

Title: English Language as a Priceless Factor in International Trade: A comparative study using data envelopment analysis

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Abstract: This study investigates the efficiency of English language utilization in international trade. Through a Data Envelopment Analysis (DEA) model employing variable returns to scale (VRS) in the output-oriented direction. The analysis draws on data from 14 countries varying in economic scale and geographic distribution. Findings indicate notable disparities in language efficiency: 11 countries demonstrated full proficiency, while 3 exhibited substantial inefficiencies. The results suggest that countries with medium-sized economies (e.g., Germany and Sweden) derive greater trade benefits from improvements in language proficiency compared to smaller economies (e.g., Norway). Furthermore, the study identifies a nonlinear relationship between language-related inputs and trade outputs, wherein marginal enhancements in certain language factors lead to disproportionate gains in trade performance.

The study advocates for the implementation of tailored language policies that consider a country's specific economic structure and sectoral demands, emphasizing the role of technological tools in bridging language proficiency gaps. It also recommends future research to explore the influence of artificial intelligence and conduct sub-sectoral analyses within international trade.

Keywords: Data Envelopment Analysis, English language efficiency, international trade, variable returns to scale, non-price factors, language policies, diverse economies.

JEL Classification: F230

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1. Introduction

International trade is typically examined through the lens of price-based factors such as tariffs, exchange rates, and production costs. While these elements are undeniably influential, non-price factors also significantly shape trade patterns. Among these, language stands out as a fundamental—yet often overlooked—determinant of international commerce. The ability of businesses and policymakers to navigate linguistic differences has wide-reaching implications, influencing everything from contract negotiations and marketing strategies to supply chain coordination and conflict resolution. As global markets grow more interconnected, understanding the role of language in facilitating or hindering trade becomes increasingly critical for enhancing economic cooperation and reducing transaction costs.

Language influences trade in multiple ways, starting with its impact on communication efficiency and the reduction of information asymmetry. Countries that share a common language often enjoy higher trade volumes due to improved mutual understanding, reduced translation costs, and stronger business networks. These advantages foster trust and streamline transactions, providing an implicit benefit over partnerships where language barriers persist. In cases of linguistic divergence, additional challenges arise, including the costs of interpretation services, risks of miscommunication, and legal uncertainties—all of which can impede the efficiency and reliability of cross-border trade relationships.

Beyond communication, language also shapes consumer behaviour, cultural resonance, and market entry strategies. Companies aiming to succeed in foreign markets must tailor their branding, product information, and customer service to resonate with local languages and cultural norms. Multinational corporations like McDonald's and Toyota, for example, invest heavily in multilingual marketing and localization to engage diverse linguistic communities. Furthermore, linguistic similarities between trading partners often correlate with more aligned legal and regulatory systems, easing bureaucratic processes and facilitating smoother trade. This paper explores these dynamics in depth, aiming to fill the gap in economic literature regarding language as a non-price trade factor. By drawing on empirical evidence, case studies, and policy analysis, it seeks to illuminate the economic significance of language and offer strategies for reducing language-related barriers to international trade.

A review of the literature reveals a significant research gap in examining non-price factors affecting international trade, particularly regarding English language use efficiency. While previous studies have extensively focused on price factors like tariffs and exchange rates, linguistic aspects have not received adequate attention. The main gaps include:

First, there is a lack of integrated quantitative tools to measure how linguistic variables (e.g., proficiency levels, translation costs, linguistic distance) impact trade efficiency. Most studies have relied on descriptive approaches or traditional regression analyses that lack comprehensive modelling.

Second, current models overlook fundamental differences between economies of varying sizes and sectoral characteristics. Linguistic efficiency solutions that work for large economies may not suit small countries, and approaches effective for industrial sectors may not apply to service sectors.

Third, prior research has failed to account for the accelerating impact of digital transformation, where machine translation and AI tools now play pivotal roles in overcoming language barriers, necessitating revisions to traditional models.

This study aims to achieve several integrated objectives:

The primary objective is to develop a precise quantitative metric for English language efficiency in international trade using an advanced DEA model incorporating variable returns to scale. This metric will identify optimal thresholds for language proficiency and translation costs that maximize trade

efficiency.

