Determinants of Global IT and ITES Exports: A Panel Data Analysis of Economic, Institutional, and Technological Factors

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ABSTRACT

The determinants of Information Technology (IT) and Information Technology Enabled Services (ITES) exports are investigated through panel data analysis of 34 countries spanning 2000-2023. The Hausman specification test results (χ^2=109.6, p=0.000), supports the use of fixed effects estimation. The econometric results identify driving factors in the expanding IT and ITES exports sector. The estimated model indicates that GDP per capita, foreign direct investment inflows, telecommunications infrastructure, human capital development, political stability, and research and development expenditure exert a substantial impact on IT and ITES export volumes. A one percentage point increase in GDP per capita correlates with a 2.2 per cent expansion in IT and ITES exports, while an equivalent improvement in human capital and R&D expenditure generate 0.53 per cent and 0.55 per cent increases respectively. Suggesting specialization patterns within global value chains, IT goods exports exhibit an inverse relationship with IT service exports, contrary to conventional intuition. Additionally, the real effective exchange rate exerts no statistically significant influence, implying the predominant role of non-price factors in driving competitiveness in this sector. The above empirical findings provide valuable policy insights to design strategies to enhance participation in the rapidly expanding global IT and ITES trade. Designing such strategic policies is particularly instrumental for developing economies seeking to diversify their exports with knowledge-intensive services.

Keywords: Panel data, Human capital, IT exports, IT-enabled services, and Digital Trade

JEL: F14, L86, O57

INTRODUCTION

Services are emerging as increasingly dynamic components of international trade, marking a substantial transformation in the global economic landscape in recent decades. In line with this transformation the Information Technology (IT) and Information Technology Enabled Services (ITES) exports show the remarkable expansion in global service trade. Thus, the sector's contribution to foreign exchange earnings across both developed and developing economies have markedly improved over the years. The growth in IT service exports is escalated from US$132.9 billion at the century's commencement to US$891.7 billion by 2021 according to World Development Indicators (2025). This represents a six-fold increase within merely two decades.

The ever-increasing significance of IT and ITES exports assumes special importance for developing nations confronting structural trade deficits and foreign exchange constraints. A considerable number of outward-oriented nations have yet to realize the full economic gains of open trade regimes. Such countries are characterized by persistent trade imbalances and numerous related macroeconomic vulnerabilities. Given this backdrop, the ability of the IT and ITES sectors to support export diversification and foreign exchange generation opens up a new path to reap the benefits of outward-oriented policies.

Given the skill-intensive nature and technological sophistication of the sector, developing countries are bound to face both opportunities and challenges in global IT and ITES trade. The skill bias and technological sophistication create an advantage for industrialized nations that dominate these service exports. Encouragingly,

the middle-income countries have progressively improved their share from 19 percent in 2005 to 31.4 percent by 2015; that indicates expanding possibilities for developing economies. Exemplary cases such as India, which has transformed its IT service exports from US$5 billion in 2000 to US$119.5 billion by 2021, provide compelling evidence of this sector's transformative potential. In the same manner countries such as Costa Rica, the Philippines, and Vietnam have effectively leveraged unique advantages including language capabilities, geographic proximity to major markets, and cost competitiveness to cultivate their IT and ITES sectors.

The empirical investigations examining their determinants remain relatively limited despite the growing relevance of perspectives on IT and ITES exports. Existing literature has predominantly emphasized managerial dimensions rather than undertaking thorough economic analyses of contributing factors. This research deficiency proves especially pronounced within developing countries contexts, where policy formulation requires robust evidence regarding the elements that drive success in IT and ITES exports.

To address the aforementioned gap, the study uses panel data analysis of IT and ITES export determinants across 34 selected countries over a 24-year period. The primary intention of the study is to identify crucial economic, institutional, and technological factors that determine the export performance in the sector. Identification of these factors is particularly relevant for developing countries to design policies that support enhancement of their engagement in global IT and ITES trade. In doing so developing countries will be better able to address their external sector structural issues with economic diversification and foreign exchange generation.

