Digital Transformation in Export / Import Operations: Challenges Faced by MSMEs in India

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Abstract
Purpose: At present era all type of commercial enterprises is increasingly using cross-border e-commerce. COVID 19 brought a digital revolution and a sense of urgency for all type of businesses to adapt digital technologies. despite the immense scope and potential of Artificial Intelligence (AI), MSMEs are struggling to adapt digital platform. here, we are exploring the factors which influenced the MSMEs to connect themselves to digital trade and what challenges they are still facing in the way of digitalization.
Methodology: By analyzing survey data from 100 MSMEs across manufacturing and service sectors in Uttar Pradesh, the study identifies key obstacles. Researchers used simple random sampling method. The survey instrument comprised questions related to organizational, Financial, Technical, legal and behavioral barrier in adopting E-commerce. Data were analyzed using PLS-SEM and SPSS to identify significant trends and impacts.
Findings: The study finds that organizational, financial, technical, legal, and behavioral barriers significantly hinder MSMEs' adoption of e-commerce for digital export-import activities. Among these, legal and behavioral barriers exert the strongest negative influence. Despite recognizing the benefits of e-commerce, MSMEs remain only partially digitalized due to resource and capability constraints. Addressing regulatory, technological, and skill-related challenges is essential to enhance digital EXIM adoption.

Key Words: MSMEs, Export/ Import, Digital Platform, Adoption.

1. Introduction

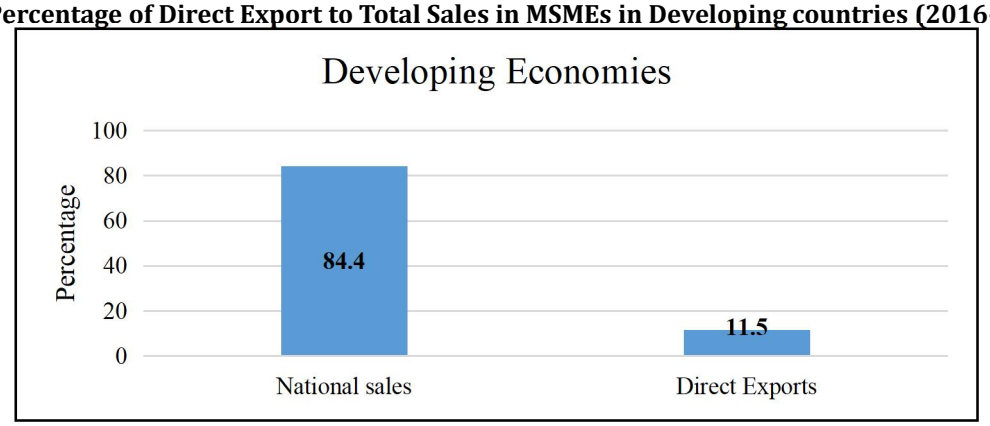
Over the past 5 decades, the Micro, Small, and Medium Enterprises sector has grown to be a very active and dynamic area. It makes a substantial contribution to the social and economic advancement of the nation by encouraging entrepreneurship and creating a significant number of job possibilities at a relatively low capital cost particularly in developing countries. For a variety of reasons, the involvement of micro, small, and medium-sized firms (MSMEs) in global trade have remained confined. They include non-tariff barriers, rules and border protocols, lack of necessary skills, ignorance of global markets, and restricted access to capital. It is more difficult for a small business to engage in foreign trade without using digital platform or adapting e-commerce. As per the report of SM Exports Summit 2022 hosted by Financial Express Online, e-commerce exports have largely become obligatory for MSME exporters seeking an accessible entry point to global markets. Exports and import via e-commerce can aid in overcoming these difficulties and give MSMEs access to a far wider range of potential clients without the requirement for a local physical presence or reliance on numerous intermediaries like export trading & management firms.

Small and medium-sized manufacturing businesses in developing countries do not export as much as similar businesses in developed countries. Large companies still dominate the market in capital-intensive industries, while MSMEs perform better in several service-related areas, such administrative or real estate and support services. According to report of WTO (2022), In Organization for OECD member economies, MSMEs account for 94% of industrial firms, but they participate in international trade to a lesser extent than larger companies, contributing only 36% of exports and 41% of imports. In developing nations, MSMEs contribute to economic growth in their respective nations while also creating jobs. formal SMEs in emerging economies contribute up to 40% of the GDP.