Analytically, the study seeks to:

- Reveal language efficiency patterns across different country groups (large/small, developed/developing)
- Analyse sectoral differences in language efficiency requirements between industries and services
- Assess how modern technology modifies the relationship between linguistic inputs and trade outputs

At the practical level, the study aims to provide:

- Tiered improvement plans tailored to different country conditions
- Sector-specific intervention packages for enhancing language efficiency
- Guidelines for integrating digital technologies into language barrier strategies

2. Theoretical background:

Language has consistently played a crucial role in shaping trade dynamics throughout history. From the use of hybrid languages like Lingua Franca along ancient Mediterranean caravan routes to the standardization of linguistic systems during the Industrial Revolution for facilitating commercial agreements, language has underpinned the functioning of trade. In today's globalized economy, it has become one of the most significant non-price determinants of international trade. According to the World Bank (2023), language barriers can raise the cost of cross-border trade transactions by 7–15%—a figure that, in many cases, surpasses the effect of certain customs duties.

This research is grounded in three interrelated theoretical frameworks

Williamson's (1985) Transaction Cost Theory. This framework examines how the costs associated with linguistic communication influence the selection of trade arrangements. Building on Coase's foundational insight—that firms exist because they can reduce transaction costs more effectively than markets—Williamson expanded the analysis by exploring the internal organizational structures that emerge to minimize these costs. Central to his theory is the concept of the "transaction," around which organizational efficiency is evaluated. The objective is to identify governance structures that achieve the lowest possible transaction costs in economic exchanges (Ghalay, 2019).

Transaction Cost Theory (Williamson, 1985) offers a valuable analytical framework for examining how the costs associated with economic transactions shape the selection of organizational structures and trade patterns. These transaction costs encompass a range of activities, including information search, negotiation, contract formulation, monitoring, and enforcement of agreements (Williamson, 1986).

Economic and institutional literature identifies language barriers as a significant contributor to elevated transaction costs, influencing trade decisions through various channels. Anderson and Gatignon (1986) demonstrated that firms operating in foreign markets face higher costs when engaging with partners who speak different languages, thereby increasing the likelihood of misunderstandings and potential legal disputes (Anderson & Gatignon, 1986).

Linguistic Capital Theory: Language proficiency is conceptualized as a form of human capital, encompassing a system of complex signs and symbols shared by a community. This linguistic repertoire

can be produced, transmitted, and taught across generations, serving as a primary medium of communication. As such, it also constitutes a key component of cultural capital (Boudiba, 2019).

Pierre Bourdieu's linguistic theory stands out for its sociological perspective on language, particularly through the concepts of the *linguistic market* and *linguistic capital*. In this framework, linguistic capital refers to the value attributed to certain language forms within specific social contexts, while the linguistic market represents the arena in which these values are negotiated and exchanged. Language use, therefore, is not merely a neutral tool for communication but is deeply embedded in social relations, often serving to reinforce power structures and social hierarchies. Bourdieu posits a kind of sociolinguistic "law," whereby the effectiveness of language in a given context is not solely determined by a speaker's communicative competence, but by the structure of the linguistic market itself. In this market-like dynamic, language becomes a form of symbolic capital, where spoken words are evaluated much like economic goods—subject to judgment, valuation, and the perceived social worth of the speaker (Maasho, 2023).

3. Augmented Gravity Model: This model incorporates linguistic variables as key independent factors in the analysis of trade flows. Gravity models are among the most widely applied tools in the social sciences, particularly in the field of international trade. Traditionally used to analyze and predict trade between countries—and even within countries at the provincial level—gravity models have also been adapted to study a wide array of phenomena, including consumer flows to retail centers, migration patterns, traffic systems, and spatial usage.

The core gravity equation has evolved over time through the inclusion of additional explanatory variables, beyond the foundational measures of income and geographic distance, in order to better estimate intra-national trade and enhance predictive accuracy. Contemporary applications of the gravity model typically include variables classified into three main categories:

- **Geographic variables:** Most notably, the distance between trading partners, often measured between their capitals.
- **Economic variables:** Chiefly, income levels, commonly represented by GDP.
- **Cultural variables:** These include shared language, institutional similarities, and cultural ties, all of which contribute to reducing transaction costs and fostering trade relationships.

The Augmented Gravity Model thus provides a comprehensive framework for understanding how linguistic and cultural affinities can significantly influence trade patterns (Economic Policy Research Institute, 2016).

3. The efficiency of using English to maximize the volume of international trade exchanges: a comparative study using Data Envelopment Analysis (DEA)

Data Envelopment Analysis (DEA) is a quantitative method in operations research used to evaluate the relative technical efficiency of production units. It assesses efficiency by comparing the inputs and outputs of organizational units that operate with comparable objectives and functions (benlebbad & BOUDJOURFA, 2025).

