



Croatian  
International  
Relations  
Review

CIRR

XXVIII (91) 2022,  
59-75

DOI 10.2478/  
CIRR-2022-0064

UDC 327 (4-6  
EU:73:55)

# How Information Technology, Entrepreneurship, and International Trade lead to the International Relations in Indonesia?

**Gomgom tp siregar**

*Universitas Darma Agung, Medan, Indonesia*

*Email: [gomgomsiregar@gmail.com](mailto:gomgomsiregar@gmail.com)*

*ORCID: <https://orcid.org/0000-0003-1128-0346>*

**Irene Silviani**

*Universitas Darma Agung, Medan, Indonesia*

*Email: [irenesilviani@gmail.com](mailto:irenesilviani@gmail.com)*

*ORCID: <https://orcid.org/0009-0009-8893-462>*

## Abstract

**Key words:**  
Information  
technology;  
entrepreneurship;  
international  
trade;  
international  
relations;  
Indonesia.

*International relations are of immense importance for nations in the present era of competitiveness. Specifically, international relations between various countries that are tied to economic activity are rapidly growing. Therefore, the purpose of the present study is to estimate the role of entrepreneurship, information technology and trade in international relations in Indonesia over (1990-2021) period. The study is quantitative in nature and empirical estimation is carried out using Autoregressive Distributed Lag Model (ARDL) Bound testing approach. The study reveals that international trade, entrepreneurship, and information technology have positive relationship with international relations. In other words, all these factors are helpful in promoting international relations of Indonesia with other countries. Based on these results, government and non-government organizations are recommended to improve information technology infrastructure, promote business or entrepreneurial activities and trade to enhance international relations of Indonesia.*

## Introduction

In every nation's economic, social, political, and security spheres of existence, relationships with other countries are crucial. It assists in conquering terrifying dangers and unlocks the way for achievement and prosperity in these spheres of life. Nations that have reliable and strong ties with other countries might benefit from their security, social collaboration, and financial support (Prabowo et al., 2020). International relations have a critical role in the current economic climate (Mendes, 2021). International relations are helping the nations work together for economic progress. The prosperity of the global economy is largely dependent on international cooperation. Collaboration among nations offers advantages for each other. Collaboration between nations, during times of global recession, can be crucial for ensuring the prosperity of both countries. Thus, on a global scale, the relevance of international relations for countries is crucial (Weldon et al., 2021).

International relations are determined by an array of factors, but the current study is focused on how entrepreneurial activities, trade and information technologies affect international relations. Because developing countries constantly need better relations to encourage economic activity that can be beneficial for people's well-being, the relationships between developing countries for entrepreneurial operations are crucial (Al-masaeed et al., 2021). Setting up a company enterprise and taking financial risks in the hopes of making profit are both examples of entrepreneurship. Cross-border business activities are well-known among academics and that they can improve global relations. Globally, there is currently a rise in entrepreneurial activities (Glinkowska-Krauze et al., 2020; Tabares et al., 2021), which is crucial for fostering international relations between nations. As a result of the efforts of various business organizations, beneficial relations between nations are fostered.

Most countries rely on business relationships, which significantly aid in their economic growth. Thus, promoting within border and cross-border entrepreneurship, which results in the growth of economic international ties, is crucial for advancing economic development of interacting nations (Al-masaeed et al., 2021; Amar et al., 2020; Astuty et al., 2022).

In addition, international trade is also crucial to sustain international relations. Trading between countries is referred to as international trade. The exchange of several goods and services among various parties and the sale and purchase of goods and services, including payment from buyer to seller, appears to be connected by trade as a fundamental economic notion. Such commercial activities could genuinely take place between producers and purchasers within an economy. Trade might occur across the entire nation as there can be international differences between manufacturers and buyers (ALSoud et al., 2021; Utami et al., 2019). In order to perform economic activities for the advantage of countries, international trade is now growing across countries. For all nations, the role of international trade is crucial (Ryazantsevet al., 2019).

The growth of the economy is greatly influenced by international trade cooperation between nations particularly between the surrounding countries (Al-masaeed et al., 2021). It is a common notion that most nations have business relationships with other nations and therefore increasing trade between nations can help to improve relations between them. Economic activity has united the entire world into a single community, and it continues to dominate international relations (Astuty et al., 2022; Pratami et al., 2021; Sibuea et al., 2022). The greater the scope of a nation's trade agreements, the greater the effect they have on the expansion of that nation's economy, which in turn leads to tighter ties with other nations. International trade therefore appears to have an important influence on international relations (Prabowo et al., 2022; Sibuea et al., 2020). Export-related commercial operations are becoming more significant and have a positive impact on global relations. Therefore the current study is attempting to illustrate how international trade affects international relations in this direction (ALSoud et al., 2021). Entrepreneurship activities can be helpful in boosting international trade.