According to the report of FIATA, MSMEs make up, averagely, 95% of businesses in practically every country in the world. They are thought to account for 60% – 70% of the global GDP and concentrate about 60% of jobs in affluent nations and 80% in emerging nations. However, MSMEs have more hurdles to overcome than larger companies when it comes to the difficulties of cross-border trade because of their lesser capacity. There is still huge unused potential for MSMEs.

The WBES (World Bank Enterprises Surveys) reports that manufacturing SMEs in developing nations continue to generate the majority of their total sales from domestic markets. Only 11.1% of all SME sales between 2016 and 21 came from direct exports, which is significantly lower than the global average proportion of total sales. Figure (1)

Figure (1): Percentage of Direct Export to Total Sales in MSMEs in Developing countries (2016-21)



Source: WTO estimates based on World Bank Enterprise Surveys

Further investigation of WBES reveals that although the SMEs in the survey appear to be actively involved in the direct export of some products, large enterprises continue to hold the majority of direct export shares. In most areas, the proportion of direct exports for large businesses seems to be at least twice that of SMEs. For instance, despite the fact that the percentages of direct exports for SMEs in tobacco (34%), leather goods (19%) and textiles & garments (18%), while the percentages of direct exports for large enterprises in the same sectors are roughly 61%, 47, and 49%.

2. Literature Review and Hypothesis

Micro, Small and Medium Enterprises (MSMEs) constitute a crucial sector of the Indian economy, contributing significantly to employment generation, industrial production, and exports. Recent statistics indicate that India has approximately 7.34 crore MSMEs, generating employment for nearly 29.77 crore individuals and contributing around 30 % to the national GDP and 45% of total exports (GOI, 2024-25). Additionally, MSMEs account for 35.4% of manufacturing output, with increasing digital adoption leading to improved sales and profitability across enterprises. Despite their substantial economic role, MSMEs continue to encounter multiple structural, operational, and technological challenges that affect the sustainability of MSMEs.

Challenges address by the Annual Report 2024-25, Ministry of MSME, GOI			
Formalization of inclusion	Access to credit	Access to finance	Access to Market
Access to Technology	Promoting Digitalization	Infrastructural Bottlenecks	Inadequate Skill

Source: Annual Report 2024-25, Ministry of MSME, GOI

As it is clearly mentioned in the report that technological, digitalization and unskilled workers are one of the major bottlenecks in the growth of the MSMEs sector which is the requirement of current scenario.

These constraints have been documented in earlier literature, and researchers Bisht & Singh (2020) grouped various challenges, as reported in various studies on MSMEs, into five domains: finance, human resources, market/export barriers, technology/infrastructure, and government regulations. Their study emphasized persistent issues such as limited access to credit, complicated loan disbursal procedures, skill deficiencies, and compliance burdens. The authors recommended simplification of financial processes, alternative collateral arrangements, employee skill enhancement, and greater adoption of information technology to promote long-term sustainability.

Financial constraints remain one of the most significant barriers affecting MSMEs. Many enterprises are perceived as high-risk borrowers due to the absence of formal credit histories and collateral security, thereby restricting their access to institutional finance. Khatri (2019) similarly observed that MSMEs frequently face delays in acquiring working capital, complex documentation processes, and inadequate consultancy support, which adversely affect operational efficiency and business continuity.

Human resource and skill gaps represent another critical challenge. Mer and Virdi (2024) highlighted that MSMEs in emerging economies experience shortages of technical and managerial capabilities despite the availability of a large labor pool. The authors noted deficiencies in digital competencies, low technology adoption, and limited training initiatives, all of which constrain innovation and competitiveness. They emphasized the need for targeted skill development programs to address these gaps and enhance productivity.

Barriers to market expansion and internationalization have also been examined in prior studies. Roy et al. (2016) found that procedural complexities, currency fluctuations, and socio-cultural differences pose significant obstacles for small and medium enterprises attempting to enter foreign markets. Their analysis revealed that entrepreneurs often lack knowledge related to foreign exchange risk management, which further restricts export potential and global competitiveness.

From a structural perspective, Boateng et al. (2019) analyzed the distribution and contribution of MSMEs across Indian states and found that a substantial proportion of enterprises operate in rural areas, contributing significantly to regional employment and development. The study indicated that trade-related activities dominate the MSME landscape, followed by manufacturing and services. However, infrastructural deficiencies and limited modernization continue to affect performance outcomes.

More recent research has focused on identifying opportunities alongside challenges. Martinravi and Krishnasamy (2025) emphasized that digital transformation, export expansion, and improved government support offer substantial growth potential for MSMEs. Nevertheless, they noted that regulatory complexity, technological gaps, and insufficient credit access must be addressed to enable sustained competitiveness.