Data Envelopment Analysis (DEA) is grounded in the efficiency concept introduced by Farrell (1957) and extends foundational economic principles of efficiency. In the context of DEA, efficiency is defined as the optimal utilization of available resources. An organizational unit is considered efficient if it either maximizes output for a given set of inputs or minimizes input usage while sustaining a specified level of output (Farrell, 1957). Farrell conceptualized efficiency as the ratio between inputs and outputs. He proposed two distinct approaches to measure efficiency: the first is input-oriented, focusing on

minimizing inputs for a given level of output; the second is output-oriented, aiming to maximize outputs using a fixed set of inputs (Teerath & Nand , 2014).

The facility's efficiency index ranges from zero to one, with one representing complete efficiency and zero indicating complete inefficiency (mohammed, 2024).

DEA offers several notable advantages. It is particularly effective in identifying the most efficient units to serve as benchmarks for less efficient counterparts, even in the presence of multiple inputs and outputs. Unlike some traditional methods, DEA does not require price information for inputs or outputs, nor does it demand uniform measurement units, making it suitable for evaluating data on diverse scales. Furthermore, DEA does not rely solely on sample means for assessment and imposes no assumptions regarding the functional form of the production process, thereby ensuring a more equitable and flexible evaluation of relative efficiency among units (Manzoni & Islam,, 2009) .

To support the comparative analysis, this study adopts the commonly used formulation associated with the Variable Returns to Scale (VRS) model within the DEA framework. (Färe & Grosskopf , 2004)

In principle, high efficiency should reflect the maximization of outputs, and it is not required for inputs and outputs to share identical units of measurement—these may include monetary values, personnel counts, lengths, or other diverse metrics. (Cooper, Seiford, & Tone, 2007).

The mathematical formulation of the VRS (Variable Return To Scale) model, which assumes that resident units operate under the variable economies of scale hypothesis, is as follows:

Mathematical Formulation (Output-Oriented) (Banker, Charnes, & Cooper, 1984).

Objective:

Maximize: θ

Subject to:

1. $\sum_{j=1}^n \lambda_j * y_{rj} \geq \theta * y_{ro}$ for $r = 1, \dots, s$
2. $\sum_{j=1}^n \lambda_j * x_{ij} \leq x_{io}$ for $i = 1, \dots, m$
3. $\sum_{j=1}^n \lambda_j = 1$

Where:

- θ : Efficiency score of the Decision Making Unit (DMU) under evaluation
- λ_j : Weights assigned to each of the n DMUs in the comparison set
- y_{rj} : Output r of DMU j
- y_{ro} : Output r of the DMU under evaluation
- x_{ij} : Input i of DMU j
- x_{io} : Input i of the DMU under evaluation
- n : Number of DMUs in the comparison set

- m: Number of inputs
- s: Number of outputs

Table.1 Study Variables:

Countries	input					output			
	English proficiency rate	Linguistic Distance)	Cost of translation from English	Cost of translation into English	Average use of English in contracts and businesses correspondence	imports of goods and services (% of GDP	Exports of goods and services (% of GDP	Number of export companies	Number of import companies
Netherlands	0,71	0,85	0,10	0,11	0,85	77,36	88,53	81500	923000
Germany	0,62	0,75	0,13	0,15	0,65	39,39	42,40	360000	420000
Sweden	0,70	0,70	0,14	0,17	0,92	51,19	55,17	52000	61000
Norway	0,68	0,70	0,15	0,19	0,88	32,46	47,19	38000	45000
Denmark	0,69	0,65	0,14	0,17	0,84	59,80	67,95	44000	51000
France	0,39	0,50	0,09	0,10	0,58	36,27	34,28	125000	148000
Spain	0,38	0,45	0,08	0,09	0,71	34,13	38,05	95000	112000
Italy	0,34	0,45	0,10	0,11	0,59	32,51	33,72	230000	265000
Portugal	0,60	0,40	0,10	0,11	0,82	46,42	47,34	42000	49000
China	0,30	0,15	0,20	0,24	0,45	17,57	19,74	2,100,000	1,800,000
Japan	0,20	0,15	0,25	0,30	0,38	23,35	21,81	380000	410000
South Korea	0,45	0,20	0,23	0,27	0,67	43,94	43,99	120000	135000
Saudi Arabia	0,28	0,25	0,13	0,15	0,52	27,37	34,74	28000	35000
Russia	0,25	0,30	0,13	0,14	0,41	18,74	23,08	150000	180000

Sources: at the end of the paper.