Recently, Information technology (IT) has been observed to have the potential to foster both entrepreneurship and international trade. Improved information technology is needed to handle corporate activity. Internet capabilities are generally supported by information technology, which improves business contacts (Al-masaeed et al., 2021; Astuty et al., 2022; Mujiatun et al., 2022; Susilawati et al., 2022; Tambunanet al., 2022; Utami et al., 2019). IT improves people's communication skills for cross border commercial activities, which can result in better relationships between business entities. Growing trade and commercial collaboration can lead to the creation of long-lasting relationships (ALSoud et al., 2021; Candrasa et al., 2020; Susilawati et al., 2021; Silviani et al., 2022).

IT has a favourable impact on international relations in addition to its positive impact on the performance of entrepreneurship and international trade. It affects international relations indirectly through performance of entrepreneurship. IT has significant positive role to play in promoting international entrepreneurship performance which causes international relations to rise. Collaborations among business organizations can be sufficiently increased by IT applications and this rise in the business activities collaborations increases the international relations. IT has an important role to play in filling up the communication gaps among cross border entrepreneur organizations which strengthens the relations among different business organizations. Thus besides the direct impact of ICT on international relations, it affects international relations indirectly also by positively affecting international entrepreneurship that affects international relations positively and favourably ([ALSoud et al., 2021](#)).

Keeping in view the above-mentioned nexus, the primary goal of this study is to examine the relationship between IT, entrepreneurship, international trade, and international relations in Iraq over 1995-2020 period. Previously a few studies have been conducted to examine this nexus in the context of different countries. However, these studies were conducted at micro level using primary data analysis. Moreover, none of the previous studies have specifically studied the association between IT, international trade, entrepreneurship, and international relations in Indonesia's context. Since 1980s, Indonesia's foreign trade regime has seen significant changes. Several import barriers have been reduced, and an outward-looking export promotion strategy has gradually replaced an import substitution policy. Moreover, Indonesia has eliminated all non-tariff restrictions and export limitations ([Tambunan, 2009](#)). Due to its robust economy, Indonesia supports a healthy mix of domestic and foreign businesses and international relations. The international entrepreneurial activities and relations are rapidly growing in Indonesia as the sales of several foreign companies are higher in Indonesia than in Singapore and Thailand, and further growth of the Indonesian market is anticipated ([Prabowo et al., 2021](#)). Previously, the association between international trade and economic growth or economic development has been studied, but the association between trade and international relationships has never been studied before. Thus, the present study is a significant contribution in the literature by estimating the nexus between IT, international trade, entrepreneurship, and international relations using macro data in Indonesia's context. The remaining study is ordered in the following manner: after this first section 1, section 2 comprises of relevant literature review. We present data and applied estimation technique in section 3. Section 4 includes empirical findings and discussions, and Section 5 gives conclusions and policy recommendations.

## **Literature Review**

The study of the interaction of non-governmental organizations and states of the nation in different fields like economics, politics and security refers

to international relations. The significance of international relations cannot be denied in the present market conditions in which different factors have crucial roles to play. Among them international trade is the most important one that has a significant role to play in business activities. The international relations of a country helps in dealing with economic activities that help strengthen the economic growth of a country (Al-masaeed et al., 2021). In recent years, different factors that can promote international relations among countries remained the focus of the researchers. International trade has a major impact on how international relations develop (Ikram et al., 2020). By numerous commercial interactions and business ventures carried out by various company entities, international trade can be encouraged. Businesses in various countries can encourage entrepreneurship among business functions, encouraging global trade, and the importance of IT in fostering entrepreneurial activities cannot be understated (Bagheri et al., 2017).

Empirically, different researchers estimated the nexus between IT, international trade, entrepreneurship and international relations like Prabowo et al. (2022) explored the role of free trade integration, financial integration, cross border entrepreneurship, bilateral trade in international relations in Malaysia and Indonesia. The study was quantitative and used Partial Least Square and Structural Equation Modeling approach that indicated the positive impact of all the above-mentioned variables on international relations. Al-masaeed et al. (2021) studied the impact of entrepreneurship, international trade, and information technologies on international relations in Malaysia and Jordan. The study is quantitative research based on organizations of both countries involved in international relations. The findings of Structural Equation Modeling showed that international trade had positive impact on international relations by strengthening IT capabilities, internet capabilities, international innovativeness and international proactiveness and entrepreneurships. ALSoud et al. (2021) analyzed the role of international entrepreneurship and information technologies in promoting international relations in Malaysia and Jordan. The researchers conducted quantitative research and surveyed organizations involved in international relations. The findings of the study revealed that entrepreneurship and ICT had a positive role in promoting international relations in both countries.