The remainder of the paper is structured as follows, to contextualize the study within existing scholarly debates the section 2 reviews the relevant literature. The section 3 details the methodology, including the conceptualization of the econometric model. The last two sections of the paper present the empirical results, policy implications and conclusion.

REVIEW OF THE LITERATURE

This review synthesizes key literature on IT/ITES export drivers. It covers services trade theory, GVC dynamics, IT/ITES trade traits and existing empirical evidence. It identifies a critical gap in cross-country econometric analysis of these determinants.

Trade Theory on Services

Based on perceived characteristics of services such as intangibility, they are viewed as non-tradable. The non-tradable narration on services is evident in economic theory, as traditional trade theories are based on merchandise goods exchange. The technological advancement in information technology fundamentally altered this perception, as it enables increasing cross-border service exchange.

A foundational perspective on cross-border trade is established by the efficiency variations in production based Absolute Advantage theory. When one country demonstrates superior efficiency in producing one commodity but inferior efficiency producing another, both nations can benefit through specialization in their absolute advantage domains. Nevertheless, this theoretical approach possesses limited explanatory capacity concerning trade among countries with analogous economic conditions and regarding contemporary service trade.

David Ricardo's Comparative Advantage theory constitutes a substantial advancement by demonstrating that mutually beneficial trade can occur even when one nation maintains an absolute disadvantage in both goods. The theory maintains that countries should specialize in goods where they exhibit lower opportunity cost of production. In light of services, the framework proposes that, skilled labor-abundant countries should specialize in skill-intensive services like IT and ITES. A contrasting perspective is presented by Bhagwati (1984) who argues services in developing nations are comparatively cheaper as they have lower wages. This cost advantage can create the comparative advantage in service trade for developing countries even if they have lower skilled labor endowments.

The factor proportions H-O theory extends analytical scope by incorporating multiple production factors. As the theory implies, countries tend to export goods whose production intensively utilizes their abundantly endowed

factors. Applied to service trade, Bhagwati (1987) contends that numerous services employ technology and capital-intensive production methods, providing competitive advantages for developed countries abundant in these resources. However, this theoretical observation confronts empirical challenges, as developing nations like India have successfully established themselves as prominent IT and ITES destinations despite these theoretical predictions.

New Trade Theory, formulated by Krugman (1979), introduces the role of increasing returns to scale and imperfect competition in elucidating trade patterns. This theoretical approach assists in explaining trade among comparable countries and the emergence of specialized industrial clusters. Agglomeration benefits, including knowledge spillovers and specialized labor markets, prove especially relevant for IT and ITES sectors, as evidenced by the concentration of India's IT industry in Bangalore.

Vernon (1966) proposed the notion of the Product Life Cycle theory. The theory offers insights on the evolution of trade patterns as products mature. Despite its centrality on goods production and trade, it provides powerful insights on the reallocation of services to developing countries as these services become mature and costly in developed countries.

Global Value Chains and Servicification

The international production and trade patterns have fundamentally transformed with the emergence and expansion of Global Value Chains (GVCs). In contrast to producing complete products within single locations, the fragmentation of production processes across multiple countries enables each stage to add value to final products. This disintegration has been facilitated by service link cost reductions, including trade, communication, and transportation expenses.

The “Smile Curve” concept illuminates value distribution within GVCs. The Smile Curve argues in comparison to actual manufacturing activities in the value chain, the knowledge-intensive pre-production stages (e.g., R&D and design) and post-production services (e.g., marketing and after-sales support) generate superior value addition. For developing countries, this presents opportunities to advance beyond low-value-added manufacturing tasks toward participation in higher-value service value chain segments.

Servicification is a terminology coined by the World Bank (Ghani & Kharas, 2010). The term refers to the increasing integration of services within manufacturing processes and the growing significance of service sectors in developing economies. The traditional development paradigm positing linear progression from agriculture to industry to services is challenged by this notion. As many developing countries are experiencing rapid service sector growth without undergoing extensive industrialization, their service sector competitiveness outpaces that of their industrial exports.

IT and ITES Trade Characteristics

The tradability in services is fundamentally linked with their intrinsic characteristics. Traditional services necessitate geographical proximity between providers and consumers. Thus, opportunities for their cross-border exchange have historically been restricted. Technological advancements in information and communication technologies have paved the way for overcoming these limitations and enabled remote delivery of traditional and numerous new services.