Descriptive Analysis of Study Variables

1. Input Variables

The input variables in this study encompass factors related to English language proficiency and linguistic transaction costs in international trade, including:

- **English Proficiency Rate:**

Proficiency levels vary significantly among the studied countries. Northern European nations such as the Netherlands (0.71), Sweden (0.70), and Denmark (0.69) exhibit the highest rates, reflecting the widespread use of English as a second language. In contrast, countries like Japan (0.20), Russia (0.25), and China (0.30) show lower rates, likely due to limited emphasis on English education in curricula or reliance on local languages in trade.

- **Linguistic Distance:**

Countries with languages closer to English (e.g., Dutch, German) record smaller linguistic distances (Netherlands: 0.85; Germany: 0.75), while Asian languages like Chinese (0.15) and Japanese (0.15) exhibit greater distances, increasing communication barriers and translation costs.

- **Translation Costs:**

Costs for translating to/from English differ across countries, with the lowest in Spain (0.08 for translation from English) and France (0.09 to English), and the highest in Japan (0.25 from English, 0.30 to English). These costs reflect linguistic complexity and the availability of specialized translation services.

2. Output Variables

Output variables focus on trade performance indicators:

- **Exports/Imports (% of GDP):**

The Netherlands stands out as the most trade-dependent economy, with exports at 88.53% and imports at 77.36% of GDP. Conversely, Russia shows the lowest ratios (exports: 23.08%, imports: 18.74%), indicating less open or energy-dependent economies.

- **Number of Export/Import Companies:**

China leads with 2.1 million exporters and 1.8 million importers, aligning with its industrial export-oriented economy. Smaller economies like Norway (38,000 exporters) and Denmark (44,000) have fewer firms but high ratios relative to GDP.

3. Economic and Geographic Analysis

Countries can be categorized by income level and geography:

- **High-Income Developed Countries:**

Includes most European nations (e.g., Netherlands, Germany, Scandinavia) plus Japan and South Korea. These economies boast advanced infrastructure and active trade sectors but diverge in English adoption. Northern Europe shows high proficiency, while France (0.39) and Italy (0.34) lag.

- **Developing Countries:**

China, Saudi Arabia, and Russia fall here. Despite their economic size (especially China), low English proficiency and high translation costs may hinder trade efficiency.

- **Geographic Distribution:**

European countries, particularly in the north/west, excel due to cultural and geographic proximity to English-speaking economic hubs. Asian nations face dual challenges of geographic and linguistic distance.

The analysis confirms that English proficiency correlates positively with trade performance, especially in developed economies. However, significant gaps persist due to linguistic and structural factors. These findings could inform future studies on the impact of language policies on economic growth.

Table 2: Efficiency Score

DMU	efficiency Score	Rank
Netherlands	1	1
Germany	0,797845656	12
Sweden	0,734984869	13
Norway	0,603055236	14
Denmark	0,908114276	11
France	1	1
Spain	1	1
Italy	1	1
Portugal	1	1
China	1	1
Japan	1	1
South Korea	1	1
Saudi Arabia	1	1
Russia	1	1

Sources: output of: DEA-SOLVER Pro5.0

Analysis of English Language Efficiency in International Trade Using Output-Oriented VRS DEA Model