In continuation, Abdeljaber et al. (2021) analyzed the role of cross border entrepreneurship and trade integration in international trade in Jordan and Malaysia by taking into consideration the organizations involved in the cross border businesses. The findings indicated that trade integration and cross border entrepreneurship had a positive role in international relations. In addition, the findings also revealed that IT infrastructure also had positive impact on international relations. Chatterjee et al. (2020) studied the covariance between access dimensions, ICT adoption and entrepreneurial orientation among rural women in India. According to their study, different forms of access lead to ICT adoption that leads to

entrepreneurial orientation and ultimately to micro entrepreneurship. [Glavas et al. \(2014\)](#) considered the data of eight companies related to tourism and travel industry to explore the nexus between internet capabilities and international entrepreneurship or business. The findings revealed that successful entrepreneurs had significant degree of integration of internet capabilities. [Al-Muttar et al. \(2022\)](#) studied the moderating effect of international relations on the relationship of trade integration and information capital on business performance by considering the data of international trade companies of Iraq. The authors used PLS-SEM estimation approach that revealed both trade integration and information capital had positive impact on performance. The indirect relationship revealed that international relations positively moderated the positive association between trade integration, information capital and business performance. Hence, we develop the following hypotheses:

H1: IT impacts international relations significantly.

H2: International trade impacts international relations significantly.

H3: Entrepreneurship impacts international relations significantly.

### Literature Gap

The review of previous studies reveals that despite many studies estimating the nexus between IT, international trade, entrepreneurship and international relations in different countries, the study of the above-mentioned nexus in the context of Indonesia is missing in the literature. Moreover, the earlier studies were conducted at primary level, and to the author's knowledge, none of the earlier studies estimated this nexus at macro level. Thus, after identifying and filling in these research gaps, the current study is a novel and significant contribution in the literature.

### Data and Methodology

The aim of current research is to analyze the effect of information technology, international trade, and entrepreneurship on international relations in Indonesia over 1995-2021 period. International relations are taken as dependent variables while IT, entrepreneurship and trade are taken as independent variables. Following [ALSoud et al. \(2021\)](#), [Abdeljaber et al. \(2021\)](#) and [Al-masaeed et al. \(2021\)](#), we specify the model of the study as follows;

$$IR = f(IT, ENT, TRADE) \quad (1)$$

This model is specified in its econometric form as follows:

$$IR_t = \beta_0 + \beta_1 IT_t + \beta_2 ENT_t + \beta_3 TRADE_t + \varepsilon_t \quad (2)$$

Where, IT stands for Information technologies, ENT represent entrepreneurship and TRADE shows international trade.  $\varepsilon_t$  denotes error term in the model. All the necessary description of the selected variables is given in [Table 1](#) below.

**Table 1.** Variable description and sources of data

Variables	Measurement	Reference	Source of data
International relations	Grants and other revenues (%of revenues)	(Lei et al., 2022)	WDI
IT	Individuals using internet (% of population)	(Awan et al., 2022)	WDI
Entrepreneurship	Total Entrepreneurial activity measured as Portion of individuals involved in establishment of a business or manager or owner of a new business.	(Stel et al., 2005), (Doran et al., 2018)	Global Entrepreneurship Monitor
International trade	Exports plus imports of goods and services / total population	(Makki et al., 2004), (Rahman et al., 2016)	WDI

## Estimation Techniques

### Stationarity Testing

It is mandatory to check the order of integration of the selected variables before moving towards the formal estimation to analyze the association between study variables. Stationarity refers that corresponding series contains constant variance, auto covariance and mean and it indicates the absence of unit root in data series in a given period of time (Brooks, 2002). We represent a variable as I (0) if it is stationary at level and 1(1) if it becomes stationary after taking the difference. Alternatively, a series is called nonstationary if it contains non-constant variance, mean or covariance over time that indicates the presence of the problem of unit root. We can make a non-stationary series stationary by taking first or second difference and such a series is represented as I(1) and I(2), respectively. For this purpose, the present study employs ADF test of stationarity. The functional form of ADF test as given in (Gujarati et al., 2012), is stated in Eq 3 as:

$$\Delta Z_t = \beta_1 + \beta_2 + \delta Z_{t-i} + \sum_{i=1}^n \alpha_i \Delta Z_{t-i} + \epsilon_t \quad (3)$$

where, data series that we test for stationarity is denoted by  $z_t$ ,  $z_{t-1}$  shows lag of a series. Similarly,  $\Delta z_{t-1}$  and  $\Delta z_{t-2}$  represents the first difference and second differences of data series respectively,  $t$  represents time notion, and last  $\epsilon_t$  shows the disturbance term. In testing the order of integration of data series, if our computed ADF value is found to be higher than critical statistic at the significance level (5 percent), we fail to accept the null hypothesis ( $H_0$ ) (assuming the existence of unit root) is rejected and conclude that given series is not unit root at given order. The opposite is true in reverse case.