The General Agreement on Trade in Services (GATS) classifies international service trade into four modes. Accordingly, Mode 1 is cross-border supply, Mode 2 is service consumption abroad, Mode 3 is commercial presence, and Mode 4 is movement of natural persons.

The IT and ITES exports, the focus of this paper’s analysis of international trade primarily fall under Mode 1(cross-border supply). In this type of trade, services are delivered remotely without the physical movement of providers or consumers. The rapid expansion of cross-border service supply is fueled by advancements in telecommunications infrastructure and digital technologies.

Empirical Findings on IT and ITES Exports

The IT and ITES exports focused empirical studies implies several crucial factors in determining the successful integration into this sector. The government policies, human capital availability, and telecommunications infrastructure are pointed out as the major contributors to emerging as leading IT and ITES outsourcing destinations (Carmel, 2003b).

Successful developing countries' experiences provide valuable insights regarding IT and ITES export performance determinants. India's extraordinary success in establishing itself as a global IT hub is a prime example. With robust human capital development, supportive government policies, and an early-mover advantage, India has managed to become one of the formidable destinations in global outsourcing. Similarly, countries including Costa Rica, the Philippines, and Vietnam have leveraged unique advantages such as language skills, geographic proximity to major markets, and cost competitiveness to develop their IT and ITES sectors.

Research by Goswami et al. (2012) indicates that developing countries' service exports have expanded by over 15% annually since the mid-1990s, not only within large economies like Brazil, India, China, and Russia but also in smaller markets including Cambodia, Ghana, Morocco, and Nigeria. This growth encompasses not merely traditional services but also modern, high-value, skill-intensive services such as computer and information services.

The above literature analysis reveals a growing body of literature on IT and ITES exports. The literature tends to be explanatory in nature thus, a significant deficiency exists in comprehensive cross-country econometric analyses of export performance determinants. To address this research gap, the study uses a thorough systematic panel data analysis of economic, institutional, and technological factors that determine IT and ITES export success.

METHODOLOGY

This section outlines the empirical approach for analyzing IT/ITES export factors. It details the theoretical model, variable measurement, data sources and panel estimation methods. The Hausman test guides the selection of fixed or random effects models.

Theoretical Model and Empirical Specification

The basic exports demand function introduced by Bahmani-Oskooee (1986) is adopted in the study as the base model. The base model is augmented by complementary theoretical lenses to reflect IT/ITES trade's unique traits. Endogenous growth theory identifies R&D and human capital as drivers of innovation and skill development. Digital trade theory identifies telecommunication infrastructure as a core enabler of digital trade. GVC theory frames IT goods-service trade dynamics, and institutional trade theory validates political stability as a foundational factor. Export demand theory remains the core, with these complementary frameworks refining the justification for the variables included in the analysis of knowledge-intensive digital services. The base model is extended to following empirical model to incorporate factors specific to IT and ITES trade.

The empirical model is specified as follows:

$$\ln ITES_{It} = \beta_0 + \beta_1 \ln GDP_{It} + \beta_2 \ln FDI_{It} + \beta_3 \ln FB_{It} + \beta_4 \ln ITGE_{It} + \beta_5 R\&D_{It} + \beta_6 \ln SER_{It} + \beta_7 PS_{It} + \beta_8 \ln REER_{It} + \mu_{It}$$

Where:

$\ln ITES_{It}$: Natural logarithm of IT and ITES service exports for country i in year t

$\ln GDP_{It}$: Natural logarithm of GDP per capita for country i in year t

$\ln FDI_{It}$: Natural logarithm of net foreign direct investment inflows for country i in year t

$\ln FB_{It}$: Natural logarithm of fixed broadband subscriptions for country i in year t

$lnITGE_{It}$: Natural logarithm of IT goods exports for country i in year t

$R\&D_{It}$: Research and development expenditure as a percentage of GDP for country i in year t

$lnSER_{It}$: Natural logarithm of gross secondary school enrollment for country i in year t

PS_{It}: Political stability and absence of violence index for country i in year t

$lnREER_{It}$: Natural logarithm of real effective exchange rate index (2010=100) for country i in year t

μ_{It}: Error term for country i in year t

Variable Description and Measurement

Considering the theoretical and empirical literature the variable selection was conducted. The following table provides detailed descriptions of each variable, measurements and data sources.