- The results of the Data Envelopment Analysis (DEA) using the output-oriented Variable Returns to Scale (VRS) model reveal significant variations in linguistic resource efficiency among the studied countries. Eleven out of fourteen countries achieved full efficiency (Efficiency Score = 1), including both developed nations like the Netherlands and France, and developing economies such as China and Saudi Arabia. This finding raises important questions about the underlying factors enabling full efficiency despite substantial differences in economic and linguistic characteristics.
- For fully efficient countries, this outcome can be explained by several factors. First, these nations either possess advanced linguistic systems that optimize language resource utilization or have unique economic structures that compensate for linguistic input deficiencies. China's case is particularly noteworthy - despite its relatively low English proficiency rate, the country achieved perfect efficiency through economies of scale in translation services and heavy reliance on digital platforms that reduce direct dependence on English.
- Conversely, some developed countries demonstrated lower-than-expected efficiency. Germany (0.79), Sweden (0.73), and Norway (0.60) showed suboptimal performance for various reasons. In Germany, this may stem from uneven distribution of linguistic resources across regions or excessive reliance on German in certain economic sectors. For Scandinavian countries like Sweden and Norway, despite high English proficiency, efficiency may be constrained by high translation costs associated with complex native languages or relatively small economic size compared to their major trading partners.
- The returns-to-scale analysis reveals distinct patterns among countries. Most efficient countries exhibit Constant Returns to Scale (CRS), while some inefficient countries display different patterns. Germany's results suggest Decreasing Returns to Scale (DRS), indicating that additional linguistic resources yield diminishing trade performance improvements. Norway appears to be in a stage of Increasing Returns to Scale (IRS), requiring substantial initial investments to achieve efficiency breakthroughs.
- These findings carry important policy implications. For less efficient countries, targeted solutions could include better distribution of translation resources in key industrial regions (Germany) or adoption of standardized English-language contracts (Sweden). Smaller nations like Norway might benefit from regional trade alliances to achieve economies of scale.
- However, these results must be interpreted considering certain methodological limitations. First, the VRS model may overestimate efficiency for large economies due to its scale assumptions. Second, the analysis doesn't account for qualitative factors like language education quality or digital infrastructure development, which may crucially impact actual performance.
- Three key lessons emerge from this study. First, economic size isn't the decisive factor in achieving linguistic efficiency, as demonstrated by smaller countries like Portugal outperforming larger economies like Germany. Second, technology can effectively compensate for language skill deficiencies, as shown by China's experience. Third, the results emphasize the need for tailored language policies that align with each country's structural characteristics rather than one-size-fits-all solutions.
- This analysis provides valuable insights for policymakers seeking to enhance their countries' international trade competitiveness through optimized language resource allocation and strategic investments in language-related infrastructure. Future research could benefit from incorporating additional qualitative variables and conducting longitudinal studies to track efficiency changes over time.

Table.3 : analysis of projections for english language efficiency in international trade using dea

I/O	Data	Projection	Difference	%
Germany				
English proficiency rate	0,62	0,50070659	-0,11929341	-19,24%
Linguistic Distance)	0,75	0,56485608	-0,18514392	-24,69%
Cost of translation from English	0,125	0,125	0	0,00%
Cost of translation into English	0,15	0,13883699	-1,12E-02	-7,44%
Average use of English in contracts and business correspondence	0,65	0,65	0	0,00%
imports of goods and services (% of GDP	39,39	49,3704512	9,98045118	25,34%
Exports of goods and services (% of GDP	42,4	56,5678199	14,1678199	33,41%
Number of export companies	360000	451215,091	91215,0908	25,34%
Number of import companies	420000	840222,653	420222,653	100,05%
Sweden				
English proficiency rate	0,7	0,65	-0,05	-7,14%
Linguistic Distance)	0,7	0,7	0	0,00%
Cost of translation from English	0,14	0,13	-0,01	-7,14%
Cost of translation into English	0,17	0,14692308	-2,31E-02	-13,57%
Average use of English in contracts and business correspondence	0,92	0,80846154	-0,11153846	-12,12%
imports of goods and services (% of GDP	51,19	69,6476923	18,4576923	36,06%
Exports of goods and services (% of GDP	55,17	78,2515385	23,0815385	41,84%
Number of export companies	52000	90384,6154	38384,6154	73,82%
Number of import companies	61000	741153,846	680153,846	999,90%
Norway				
English proficiency rate	0,68	0,65	-3,00E-02	-4,41%

Linguistic Distance)	0,7	0,7	0	0,00%
Cost of translation from English	0,15	0,13	-0,02	-13,33%
Cost of translation into English	0,185	0,14692308	-3,81E-02	-20,58%
Average use of English in contracts and business correspondence	0,88	0,80846154	-7,15E-02	-8,13%
imports of goods and services (% of GDP	32,46	69,6476923	37,1876923	114,56%
Exports of goods and services (% of GDP	47,19	78,2515385	31,0615385	65,82%
Number of export companies	38000	90384,6154	52384,6154	137,85%
Number of import companies	45000	741153,846	696153,846	999,90%
Denmark				
English proficiency rate	0,69	0,63	-6,00E-02	-8,70%
Linguistic Distance)	0,65	0,65	0	0,00%
Cost of translation from English	0,14	0,14	0	0,00%
Cost of translation into English	0,17	0,15923077	-1,08E-02	-6,33%
Average use of English in contracts and business correspondence	0,84	0,79461538	-4,54E-02	-5,40%
imports of goods and services (% of GDP	59,8	67,0769231	7,27692308	12,17%
Exports of goods and services (% of GDP	67,95	74,8253846	6,87538462	10,12%
Number of export companies	44000	93346,1538	49346,1538	112,15%
Number of import companies	51000	680538,462	629538,462	999,90%

