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The Influence Of Gravity Model And Intra Industry Trade Factors On Indonesian Tourism Demand From Ten Countries

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Abstact. *The health emergency conditions during the Covid-19 pandemic which also had an impact on the global social and economic crisis, the tourism sector was one of the sectors most negatively affected, especially the decline in tourist visits due to the travel restriction policy. This condition also affects the contribution of the tourism sector to the national economy. This research was conducted to observe the impact of factors in the gravity model and intra-industry trade, including relative distance, GDP per capita, tourism sector integration, and exchange rates on tourism demand in Indonesia from ten countries during 2017-2022 on 60 data samples with observation techniques and panel data regression model observations. Results were obtained which stated that the relative distance variable and GDP per capita had a negative effect on Indonesian tourism demand, conversely the integration of the tourism sector had a positive effect on Indonesian tourist demand, while the exchange rate variable had no significant impact on housing tourism demand in Indonesia from ten countries in 2017-2022.*

Keywords: *Tourism Demand; Gravity Model; Intra-Industry Trade (IIT);*

INTRODUCTION

The health emergency during the COVID-19 pandemic also had an impact on the global social and economic crisis and the tourism sector was very negatively impacted, especially by the decrease in the number of tourist visits due to the implementation of travel restriction policies which were implemented in almost all countries throughout the world. In Indonesia, the tourism sector is included in the national development priority sector which has the potential to become a *leading sector* or support the national economy and stimulate the development of other industrial sectors in the country.

Sector Tourism has also contributed greatly to the country's foreign exchange besides exports of *crude palm oil* And coal . This is because the tourism sector is able to create more foreign exchange fast when compared to conventional export activities . Based on this, it is important to carry out research and development related to the tourism sector as an effort to increase the utilization of Indonesia's tourism potential in tourism export activities besides relying solely on commodity exports as a support for the national economy.

Because of several commodities such as *crude palm oil* And Coal is a limited resource and is considered less sustainable . The success of a tourism sector can be observed from the

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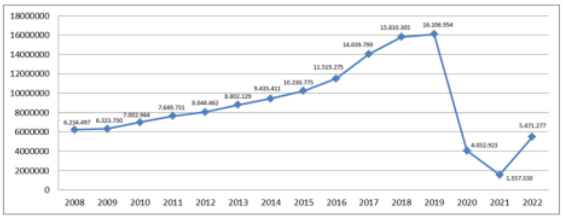
tourism demand side. The size of a country's tourism demand can be observed from various indicators. Several previous studies and research have observed the flow of foreign tourist visits to that country as a tourist destination. The graph in Figure 1 shows that during the period 2008 – 2022.

In the 2008-2019 period there was a consistent increase in the flow of foreign tourist visits to Indonesia. Indonesian tourism demand, which is measured based on the number of foreign tourist visits, reached 16.11 million visits in 2019, then there was a significant decline as we entered 2020, the number of foreign tourist visits decreased drastically, reaching 74.84 percent to 4.05 million visits. . The increasingly worsening pandemic conditions have resulted in a further reduction in foreign tourists to 1.56 million visits in 2021.



Source: Central Statistics Agency, 2023

Figure 1 .

Graph of the Development of Numbers of Foreign Tourist Visits to Indonesia

Malaysia, China, Timor Leste, Singapore, Australia, India, Japan, the United States, England and South Korea are the ten countries with the highest number of tourist visits in the 2017 - 2022 period. This explains that the majority of foreign tourists come from countries in the Asian region. especially Southeast Asia (ASEAN). Geographical proximity, relatively easy access, strong currency exchange rates, relatively low travel costs, and good integration are thought to influence the motivation of tourists from these ten countries to choose Indonesia as a tourist destination. In terms of tourism sector activities, Indonesia not only acts as a tourist destination that provides tourism offers , especially to ten countries of origin of tourists Most of them go to Indonesia, but tourists from Indonesia also travel to these ten countries.

Source: Central Statistics Agency, 2024

Figure 2 .

Ten Countries of Origin of Tourists by Number of Visits Most people will go to Indonesia in 2017-2022

This fact shows that trade activities related to tourism in Indonesia can be said to follow the pattern of *intra - industry trade theory* . Based on the background of these problems, a new trade theory *known* as *the Gravity Model* and *Intra Industry Trade theory* is considered relevant for observing activity patterns in the Indonesian tourism sector. *The gravity model* in tourism involves factors such as economic size and distance between countries . Distance is assumed to be a proxy for transportation costs , so distance is assumed to have a negative relationship with tourism demand. Meanwhile, *G ross Domestic Product per capita* from the tourist's country of origin, which describes the size of the economy and tourist income , is considered to have a positive influence on tourism demand (Krugman, 2012).

In contrast to the theory that has been mentioned, according to published data from the Central Statistics Agency, the number of tourist visits from China is actually higher even though China is relatively farther away than Timor Leste, Singapore, Australia and Japan. Data also shows that tourist arrivals from several countries, namely Malaysia, China, Timor Leste, are actually higher even though they have lower *Gross Domestic Product income per capita than several countries such as Singapore, Australia and Japan.*

variable is related to *intraindustry trade* theory namely the integration of an industrial sector between countries. *Intraindustry Trade* Theory is a theoretical concept that examines trade activities between countries which tend to be based on similarities or integration of economic sectors, where Intra-industry commercial activity is assumed to increase if the size of the economic sector and the proportion of production factors owned tend to be similar.