Table I: Variable Definitions, Measurements, and Data Sources

Variable Name	**Variable**	**Measurement**	**Source**
IT and ITES service Exports	lnITES	Log of IT and ITES exports	United Nations Conference on Trade and Development
GDP per capita	lnGDP	Log of constant US$ (billion)	World Bank, World Development Indicators (WDI) (2025)
Foreign Direct Investment	lnFDI	Log of foreign direct investment inflows	World Bank, World Development Indicators (2025)
IT goods exports	lnITGE	Log of IT goods exports	World Bank, WDI (2025)
Human Capital	lnSER	Log of gross secondary school enrollment	World Bank, WDI (2025)
R&D expenditure	R&D	R&D expenditure as a % of GDP	World Bank, WDI (2025)
Fixed Broadband Subscriptions	lnFB	Log of fixed broadband subscriptions	World Bank, WDI (2025)
Political Stability	PS	Political Stability and absence of violence	World Bank, Worldwide Governance Indicators (WGI) (2025)
Real effective exchange rate	lnREER	Real effective exchange rate index (2010 = 100)	World Bank, WDI (2025)

Source: Author's compilation based on World Bank, UNCTAD, and WGI data (2025)

IT and ITES service exports serve as the dependent variable representing a country's performance in exporting information technology and enabled service. The variable captures the growing significance of digital services in international trade.

The impact of economic size and development level on IT and ITES exports is captured by GDP per capita. Higher income levels typically correlate with an enhanced capacity to invest in the infrastructure and human capital necessary for competitiveness in IT services.

The role of international investment in facilitating technology transfer, knowledge spillovers, and global market access is captured by Foreign Direct Investment. This proves particularly important for developing countries seeking integration into global IT value chains.

To capture the relationship between hardware exports and service exports, information technology goods exports were included in the model. The variable tests whether complementarities or substitution effects dominate in IT trade.

Gross secondary school enrollment rates are used to proxy human capital. This reflects the educational foundation required for IT and ITES employment. These services necessitate a skilled workforce, as they are knowledge-intensive in nature.

Investments in innovation and technological advancement are captured by research and development (R&D) expenditure as a share of GDP. R&D proves crucial to maintain competitiveness in the rapid pace of change in information technologies,

Technology infrastructure, an indicator of a country's telecommunications capacity, is proxied by fixed broadband subscriptions. Reliable, high-speed internet connectivity is essential for the remote delivery of IT and ITES.

Political stability measures the quality of the institutional environment, particularly the predictability of the business climate and overall security. Political instability can deter long-term investments in knowledge-intensive industries.

The real effective exchange rate is included to capture price competitiveness in international markets. This variable serves the purpose of accounting for the impact of exchange rate movements on services export performance.

Data Sources and Sample

Secondary data from the Worldwide Governance Indicators, World Bank's World Development Indicators, and United Nations Conference on Trade and Development (UNCTAD) used in the study. Including both developed and developing economies, the sample comprises 34 countries. The study period (2000-2023) was chosen based on data availability.

Estimation Methods

To account for both cross-sectional and time-series data dimensions the analysis employs panel data estimation techniques. Panel data offers advantages over other estimation methods, including controlling for individual heterogeneity, providing more informative data, reducing collinearity among variables, and increasing degrees of freedom.

The study employs both fixed effects and random effects estimators with the choice between them determined by the Hausman specification test. The fixed effects model controls for time-invariant country-specific characteristics. By contrast, the random effects model assumes that individual effects are uncorrelated with the regressors.

The Hausman specification test compares coefficients from fixed and random effects models to determine which estimator proves more appropriate. The null hypothesis of no correlation between individual effects and regressors, holds that both estimators are consistent, but the random effects model is more efficient. Thus, if the null hypothesis is rejected, the fixed effects estimator is preferred, as the random effects model becomes inconsistent.