A synthesis of the literature indicates that the majority of earlier studies primarily focused on traditional issues such as finance, infrastructure, and regulatory barriers and recommended technology adoption as a general solution. However, there is limited empirical evidence examining the specific obstacles MSMEs face while transitioning to a digital environment, including digital skill deficiencies, cybersecurity risks, technology costs, infrastructural limitations, and resistance to change. Therefore, a contemporary empirical study is necessary to explore the digital transformation challenges faced by MSMEs and assess their impact on enterprise performance. So, with this primary objective, following hypotheses are formed to know the conclusive image:

H1: Organizational barriers have a significant negative impact on the adoption of e-commerce for Digital Export/Import in MSMEs.

H2: Financial barriers have a significant negative impact on the adoption of e-commerce for Digital Export/Import in MSMEs.

H3: Technical barriers have a significant negative impact on the adoption of e-commerce for Digital Export/Import in MSMEs.

H4: Legal and regulatory barriers have a significant negative impact on the adoption of e-commerce for Digital Export/Import in MSMEs.

H5: Behavioral barriers have a significant negative impact on the adoption of e-commerce for Digital Export/Import in MSMEs.

3. Research Model and Research Instrument

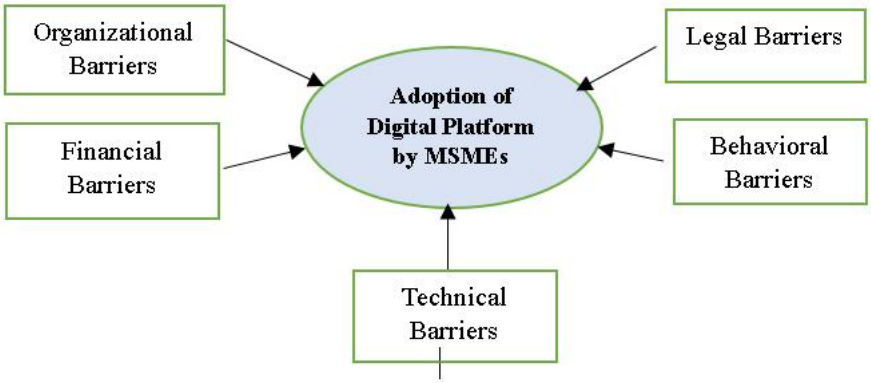


Figure 2: Research Model

In this study, a self-structured questionnaire was framed based on five-point Likert scale, ranging from strongly disagree to strongly agree by adopting the scales on the constructs from the relevant study of MSMEs and Digital Import/Export. Questionnaire was split into two sections, first includes questions related to demographic profile and second part consists questions related to the Barriers faced by MSMEs in adoption of digital platforms as independent variables and Adoption of Digital platforms as dependent Variables. Construct with the item are as follows:

Table 1: Research Instrument

Variable	Indicators	Source of Adoption
Organizational Barriers	1. Our organization lacks trained technical staff for digital activities. 2. There is a lack of internal leadership or initiative to adopt online platforms. 3. Employees are resistant to changes involving technology and digital systems. 4. We face difficulties managing digital platforms due to lack of internal process standardization.	*Saif-Ur-Rehman & Alam (2011)*
Financial Barriers	1. High initial setup costs discourage adopting digital platforms for international trade. 2. We lack access to sufficient funds or credit for investing in digital systems. 3. Ongoing maintenance and subscription costs for online platforms are burdensome. 4. Cost of hiring digital marketing experts is unaffordable for our business.	*Saif-Ur-Rehman & Alam (2011)*
Technical Barriers	1. Our region has poor internet infrastructure, making online trade unreliable. 2. Our staff lacks necessary ICT skills to operate digital platforms effectively. 3. We face challenges in integrating our existing systems with modern digital platforms. 4. Lack of access to technical support to maintain digital systems.	*Saif-Ur-Rehman & Alam (2011)*
Legal Barriers	1. Government policies related to cross-border e-commerce are unclear. 2. concerned about data privacy with international digital trade regulations. 3. Taxation rules and export-import duties for online trade are not transparent. 4. We face delays in approvals or licenses needed for digital export/import activity.	*Saif-Ur-Rehman & Alam (2011)*
Behavioral Barriers	1. Our decision-makers are hesitant to adopt digital platforms due to perceived risks. 2. Low awareness of how digital platforms improve international business performance. 3. We lack confidence in digital systems for secure transactions with foreign customers. 4. Our traditional mindset and habits discourage online trade practices.	*Saif-Ur-Rehman & Alam (2011)*
Adoption	1. Our firm uses digital platforms for international trade operations. 2. We receive and process export/import orders through online systems or marketplaces. 3. integrated online payment, shipment tracking, and invoicing in export/import process 4. digital platforms have improved our ability to reach international markets. 5. We regularly update and manage our online presence for trade-related promotions and sales.	*Venkatesh et al. (2003); Zhu & Kraemer (2005); Al-Shammari et al. (2022)*