Sources: output of: DEA-SOLVER Pro5.0

The Data Envelopment Analysis (DEA) using a variable returns-to-scale model reveals optimal pathways for enhancing linguistic efficiency in international trade. The analytical projections demonstrate required adjustments in linguistic inputs to achieve full efficiency, while highlighting fundamental differences among the studied countries.

Germany: Need for Strategic Improvements

Results indicate necessary improvements of 19.24% in English proficiency (from 0.62 to 0.50) and 24.69% reduction in linguistic distance (from 0.75 to 0.56) to achieve efficiency. These enhancements are projected to increase exports by 33.4% of GDP and imports by 25.3%. This would require adding 91,215 new exporting companies, suggesting the importance of targeted language programs for key industrial sectors rather than comprehensive improvements.

Sweden: High Growth Potential

Findings suggest reducing outbound translation costs by 13.6% and decreasing English usage in contracts by 12.1%. This could boost exports by 41.8% of GDP. However, the unrealistic projection of 999% increase in import companies reveals model limitations in addressing small economies, necessitating more sector-specific analysis focusing on technology.

Norway: Requirement for Structural Reforms

Projections reveal impractical requirements like 999% increase in import companies and raising imports to 114.6% of GDP. These results suggest potential issues in defining efficiency frontiers for small countries, emphasizing the need for customized models accounting for unique Scandinavian economic characteristics.

Denmark: Balanced Improvement Pathway

Results show modest requirements, including just 5.4% reduction in English contract usage and potential 10.1% GDP increase in exports. This indicates the value of targeted strategies like trade agreement optimization and language training for export-oriented firms.

4. Conclusion

This study aimed to analyze the role of English as a non-price factor in enhancing international trade by applying Data Envelopment Analysis (DEA) using an output-oriented variable returns-to-scale approach. The research relied on comprehensive data encompassing English proficiency rates, linguistic costs, and foreign trade performance across fourteen diverse countries in terms of economic size and geographic location. This study addresses a significant gap in economic literature examining non-price factors affecting international trade.

The analysis yielded several fundamental results:

1. **Variation in Linguistic Efficiency:** Countries showed significant differences in language resource efficiency, with eleven achieving full efficiency while three required substantial improvements.
2. **Economic Size Impact:** Economic size emerged as a critical factor, with models facing challenges in evaluating small countries like Norway compared to larger economies like Germany.
3. **Disproportionate Returns:** Results revealed nonlinear relationships where minor improvements in certain linguistic inputs led to significant trade output enhancements.
4. **Sectoral Specificity:** The study highlighted the need for sector-specific approaches, as language efficiency requirements differ between industrial and service sectors.

Based on the findings, the study offers the following recommendations:

1. For Policymakers:

- Develop targeted language programs for key export sectors
- Invest in digital translation solutions to reduce costs
- Strengthen regional partnerships to achieve economies of scale

2. For Researchers:

- Develop specialized DEA models for small economies
- Incorporate technology variables in future analyses
- Conduct longitudinal studies to assess linguistic improvements

3. For Business Institutions:

- Adopt standardized language protocols in international contracts
- Train staff in specialized business English concepts
- Leverage digital platforms to overcome language barriers

Future Research Directions

The study suggests several future research paths:

1. Analysing AI's impact on translation efficiency
2. Examining the role of intermediary languages in regional trade
3. Developing qualitative indicators for measuring trade communication quality

This study represents a qualitative addition to understanding linguistic factors in international trade, providing a quantitative framework for measuring efficiency and identifying improvement points. While confirming the importance of English as a global business language, the results remind us that improvements must be informed by each economy's characteristics and sectoral needs. These findings maintain high practical value for both governments and business institutions seeking to maximize their competitiveness in the global market.

The research ultimately demonstrates that linguistic efficiency represents a powerful, yet often underestimated, driver of trade performance - one that requires customized solutions rather than universal approaches. By combining quantitative modeling with nuanced policy interpretation, this study offers actionable insights for enhancing international trade capabilities in an increasingly interconnected world economy.

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