ANALYSIS AND RESULTS

This section presents the study's empirical panel data results. It includes correlation analysis, Hausman test outcomes and core regression estimates. It interprets factors impacts and highlights key counterintuitive findings for discussion.

Descriptive Statistics

The table illustrated below shows the correlation matrix among the variables included in the model. Most independent variables exhibit positive correlations with IT and ITES exports, with GDP per capita (0.7137), fixed broadband subscriptions (0.7365), and R&D expenditure (0.6763) showing relatively strong positive associations.

Table II: Correlation Matrix of Explanatory and Dependent Variables

	lnITES	**lnGDP**	**lnFDI**	**lnFB**	**lnITGE**	**lnSER**	**PS**	**R&D**	**lnREER**
lnITES	1.0000								
lnGDP	0.7137	1.0000							
lnFDI	0.6557	0.3985	1.0000						
lnFB	0.7365	0.4270	0.6068	1.0000					
lnITGE	0.4010	0.3345	0.2749	0.0460	1.0000				
lnSER	0.3671	0.6445	0.1800	0.1704	0.1669	1.0000			
PS	0.2022	0.5381	0.1355	-0.0031	0.4822	0.4739	1.0000		
R&D	0.6763	0.6401	0.3229	0.3114	0.4575	0.4563	0.1792	1.0000	
lnREER	0.3770	0.4164	0.1719	0.1380	0.3961	0.1464	0.2999	0.2712	1.0000
Source: Compiled by author's based on econometric analysis									

Among independent variables, moderate correlations are observed between GDP per capita and secondary enrollment (0.6445), GDP per capita and R&D expenditure (0.6401), and between FDI and fixed broadband subscriptions (0.6068). A certain degree of interrelatedness among the explanatory variables is suggested by these correlations. However, it is noteworthy that these correlations do not indicate severe multicollinearity, which would otherwise compromise regression analysis.

Model Selection: Hausman Test

To determine the appropriate estimation method between the fixed effects and random effects models, the Hausman specification test was conducted. The test results yielded a X^2 statistic of 109.6 with 8 degrees of freedom, corresponding to a p-value of 0.0000.

Table III: Hausman Specification Test Results for Fixed vs. Random Effects

	X^2 Value	**degrees of freedom**	**p-value**
Cross-Section Random Effect	109.6	8	0.0000
Source: Compiled by author's based on econometric analysis			

Systematic differences between the fixed and random effects coefficients lead to rejection of the null hypothesis. This rejection indicates that the fixed effects model is more appropriate for this analysis. This result implies that country-specific effects are correlated with the regressors, necessitating the use of fixed effects to obtain consistent estimates.

Regression Results

Table IV presents regression results for both the fixed effects and random effects models, the fixed effects model is preferred based on Hausman test results.

Table IV: Fixed and Random Effects Regression Estimation Results

	Fixed Effects		**Random Effects**	
Variables	**Coefficient**	**Std.Err**	**Coefficient**	**Std.Err**
C	-5.7344**	2.2623	6.0478**	1.6174
lnGDP	2.2673*	0.2149	0.8930*	0.1063
lnFDI	0.0571**	0.0199	0.0820*	0.0188
lnFB	0.1584*	0.0184	0.2624*	0.0138
lnITGE	-0.1768*	0.0430	-0.0538	0.0375
lnSER	0.5326**	0.2634	0.3322	0.2474
PS	0.3174**	0.0824	0.2742*	0.0722
R&D	0.5486*	0.0995	0.3971*	0.0716
lnREER	-0.3609	0.2265	-0.2150	0.2195
R-squared		0.9545		0.7375
Adjusted R-squared		0.9506		0.7325
Sum of squared residuals		47.1		47.1
F-statistic		243.15		147.52
Prob(F-statistic)		0.0000		0.0000
Source: Compiled by author's based on econometric analysis				

The R-squared value of 0.955 demonstrates the strong explanatory power of the fixed effects model. Accordingly, the model explains approximately 95.5% of the variation in IT and ITES exports. An F-statistic of 243.15 (p=0.0000) confirms the overall statistical significance of the model.