4. Analysis and Interpretation

4.1 Enterprise Profile:

Type of Enterprise: A majority of respondents belong to the Micro (42%) and Small (38%) enterprises, while medium enterprises constitute 20% of the sample. This reflects the dominance of micro and small firms in India's MSME export ecosystem.

Nature of Enterprise: Nearly 46% of firms are engaged in manufacturing, 32% in services, and 22% operate in both manufacturing and service

activities, highlighting the growing role of service-enabled exports through digital platforms.

Annual Turnover: Most enterprises reported a turnover of ₹50 lakh – ₹1 crore (34%), followed by less than ₹50 lakh (28%). Only 12% of firms reported turnover above ₹50 crore, indicating limited financial capacity among exporting MSMEs.

Based on the profiles of the enterprises, it is highly possible that factors such as resource scarcity and scale limitations may impact the usage of digital Export/Import, thus making e-commerce a necessity but a challenge for MSMEs.

4.2 Challenges Faced by MSMEs:

A significant 68% of respondents agreed that lack of trained technical staff, leadership initiative, and resistance to change act as major organizational barriers. This finding supports Saif-Ur-Rehman & Alam (2011), emphasizing that internal organizational readiness is a crucial determinant of digital trade adoption.

Financial constraints also emerged as the most critical challenge, with 74% respondents indicating that high setup costs, maintenance expenses, and unaffordable digital expertise discourage adoption. MSMEs perceive digital EXIM as capital-intensive, particularly in the initial stages. Limited access to finance remains a structural bottleneck.

About 66% of respondents reported poor internet infrastructure, lack of ICT skills, and integration issues. This challenge is more pronounced among micro and rural-based MSMEs which shows that Digital infrastructure and technical capability gaps continue to hinder effective participation of MSMEs on digital platforms.

A majority (61%) expressed concerns over unclear government policies, data privacy regulations, taxation, and licensing delays related to cross-border business which clearly explains the Regulatory complexity reduces confidence in digital platforms. Approximately 69% respondents acknowledged risk aversion, low awareness, lack of trust, and traditional mindset as barriers which signifies the need for capacity building, awareness programs to encourage adoption.

Despite facing multiple challenges, MSMEs recognize the strategic value of e-commerce in global trade as 63% respondents believe e-commerce has improved international market reach. Less than 50% have fully integrated payments, logistics, and invoicing, indicating partial digitalization. As per result, Adoption is higher among medium enterprises compared to micro units.

4.3 Hypothesis Testing

(A) Reliability and Validity:

The table (2) presents the reliability analysis of all constructs using Cronbach's Alpha and Composite Reliability (CR). All constructs—ORG, FIN, TECH, LEG, BEH, and Adoption—show Cronbach's Alpha values above 0.80, indicating strong internal consistency. Similarly, Composite Reliability values range from 0.86 to 0.91, which exceed the recommended threshold of 0.70, confirming high reliability.

Table 2: Reliability

Construct	Cronbach Alpha	Composite Reliability	Reliability Status
ORG	0.82	0.88	Acceptable
FIN	0.85	0.89	Acceptable
TECH	0.80	0.87	Acceptable
LEG	0.83	0.88	Acceptable
BEH	0.81	0.86	Acceptable
Adoption	0.89	0.91	Acceptable

Source: PLS-SEM

Table (3) presents Composite Reliability (CR) and Average Variance Extracted (AVE) for each construct. All constructs have CR values ranging from 0.86 to 0.91, which are above the recommended threshold of 0.70, indicating strong internal consistency. The AVE values range from 0.51 to 0.62, all exceeding the minimum acceptable level of 0.50, which confirms adequate convergent validity. This means that each construct explains more than 50% of the variance of its indicators. The results confirm that all constructs possess good reliability and satisfactory convergent validity, making the measurement model appropriate for further structural analysis.