## Selecting Optimal Lag Length

The application of the ARDL technique, as presented by Peseran et al. (1997) for estimation of model coefficients is encouraged by the evidence of mixed integration order of certain variable series. Later, (Pesaran et al., 2001) refined this strategy by including the bound test. Numerous advantages can be reported of this estimation approach; first, data series don't need to have the same integration order for the application of this technique. Second, reliable and robust estimates can be obtained by this approach even in the case of small sample (Peseran et al., 1997). Third, the endogeneity issue among series can be effectively handled by this technique (Pesaran et al., 2001). ARDL estimation model uses lagged values of independent and dependent variables both. Consequently, choosing a suitable lag length is essential for both long-run and short run model parameter estimation. We represent the optimal ARDL model as follows:

$$\Delta IR_t = \alpha_0 + \alpha_1 IR_{t-1} + \sum_{i=1}^l \alpha_1 \Delta IR_{t-i} + \sum_{i=1}^m \alpha_2 \Delta IT_{t-i} + \sum_{i=1}^o \alpha_3 \Delta ENT_{t-i} + \sum_{i=1}^q \alpha_4 \Delta TRADE_{t-i} + \beta_1 IT_{t-1} + \beta_2 ENT_{t-1} + \beta_3 TRADE_{t-1} + \varepsilon_t \quad (4)$$

Where the optimal lags are denoted by l, m, n and q which are selected automatically through Akaike Information Criterion (AIC).

## The ARDL Bound Test

Finding out if both independent and dependent variables are co integrated comes after selecting the optimal ARDL model employing a common lag length selection criterion. Compared to other methods of verifying the existence of cointegration such as (Engle et al., 1987) and (Johamen et al., 1990) cointegration approaches, this kind of investigation is more trustworthy because any integration order prerequisites are not required for the given series. Therefore, this approach is used to finding out the integration between the variables. The test uses the joint F statistic or Wald test to compare the alternative cointegration hypothesis with the null hypothesis of the absence of cointegration for a set of variables. The lower and upper (I (0) & I(1) critical bounds are compared with F-statistics. If the estimated F statistic value exceeds the upper critical boundaries, cointegration is presumed to exist. In contrast, the test result remains ambiguous if the F statistic is between the upper and lower bound critical limits. In contrast, if the F statistic is lower than the lower critical bound, it is assumed that there isn't any cointegration.

## The Short Run and Long Run Coefficients

Equation 5 represents the long run form of model.

$$\Delta IR_t = \sigma_0 + \sum_{i=1}^l \sigma_1 IR_{t-1} + \sum_{i=1}^m \sigma_2 IT_{t-i} + \sum_{i=1}^o \sigma_3 ENT_{t-i} + \sum_{i=1}^q \sigma_4 TRADE_{t-i} + \varepsilon_t \quad (5)$$



The model given in eq (6) is used to estimate the short run model after assessing the long run model.

$$\Delta IR_t = \varphi_0 + \sum_{i=1}^l \varphi_1 \Delta IR_{t-1} + \sum_{i=1}^m \varphi_2 \Delta IT_{t-i} + \sum_{i=1}^o \varphi_3 \Delta ENT_{t-i} + \sum_{i=1}^q \varphi_4 \Delta TRADE_{t-i} + \varphi_5 ECT + \varepsilon_t \quad (6)$$

ECT displays the error correction mechanism, which should be significant and negative, shows the rate at which adjustments are made in order to reach equilibrium. Hence, its coefficient should have a magnitude less than 1.

## Estimations and Discussions

### Descriptive Statistics

To begin the empirical estimation, basic data characteristics including mean, standard deviation, data range etc are given in descriptive or summary statistics analysis. Table 2 provides summary statistics results. Among all the series, TRADE has the highest mean value as well as the highest data range. The mean value of IT is found to be the lowest among all the series. We observe that IT possesses the highest standard deviation whereas IR has the lowest standard deviation among all the variables.

**Table 2.** Summary Statistics Analysis

Series	Mean	Min	Max	Std Dev.	J-B Stats
IR	19.546	5.394	36.107	8.856	1.9054***
IT	12.284	0.098	62.104	17.190	16.420***
ENT	33.43	11.88	89.96	14.216	19.412***
TRADE	53.066	32.97	96.866	12.023	23.333***
Note ***=P<0.05					

### Correlation Matrix

The correlation between the study variables is given in Table 3. According to the correlation findings, positive correlation is found to be present between international relations, international trade, IT and entrepreneurship.

**Table 3.** Correlation Matrix

	IR	IT	ENT	TRADE
IR	1.000			
IT	0.835	1.000		
ENT	0.193	0.234	1.000	
TRADE	0.834	0.436	0.538	1.000

The first step to begin empirical estimation is the finding of the integration order of the variable series. To apply ARDL approach, it is very important to check whether the series is stationary at level or becomes stationary after taking the first difference, as F Statistic becomes non suitable in the

case of the series has order of integration 2. For this estimation, we applied ADF test for stationarity in the present study. The corresponding findings of the test are provided in [Table 4](#) below.

**Table 4.** ADF Unit Root Test

Unit root (level)	Intercept	Intercept and Trend	Decision
IR	0.993	4.432	I(1)
IT	0.100	5.146	I(1)
ENT	-2.124***	-3.411***	I(0)
TRADE	-2.562	-3.585	I(1)
Unit root (first difference)			
IR	-4.354***	-3.299***	I(1)
IT	0.9049***	1.9396***	I(1)
ENT	-----	-----	I(0)
TRADE	-5.542***	-3.2666*	I(1)

The findings of the ADF test are shown in [Table 4](#) (employing intercept in the empirical estimation along with intercept and trend). [Table 4](#) shows that international relations, international trade and IT are stationary at level, whereas entrepreneurship is stationary at first difference. As a result, we may claim that each series is integrated at a different order, which supports the usage of the ARDL method for estimation testing.

