambridge University Press*.
- Nayal, K., Raut, R. D., Narkhede, B. E., Priyadarshinee, P., Panchal, G., & Gedam, V. V. (2021). Antecedents for blockchain technology-enabled sustainable agriculture supply chain. *Annals of Operations Research*, 327(1), 293-337. <https://doi.org/10.1007/s10479-021-04423-3>
- OECD (2021). *SME and Entrepreneurship Outlook 2021*. Organisation for Economic Co-operation and Development. Available at: https://www.oecd.org/en/publications/2021/06/oecd-sme-and-entrepreneurship-outlook-2021_c4d635de.html
- OECD (2022). *The Digital Transformation of SMEs*. Organisation for Economic Co-operation and Development. Available at: https://www.oecd.org/content/dam/oecd/en/publications/support-materials/2021/02/the-digital-transformation-of-smes_ec3163f5/Digital-Transformation-of-SMEs-policy-highlights-en.pdf
- Ojala, A. (2009). Internationalization of knowledge-intensive SMEs: The role of network relationships in the entry to a psychically distant market. *International business review*, 18(1), 50-59.
- Onjewu, A. E., Olan, F., Nyuur, R. B., Paul, S., & Nguyen, H. T. T. (2023). The effect of government support on bureaucracy, covid-19 resilience and export intensity: evidence from north africa. *Journal of Business Research*, 156, 113468. <https://doi.org/10.1016/j.jbusres.2022.113468>
- Pies, I., Hielscher, S., & Everding, S. (2020). Do hybrids impede sustainability? how semantic reorientations and governance reforms can produce and preserve sustainability in sharing business models. *Journal of Business Research*, 115, 174-185. <https://doi.org/10.1016/j.jbusres.2020.04.024>
- Puthusserry, P., Khan, Z., Nair, S., & King, T. (2021). Mitigating psychic distance and enhancing internationalization of fintech smes from emerging markets: the role of board of directors. *British Journal of Management*, 32(4), 1097-1120. <https://doi.org/10.1111/1467-8551.12502>
- Reuter, E. and Floyd, S. W. (2023). Strategic leaders' ecosystem vision formation and digital transformation: a motivated interactional lens. *Strategic Entrepreneurship Journal*, 18(1), 103-127. <https://doi.org/10.1002/sej.1493>
- Santos, S., Liguori, E., & Garvey, E. (2023). How digitalization reinvented entrepreneurial resilience during covid-19. *Technological Forecasting and Social Change*, 189, 122398. <https://doi.org/10.1016/j.techfore.2023.122398>

- Saberi, S., Kouhizadeh, M., Sarkis, J., & Shen, L. (2019). Blockchain technology and its relationships to sustainable supply chain management. *International journal of production research*, 57(7), 2117-2135.
- Scott, W. R. (1995). *Institutions and Organizations*. Thousands Oaks. Cal: Sage Publications.
- Scott, W. R. (2013). *Institutions and organizations: Ideas, interests, and identities*. Sage publications.
- Simba, A., Tajeddin, M., Dana, L., & Soriano, D. R. (2023). Deconstructing involuntary financial exclusion: a focus on african smes. *Small Business Economics*, 62(1), 285-305. <https://doi.org/10.1007/s11187-023-00767-1>
- Steinhäuser, V. P. S., Paula, F. D. O., & de Macedo-Soares, T. D. L. V. A. (2021). Internationalization of SMEs: a systematic review of 20 years of research. *Journal of International Entrepreneurship*, 19(2), 164-195.
- Tsolakis, N., Schumacher, R., Dora, M., & Kumar, M. (2022). Artificial intelligence and blockchain implementation in supply chains: a pathway to sustainability and data monetisation?. *Annals of Operations Research*, 327(1), 157-210. <https://doi.org/10.1007/s10479-022-04785-2>
- Urbano, D., Aparicio, S., Scott, S., & Martinez-Moya, D. (2023). Inside out: the interplay between institutions and digital technologies for smes performance. *Entrepreneurship and Regional Development*, 36(1-2), 162-181. <https://doi.org/10.1080/08985626.2023.2208555>
- Wang, D. (2020). When do return migrants become entrepreneurs? the role of global social networks and institutional distance. *Strategic Entrepreneurship Journal*, 14(2), 125-148. <https://doi.org/10.1002/sej.1352>
- Webb, J. W., Khoury, T. A., & Hitt, M. A. (2019). The influence of formal and informal institutional voids on entrepreneurship. *Entrepreneurship Theory and Practice*, 44(3), 504-526. <https://doi.org/10.1177/1042258719830310>
- Williams, C., Du, J., & Zhang, H. (2020). International orientation of chinese internet smes: direct and indirect effects of foreign and indigenous social networking site use. *Journal of World Business*, 55(3), 101051. <https://doi.org/10.1016/j.jwb.2019.101051>
- Williamson, O. E. (1985). *The economic institutions of capitalism*. Free Press.
- World Bank. (2024). *Worldwide Governance Indicators (WGI)*. Retrieved June 26, 2025, from <https://info.worldbank.org/governance/wgi/>
- Wu, L., Wei, Y., Wang, C., McDonald, F. B., & Xia, H. (2022). The importance of institutional and financial resources for export performance associated with technological innovation. *Technological Forecasting and Social Change*, 185, 122040. <https://doi.org/10.1016/j.techfore.2022.122040>
- Yavaprabhas, K., Pournader, M., & Seuring, S. (2022). Blockchain as the “trust-building machine” for supply chain management. *Annals of Operations Research*, 327(1), 49-88. <https://doi.org/10.1007/s10479-022-04868-0>
- Zahoor, N., Pepple, D., & Choudrie, J. (2021). Entrepreneurial competencies and alliance success: the role of external knowledge absorption and mutual trust. *Journal of Business Research*, 136, 440-450. <https://doi.org/10.1016/j.jbusres.2021.07.057>
- Zhang, X., Li, J., Xiang, D., & Worthington, A. C. (2023). Digitalization, financial inclusion, and small and medium-sized enterprise financing: Evidence from China. *Economic modelling*, 126, 106410.