GDP per capita (lnGDP) exhibits a positive and statistically significant relationship with IT and ITES exports at the 1% level. The estimated coefficient of 2.2673 indicates that, holding other factors constant a 1% increase in GDP per capita is associated with a 2.27% increase in IT and ITES exports. This strong relationship underscores the importance of general economic development in facilitating IT service exports.

At the 5% level foreign direct investment (lnFDI) shows a positive and statistically significant relationship. A 1% increase in FDI inflows leads to a 0.06% increase in IT and ITES exports as per the coefficient of 0.0571 suggests. Despite being statistically significant, the relatively small coefficient indicates that FDI's direct impact on export performance is modest compared to other explanatory factors.

At the 1% level a positive and statistically significant relationship emerges with the fixed broadband subscriptions (lnFB), and IT and ITES exports. The 0.1584 coefficient implies that a 1% improvement in telecommunications infrastructure results in a 0.16% increase in IT and ITES exports. These findings highlight the critical role of digital connectivity in enabling cross-border service delivery.

IT goods exports (lnITGE) exhibit a negative and statistically significant relationship with IT service exports at the 1% level. The estimated coefficient suggests that a 1% increase in IT goods exports is associated with a 0.18% decrease in IT service exports. Even though this finding is counterintuitive, it may signal a potential specialization pattern in global value chains and will be discussed in detail in the next section.

Gross secondary school enrollment (lnSER), the proxy for human capital in the model exhibits a positive and statistically significant relationship at the 5% level. A 1% improvement in human capital leads to a 0.53% increase in IT and ITES exports according to the coefficient of 0.5326. This substantial effect reiterates the importance of educational foundations and the knowledge-intensive nature of IT services.

At the 5% level political stability (PS) demonstrates a positive and statistically significant relationship. The coefficient of 0.3174 indicates that a one-unit improvement in political stability is associated with a 0.32% increase in IT and ITES exports. This finding emphasizes the importance of institutional quality and the role of predictable business environments in fostering knowledge-intensive industries.

Research and development expenditure (R&D) shows a positive and statistically significant relationship at the 1% level. The importance of innovation and technological advancement in maintaining competitiveness is highlighted by the coefficient of 0.5486. Thus, a one-unit increase in R&D expenditure as a percentage of GDP leads to a 0.55% increase in IT and ITES exports.

The coefficient for real effective exchange rate (lnREER) is not statistically significant. This suggests that considerations of quality and capability in IT service trade are far more important than price competitiveness. However, this requires further investigation to systematically validate this notion.

Diagnostic Tests and Robustness

Diagnostic tests confirm the validity of the fixed effect model. VIF values for all variables range from 1.2 to 6.8, indicating no severe multicollinearity. The Wooldridge test (p=0.21) and modified Wald test (p=0.15) fail to reject the null hypotheses of no serial correlation and homoskedasticity, respectively. Pesaran's CD test (p=0.33) also shows no cross-sectional dependence.

DISCUSSION

Important insights regarding the determinants of IT and ITES exports can be derived from the empirical results. The key findings outlined above have significant implications for theoretical frameworks and policy formulation. Notably, the study's findings both confirm and challenge established international trade theories when applied to services trade.

The strong positive relationship between GDP per capita and IT and ITES exports supports the theoretical underpinnings of both comparative advantage and factor proportions theories. The above relationship express that developed countries with higher income levels typically in a better position to compete in knowledge-intensive service exports. This is because high GDP per capita is closely linked to the availability of advanced technological infrastructure, skilled workforces, and sophisticated business environments. It is noteworthy that the remarkable success of developing countries like India in this sector demonstrates that GDP per capita alone does not determine comparative advantage within this sector.

FDI's role in facilitating technology transfer and knowledge spillovers is reaffirmed by the positive impact identified in the regression estimates. Given the relatively modest coefficient, it is prudent to suggest that FDI benefits are contingent on complementary factors like human capital and infrastructure. This notion is in line

with the absorptive capacity principle that emphasizing that countries require sufficient human and technological capability to benefit from FDI.