### Optimal ARDL Model Selection

Before moving on to coefficient estimation, it is necessary to choose the best ARDL model. The optimal ARDL model that reduces RSS must be chosen since the ARDL model combines lagged values of independent and dependent variables. The best model is selected based on AIC. [Table 5](#) gives the process of model selection. ARDL model (1,0,0,1) is selected as best or optimal model based on AIC. This model, which is selected due to having the least residual sum of squares, satisfies all the model fitness conditions.

**Table 5.** ARDL Best or Optimal Model

DV= International Relations (IR), optimal model: ARDL (1,0,0,1)				
Series	parameters	Std.error	t-values	Prob value
IR (-1)	0.6555	0.113	5.782	0.000
IT	0.0414	0.058	0.706	0.489
TRADE	0.0596	0.078	0.756	0.459
ENT	0.779	0.456	1.708	0.1047
ENT (-1)	0.525	0.440	1.191	0.2490
CONS	7.345	5.193	1.414	0.174
R <sup>2</sup>	0.851	Hannan- Quinn criterion		5.556
Adj. R <sup>2</sup>	0.810	DW (Durbin Watson stat)		2.23
AIC Criterion	5.478	F-stat		20.677
Schwarz Criterion	5.772	p (F-stat)		0.000

### ARDL Bound Test

The following step involves finding out if the series are cointegrated after choosing an optimal model by applying AIC optimum lag selection criterion (Pesaran et al., 2001). At all acceptable significance levels, the computed F-statistic exceeds the I1 bound, demonstrating the cointegration of the study variables. Hence, it is determined that study variables are long run cointegrated.

**Table 6.** ARDL Bound Test

Test- stat	Value	K
F-stat	4.692	3
Critical bound value		
Significance	I0	I1
10%	2.37	3.2
5%	2.79	3.67
2.5%	3.13	4.08
1%	3.65	4.66

### Long Run Estimation

How IR (dependent variable) responses to changes in the independent is depicted by the long-run regression coefficients. It is then possible to forecast long-term connections among variables using the dynamic ARDL model. The estimations for long-run parameters are shown in Table 7.

**Table 7.** Long-Run ARDL Estimates

DV (IR)	Coefficients	Prob-value
IT	0.120*	0.091
ENT	0.739*	0.087
TRADE	0.059***	0.045
Cons	0.735	0.174

The long run estimation results indicate the significant impact of all variables on international relations in Indonesia. We find that all of the variables possess a positive association with international relations. IT is founded to enhance international relations. For a unit increase in IT, IR is observed to increase by 0.12 units in the long run. Similarly, we observed that a unit rise in ENT is associated with 0.73 units in IR in the long run. Considering the impact of TRADE, there is a rise of 0.05 units in IR in the long run if TRADE rises by one unit.

### Short-Run ARDL results

The ECT term shows the adjustment speed towards long run equilibrium as given in Table 8. ECT term fulfills all the three criteria, i.e., it is significant, negative and has coefficient less than one. The value of the coefficient is -0.344, showing that the adjustment speed towards long run equilibrium is

34.4 percent. The model will finally attain equilibrium according to the negative sign. The coefficients of all parameters are statistically significant at different levels in the short run.

**Table 8.** ARDL Short Run Estimation

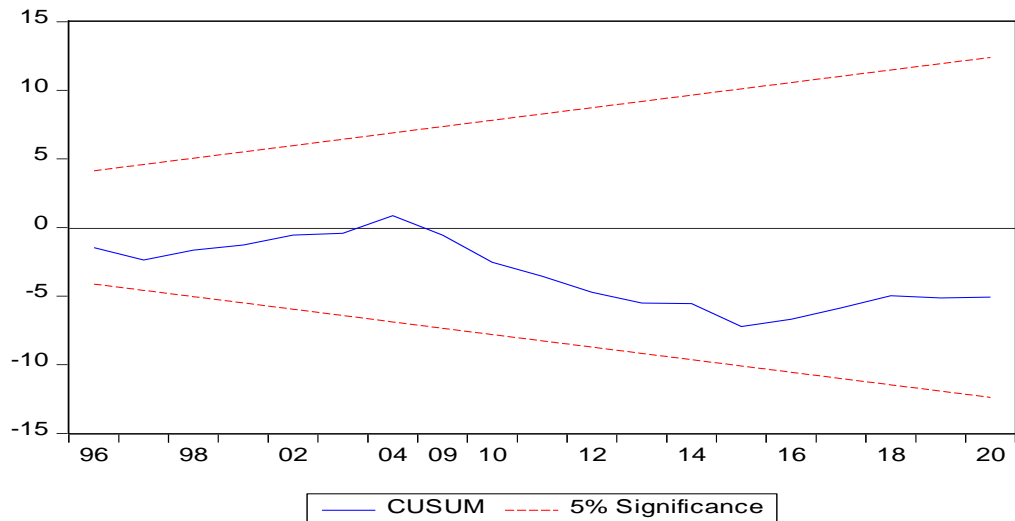
Variables	Parameters	t-stat	Prob value
Error correction term (ECM)	-0.344***	-3.640	0.019
D(IT)	0.779	2.053	0.054
D(TRADE)	0.432	3.334	0.049
D(ENT)	0.561	2.813	0.003
D(ENT-1)	0.511	4.623	0.000
Cons	0.130	0.145	0.021