Table 3: Convergent Validity

Construct	CR	AVE
ORG	0.88	0.54
FIN	0.89	0.59
TECH	0.87	0.52
LEG	0.88	0.51
BEH	0.86	0.58

Adoption	0.91	0.62

Source: PLS-SEM

Table (4) shows the model fit indices SRMR and NFI. The SRMR value is 0.061, which is below the recommended threshold of 0.08 and The NFI value is 0.91, exceeding the minimum acceptable level of 0.90 suggest a good fit.

Table 4: Model Fit Indices

Fit Index	Acceptable Value	Reported	Status
SRMR	<0.08	0.061	Good Fit
NFI	>0.90	0.91	Good Fit

Source: PLS-SEM

All the indices confirm that the model demonstrates a good overall fit, indicating that the proposed model is well-structured and adequately represents the data.

(B) Path Analysis and model Testing

Table 5: Path Coefficient

Hypothesis	Relationship	Path Coefficient (β)	Effect Direction	Decision
H1	ORG → Adoption	-0.188	Negative	Supported
H2	FIN → Adoption	-0.229	Negative	Supported
H3	TECH → Adoption	-0.260	Negative	Supported
H4	LEG → Adoption	-0.284	Negative	Supported
H5	BEH → Adoption	-0.281	Negative	Supported

Source: PLS-SEM

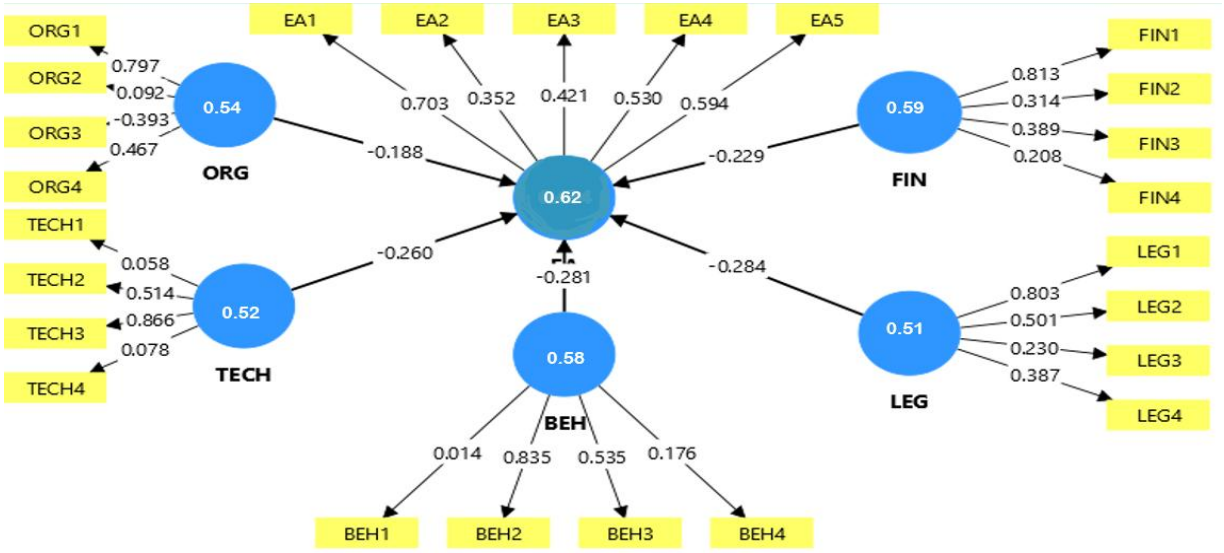


Figure 3: Tested research Model

The PLS-SEM model examines the impact of five barriers—Organizational (ORG), Financial (FIN), Technical (TECH), Legal & Regulatory (LEG), and Behavioral (BEH)—on the Adoption of E-commerce for Digital EXIM. The results shows that E-commerce Adoption has an $R^2 = 0.62$, indicating that 62% of the variance in Digital EXIM adoption is explained jointly by organizational, financial, technical, legal, and behavioral barriers. "According to Hair et al. (2021), R^2 values of 0.75, 0.50, and 0.25 can be described as substantial, moderate, and weak, respectively. Therefore, the R^2 value of 0.62 in this study indicates a moderate to substantial level of explanatory power." Tested Research Model (Path Coefficient) shows the final result is as follows (Table:5, Figure:3):

H1 (Organizational Barriers → Adoption): The path coefficient (β = -0.188) shows organizational barriers negatively influence e-commerce adoption which shows the Lack of managerial support, poor digital readiness, and resistance in organizational structure hinder adoption. So, the hypothesis is accepted.