The importance of fundamental digital connectivity is underscored by the statistical significance of telecommunications infrastructure in the model. Specially in the case of cross-border supply services where reliable high-speed internet constitutes a service delivery prerequisite. Technological advancements that reduce service link costs thus enabling the servicification of trade have therefore become a fundamental prerequisite for success in IT and ITES trade.

Contrary to expectations the negative relationship between IT goods exports and IT service exports presents an intriguing puzzle. These findings directly contradict the expected complementarity between IT hardware and software/services. Instead, the findings may reflect specialization patterns within global value chains, where countries tend to specialize in either goods production or service provision based on their comparative advantages. For example, developed countries often retain high-value service components such as R&D, design, marketing, while offshoring manufacturing to developing countries. The underlying negative correlation between goods and services exports at the country level is probably created as a result. The pattern aligns with the Smile Curve concept, where pre-production and post-production services command superior value addition compared to manufacturing activities.

The notion of human capital based comparative advantage is supported by the substantial impact of human capital in the model. The necessity of a skilled workforce is closely linked with the knowledge-intensive nature of IT and ITES sectors. The finding is consistent with successful IT exporters' experiences such as India and Israel, which have invested significantly in technical education.

The importance of institutional quality for knowledge-intensive industries is highlighted by the positive effect of political stability. Political stability reduces investment risk and enables long-term strategic planning. These qualities are crucial for IT and ITES sector, which is characterized by significant upfront investments in human capital and technology. This extends institutional development theories to the specific service export contexts.

Given that IT is a rapidly evolving technological sector, the strong positive relationship between R&D expenditure and IT and ITES exports is expected. The finding illustrates the role of innovation in maintaining competitiveness in this international trade. As endogenous growth theories suggest, the creation of knowledge is a key driver of economic advancement. The finding also implies that static comparative advantage based on existing factor endowments may prove insufficient for sustained success within dynamic sectors like IT services.

In contrast to conventional trade theories that emphasizes price competitiveness, the real exchange rate's coefficient is estimated to be statistically insignificant. This may suggest that for complex, high-value services quality, reliability, and capability considerations may outweigh cost factors. Given that corporate clients may prioritize service quality and innovation over minor price differences when outsourcing critical business functions.

CONCLUSION

To conduct a comprehensive analysis of the determinants of IT and ITES exports, the study uses a panel dataset of 34 countries covering 2000-2023. The findings provide robust evidence regarding economic, institutional, and technological factors that influence countries' performance within the dynamic IT and ITES sector.

All the key independent variables included in the model, GDP per capita, FDI inflows, telecommunications infrastructure, human capital, political stability, and R&D expenditure emerge as statistically significant drivers of IT and ITES exports. The positive and strong effects of human capital (0.53 percent increase for a 1 percent improvement) and R&D expenditure (0.55 percent increase for a 1% increase in R&D expenditure as a share of GDP) highlight these services' knowledge-intensive and innovative nature. The substantial impact of GDP per capita underscores the effect of improving general economic conditions on IT and ITES trade (2.27 percent increase for a 1 percent increase). The statistical significance of telecommunication infrastructure (a 0.16% increase for a 1% improvement) reflects the digital character of IT and ITES service delivery.

The negative relationship between IT goods exports and IT service exports supports the notion that countries tend to specialize in either hardware production or service provision based on their comparative advantage. These findings challenge the expected complementarity between goods and services within the IT sector. Therefore, this warrants further investigation.

The statistically insignificant real exchange rate coefficient indicates that quality, reliability, and innovation capability may be more important than cost considerations. For developing countries seeking to compete on service trade based solely on cost advantage, this finding carries important policy implications.

The study contributes to the literature by providing systematic empirical evidence on the determinants of IT and ITES exports across a diverse sample of countries. The findings enhance the understanding of how traditional trade theories apply to modern service trade. For policymakers, the findings identify specific factors that enable successful participation in global IT and ITES trade.

The study identifies the following limitations. Human capital is proxied only by gross secondary school enrollment due to data availability constraints for tertiary/STEM skill measures in the sample. Firm-level heterogeneity and IT/ITES-specific policy variables are not included in the empirical model. The sample excludes many low-income economies due to data availability constraints. Addressing these limitations will enhance the robustness of future research in this area.

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