Like the findings of the long run, all of the variables are statistically significant in the short run as well. The findings indicate that international trade impacts international relations positively. The results are in line with (Basso et al., 2017; Ikram et al., 2020) and Abdeljaber et al. (2021) which concluded that international trade plays significant role in promoting international relations between different nations. Increasing trade relations between the countries has an important role in developing positive entrepreneur behaviour between them that increases the welfare of integrated nations. Moreover, international trade relations are also necessary for countries to survive in a competitive environment. International trade also impacts international relations indirectly by improving the international business relations that in turn increases the economic activity (Basso et al., 2017).

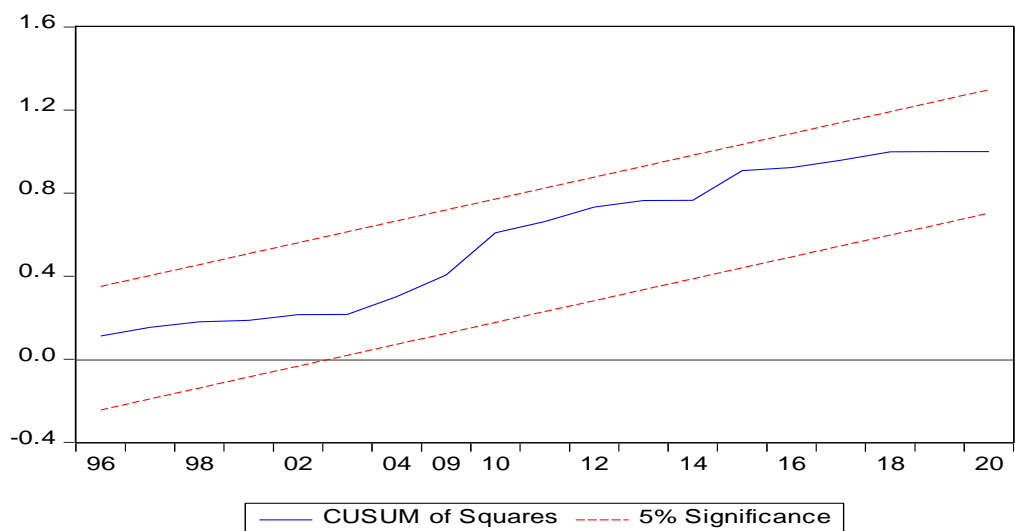
Second, the relationship between ENT and IR is also found to be positive and significant in the short run. Thus, it is concluded that ENT is a factor that enhances international relations of Indonesia with other nations. The finding is justifiable because entrepreneur relationships between business organizations help improve international relations. Higher-level government to government relations and relations in other fields result from improved entrepreneurship relationships. The positive role of entrepreneurship activities in relationship development is justified in several studies including Prabowo et al. (2022), Al-masaeed et al. (2021) Elo et al. (2018) and Etemad (2015) Additionally, entrepreneurial activities result in international trade, which plays a crucial part in the advancement of international relations. As a result, entrepreneurship growth has an impact on both global trade and international relations.

Furthermore, the study finds that IT has role in international relations. This finding is consistent with a number of previous studies including Chatterjee et al. (2020), ALSoud et al. (2021) and Al-masaeed et al. (2021) that evidenced that IT has positive role in enhancing international relations. The significance of IT cannot be neglected in international trade, entrepreneurship, and international relations. IT capabilities can improve internet capabilities, which will ultimately result in increased global trade

and relations. Therefore, IT can promote international relations by directly impacting entrepreneurship and international trade. The stability of the study coefficients is checked by CUSUM and CUSUMSQ proposed by (Brown et al., 1975). It is found that the graphs of both CUSUM and CUSUMSQ statistic lie within bounds at significance level of 5%, and proves that coefficients of the study model are stable. These plots are provided in Figure 1 and Figure 2 respectively.



**Figure 1.** CUSUM Plot for Coefficient Stability



**Figure 2.** CUSUMSQ plot for Coefficients Stability

### Conclusion and Policy Implications

The present study aims at analyzing the role of information technologies, international trade and entrepreneurship in international relations in Indonesia over the period from 1990-2021. This study has both theoretical and empirical contribution in the literature. Previously, many studies have estimated the role of above-mentioned variables in international trade in different countries, yet the absence of the estimation of this nexus in the context of Indonesia is a gap that was needed to be filled. Therefore, the

study examines the relationship between IT, international trade, entrepreneurship, and international relations. The Data of these variables is collected from different secondary sources. Empirical estimation is carried out using ARDL Bound testing approach. According to the findings of the study IT, entrepreneurship and international trade have positive contribution in improving the international relations of Indonesia. The findings of the study match the hypotheses of the study.