H2 (Financial Barriers → Adoption): Financial barriers have a negative impact (β = -0.229), suggesting that high implementation costs, lack of funding, and perceived financial risk reduce adoption. Hence, the hypothesis is accepted.

H3 (Technical Barriers → Adoption): Technical barriers show a significant negative effect (β = -0.260), indicating inadequate infrastructure, cybersecurity concerns, and low technological competence obstruct adoption. Resulted, Hypothesis is accepted.

H4 (Legal & Regulatory Barriers → Adoption): Legal barriers have the strongest negative effect (β = -0.284) which clearly implying compliance issues, taxation complexities, and regulatory uncertainty substantially reduce adoption. So, the hypothesis is accepted.

H5 (Behavioral Barriers → Adoption): Finding shows that Behavioral barriers also significantly inhibit adoption (β = -0.281) which is reflecting resistance to change, low trust, and lack of awareness. Hence, the hypothesis is accepted.

Ranking of Barrier Effects (Strongest to weak)

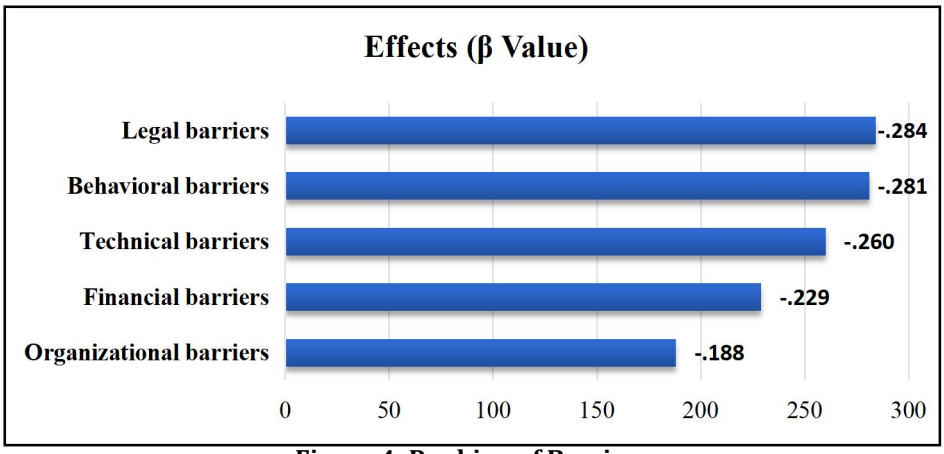


Figure 4: Ranking of Barriers

5. Practical implication

The study provides important implications for policymakers, MSME owners, and financial institutions. Since legal and behavioral barriers were found to have the strongest negative impact on digital EXIM adoption, the government should simplify e-commerce regulations, taxation, licensing, and cross-border trade procedures. MSMEs also require awareness programs, digital training, and skill development initiatives to reduce resistance to technology and improve trust in digital platforms. Financial institutions should provide affordable loans, subsidies, and financial assistance for digital transformation. In addition, improving internet infrastructure and technical support can help MSMEs adopt e-commerce platforms more effectively and expand their participation in international trade.

6. Limitation of the Study

The study is limited to 100 MSMEs from Uttar Pradesh, which may limit the generalization of findings to other regions. The study uses a cross-sectional design, so changes in digital adoption over time could not be examined. The research mainly focuses on barriers affecting e-commerce adoption and does not include other influencing factors such as government support, innovation capability, or competitive pressure. Further, the data are based on self-reported responses, which may involve respondent bias. Future studies may include larger samples from different states or countries to improve generalizability and comparative understanding.

7. Conclusion

The study concludes that MSMEs face multiple interrelated barriers in adopting e-commerce for digital export-import activities. The PLS-SEM results confirm that all five barriers—organizational, financial, technical, legal, and behavioral—have a significant negative impact on adoption. Among these, legal and behavioral barriers emerge as the most influential constraints, followed by technical and financial barriers, while organizational barriers have a relatively weaker yet significant effect. The model demonstrates strong explanatory power (R^2 = 0.62) along with satisfactory reliability, validity, and model fit, indicating robustness of the findings. Despite recognizing the benefits of e-commerce in expanding global market reach, MSMEs—especially micro and small enterprises—remain partially digitalized due to resource limitations, regulatory complexities, and lack of digital readiness.

Overall, the study highlights that addressing regulatory clarity, enhancing digital skills, improving infrastructure, and increasing financial accessibility are critical to accelerating digital EXIM adoption among MSMEs.

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