In practical terms, this study will help government and non-government organizations in improving trade, which will improve ties between nations. Government of Indonesia is advised to promote more trade activities with different nations by liberalizing the trade policies and diversifying the trade products. Moreover, the Indonesian government and policy makers should pay heed to improve entrepreneurial activities and information technology infrastructure that will be fruitful in improving the international relations of Indonesia with other nations.

## References

- Abdeljaber, O., Al-masaeed, S., Azam, S. F., Ab Yajid, M. S., ALSoud, A. R., & Johar, M. (2021). The role of Trade Integration and Cross-Border Entrepreneurship in International Relations: A moderating role of IT Infrastructure. *Croatian International Relations Review*, 27(87), 63-94. doi: <https://doi.org/10.2478/CIRR-2021-0001>
- Al-masaeed, S., ALSoud, A. R., Ab Yajid, M. S., Tham, J., Abdeljaber, O., & Khatibi, A. (2021). How the relationship between Information Technology, Entrepreneurship, and International Trade lead to the International Relations? *Croatian International Relations Review*, 27(87), 32-62. doi: <https://doi.org/10.2478/CIRR-2021-0001>
- Al-Muttar, M. Y. O., Basheer, Z. M., Sahib, A. A., et al. (2022). Moderating effect of international relations among information capital, supplier trade integration and performance: An evidence from international trade business in Iraq. *Croatian International Relations Review*, 28(90), 193-213. doi: <https://doi.org/10.2478/CIRR-2022-0085>
- ALSoud, A. R., Abdeljaber, O., Ab Yajid, M. S., Johar, M., Al-masaeed, S., & Azam, S. F. (2021). Adoption of information communication technology (Ict) in international entrepreneurship: A way to promote international relations among business entities. *Croatian International Relations Review*, 27(87), 1-31. doi: <https://doi.org/10.2478/CIRR-2021-0001>
- Awan, A., Abbasi, K. R., Rej, S., Bandyopadhyay, A., & Lv, K. (2022). The impact of renewable energy, internet use and foreign direct investment on carbon dioxide emissions: A method of moments quantile analysis. *Renewable Energy*, 189, 454-466. doi: <https://doi.org/10.1016/j.renene.2022.03.017>
- Bagheri, M., & Kiani, M. (2017). Identifying the place of university in education and promotion of students' entrepreneurship capabilities based on fuzzy screening approach. *Quarterly Journal of Research*

- and Planning in Higher Education, 22(4), 43-67. Retrieved from <http://journal.irphe.ac.ir/article-1-3138-en.html>
- Basso, F. G., Porto, G. S., & Junior, S. K. (2017). *International Trade Relations of Products for Wind Energy Production: A Study from the Dynamic Social Network Analysis (DSNA)*. Paper presented at the 2017 Portland International Conference on Management of Engineering and Technology (PICMET): IEEE, 1-18. doi: <https://doi.org/10.23919/PICMET.2017.8125406>
- Brooks, C. (2002). *Introductory Econometrics for Finance*, Cambridge, UK: Cambridge U. In: Press.
- Brown, R. L., Durbin, J., & Evans, J. M. (1975). Techniques for testing the constancy of regression relationships over time. *Journal of the Royal Statistical Society: Series B (Methodological)*, 37(2), 149-163. doi: <https://doi.org/10.1111/j.2517-6161.1975.tb01532.x>
- Chatterjee, S., Gupta, S. D., & Upadhyay, P. (2020). Technology adoption and entrepreneurial orientation for rural women: Evidence from India. *Technological Forecasting and Social Change*, 160, 120236. doi: <https://doi.org/10.1016/j.techfore.2020.120236>
- Doran, J., McCarthy, N., & O'Connor, M. (2018). The role of entrepreneurship in stimulating economic growth in developed and developing countries. *Cogent Economics & Finance*, 6(1), 1442093. doi: <https://doi.org/10.1080/23322039.2018.1442093>
- Elo, M., Sandberg, S., Servais, P., et al. (2018). Advancing the views on migrant and diaspora entrepreneurs in international entrepreneurship. *Journal of International Entrepreneurship*, 16, 119-133. doi: <https://doi.org/10.1007/s10843-018-0231-x>
- Engle, R. F., & Granger, C. W. (1987). Co-integration and error correction: representation, estimation, and testing. *Econometrica: journal of the Econometric Society*, 55(2), 251-276. doi: <https://doi.org/10.2307/1913236>
- Etemad, H. (2015). The promise of a potential theoretical framework in international entrepreneurship: an entrepreneurial orientation-performance relation in internationalized context. *Journal of International Entrepreneurship*, 13, 89-95. doi: <https://doi.org/10.1007/s10843-015-0157-5>
- Glavas, C., & Mathews, S. (2014). How international entrepreneurship characteristics influence Internet capabilities for the international business processes of the firm. *International Business Review*, 23(1), 228-245. doi: <https://doi.org/10.1016/j.ibusrev.2013.04.001>
- Glinkowska-Krauze, B., Chebotarov, I., & Chebotarov, V. (2020). Comparative studies of national business cultures in the countries of Central and Eastern Europe: the basics for improving international entrepreneurship in Poland and Ukraine. *Comparative Economic Research. Central and Eastern Europe*, 23(1), 7-18. Retrieved from <https://www.ceeol.com/search/article-detail?id=842253>
- Gujarati, D. N., Porter, D. C., & Gunasekar, S. (2012). *Basic econometrics*: Tata McGraw-Hill Education

- Ikram, M., Sroufe, R., Rehman, E., Shah, S. Z. A., & Mahmoudi, A. (2020). Do quality, environmental, and social (QES) certifications improve international trade? A comparative grey relation analysis of developing vs. developed countries. *Physica A: Statistical Mechanics and its Applications*, 545, 123486. doi: <https://doi.org/10.1016/j.physa.2019.123486>
- Johamen, S., & Jtiselius, K. (1990). Maximum likelihood estimation and inference on cointegration—with appucations to the demand for money. *Oxford Bulletin of Economics and Statistics*, 52(2), 169-210. Retrieved from <https://digilander.libero.it/rocco.mosconi/JohansenJuselius1990>
- Lei, X., Alharthi, M., Ahmad, I., Aziz, B., & ul Abdin, Z. (2022). Importance of international relations for the promotion of renewable energy, preservation of natural resources and environment: Empirics from SEA nations. *Renewable Energy*, 196, 1250-1257. doi: <https://doi.org/10.1016/j.renene.2022.07.083>
- Makki, S. S., & Somwaru, A. (2004). Impact of foreign direct investment and trade on economic growth: Evidence from developing countries. *American Journal of Agricultural Economics*, 86(3), 795-801. Retrieved from <https://www.jstor.org/stable/3697825>
- Mendes, M. V. I. (2021). The limitations of International Relations regarding MNCs and the digital economy: evidence from Brazil. *Review of Political Economy*, 33(1), 67-87. doi: <https://doi.org/10.1080/09538259.2020.1730609>
- Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16(3), 289-326. doi: <https://doi.org/10.1002/jae.616>
- Peseran, M., & Peseran, B. (1997). Working with Microfit 4: Interactive Econometric Analysis. In: Oxford University Press, Oxford.
- Prabowo, H., & Sinaga, O. (2020). The Role of Tourism on International Relations: Evidence from the Indonesian Economy. *Croatian International Relations Review*, 26(86), 187-200. Retrieved from <http://eprints2.ipdn.ac.id/id/eprint/785>
- Prabowo, H., & Sinaga, O. (2021). The Effect of Information and Communication Technology on Competitive Advantage of International Business in Indonesia. *Croatian International Relations Review*, 27(88), 205-222. doi: <https://doi.org/10.2478/CIRR-2021-0002>
- Prabowo, H., & Sinaga, O. (2022). Free Trade Integration Effect on International Relations through Cross Border Entrepreneurship: A Study from Indonesia and Malaysia International Business Perspective. *The Croatian International Relations Review (CIRR)*, 26(86), 220-237. doi: <https://doi.org/10.2478/CIRR-2022-0026>
- Rahman, M. M., & Mamun, S. A. K. (2016). Energy use, international trade and economic growth nexus in Australia: New evidence from an extended growth model. *Renewable and Sustainable Energy Reviews*, 64, 806-816. doi: <https://doi.org/10.1016/j.rser.2016.06.039>



- Stel, A. v., Carree, M., & Thurik, R. (2005). The effect of entrepreneurial activity on national economic growth. *Small Business Economics*, 24, 311-321. doi: <https://doi.org/10.1007/s11187-005-1996-6>
- Tabares, A., Chandra, Y., Alvarez, C., & Escobar-Sierra, M. (2021). Opportunity-related behaviors in international entrepreneurship research: a multilevel analysis of antecedents, processes, and outcomes. *International Entrepreneurship and Management Journal*, 17, 321-368. doi: <https://doi.org/10.1007/s11365-020-00636-3>
- Tambunan, T. T. (2009). Trade liberalization effects on the development of small and medium-sized enterprises in Indonesia: A case study. *Asia-Pacific Development Journal*, 15(2), 35-59. Retrieved from <https://repository.unescap.org/bitstream/handle/20.500.12870/2352/ESCAP-2008-JN-APDJ-V15-N2.pdf?sequence=1#page=42>
- Weldon, I., & Hoffman, S. J. (2021). Bridging the commitment-compliance gap in global health politics: lessons from international relations for the global action plan on antimicrobial resistance. *Global Public Health*, 16(1), 60-74. doi: <https://doi.org/10.1080/17441692.2020.1788623>