According to the theory of Helpman and Krugman (1985), which explains that the similarity and integration of economic sectors has a positive influence on trade, countries with almost the same economic size will carry out greater trade activities . However, Yeshineh (2014) stated that the same size of a country's industrial sector will have a negative impact on trade between the two countries, especially for countries that still rely on agricultural products or are low in technology.

A factor that is considered to influence international tourists' decisions in determining tourist destinations is the exchange rate between the countries involved . Yakup (2019) describes that the higher the costs that need to be incurred to travel between tourist destinations in the destination country, the more sensitive tourists will be regarding prices and the exchange rate is an indicator that reflects the price of products in that country, so tourists will generally move from that country. a strong exchange rate to a country whose exchange rate is considered weaker. But unlike the existing theory, in reality There is often a discrepancy between theory and reality on the ground in observing the number of tourist visits.

Based on the description of the problem context and research gaps, this research was conducted to test the theory and observe the relationship between variables that are factors in the Gravity Model theory, namely the Relative Distance and GDP per capita variables, as well as variables in the intra-industry trade theory, namely the integration of the tourism sector and the exchange rate. on changes in tourism demand in Indonesia from ten countries in the 2017-2022 research year period, both simultaneously and partially.

RESEARCH METHODS

This research examines the influence of variables from the *Gravity Model* and *Intra-Industry Trade theory* , including Relative Distance (X_1), GDP Per Capita (X_2), Tourism Sector Integration (X_3) and Exchange Rates (X_4) on changes in Demand. Tourism in Indonesia (Y) of the ten countries of origin including Malaysia , China, Timor Leste, Singapore, Australia, India, Japan, the United States, England and South Korea as research objects. The size of tourism demand in this research is described by data on the number of tourist arrivals in Indonesia in the 2017 – 2022 period.

Relative Distance is the distance between the capital of the country of origin and the capital of Indonesia geographically compared to the GDP per capita of each country. The Relative Distance Value as a variable in this research can be obtained from equation (1).

$$D_{ij} = D_i + D_j$$

(1)

Where:

D_{ij} = Relative distance to the capital of the country of origin of tourists to Indonesia.

$$D_i = \frac{D_{ij}absolut}{\left(\frac{GDP_{asal}}{GDP_{Dunia}}\right)}$$

$$D_j = \frac{D_{ij}absolut}{\left(\frac{GDP_{tujuan}}{GDP_{Dunia}}\right)}$$

GDP per capita describes the national income of ten tourists' countries of origin. The GDP per capita value of a country can be obtained based on the following equation:

$$GDP = \frac{Pendapatan\ Nasional}{Jumlah\ Penduduk}$$

(2)

Tourism Sector Integration is achieved by observing the exchange of tourist visits between ten countries of origin of tourists and Indonesia. The indicator for measuring Tourism Sector Integration in this research uses the Tourism Sector Integration Index based on *GL-Index* calculations which is expressed in units of an index percentage scale of 0%-100%. *The GL-Index* value is calculated based on an adjusted formula calculation in equation (3).

$$Integrasi_{Pariwisata} = 1 - \frac{\left|Kunjungan_{ji} - Kunjungan_{ij}\right|}{\left(Kunjungan_{ji} + Kunjungan_{ij}\right)} \times 100$$

(3)

Where:

$_{Tourism}\ Integration$ = Tourism Sector Integration Index

$_{Ji's}\ visit$ = The number of tourist visits from country *j* to country *i*

$Visit_{ij}$ = Number of tourist visits from country *i* to country *j*

The exchange rate variable data in this study uses the ratio between the exchange rates of ten tourists' countries of origin in Rupiah units. This research will estimate tourist demand based on several variables previously mentioned, such as the following functions:

$$Y_{it} = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \varepsilon_{it} \quad (4)$$

Information:

Y = Number of tourist visits

X_1 = Relative distance

X_2 = GDP per capita

X_3 = Tourism Sector Integration Index value

X_4 = Exchange rate

$\beta_{(1\ldots4)}$ = Regression coefficient of each independent variable

ε = error

i = country

t = year

RESULTS AND DISCUSSION

With descriptive statistical analysis, information was obtained in the research that the *mean* (average) value of each observed variable data presented a higher value than the standard deviation value, therefore the *mean value* of all data for each variable in this study was considered capable of describing. all well these variables.

Tab e l 1.
Results of Descriptive Statistical Analysis

Variables	N	Maximum	Minimum	Mean	Median	Std. Deviation
Log(Y)	60	14.91	8.07	12.66	12.99	1.68
Log(X_1)	60	10.88	7.83	9.73	9.80	0.89
Log(X_2)	60	11.32	7.12	9.85	10.45	1.33
X_3	60	1.00	0.00	0.71	0.77	0.28
Log(X_4)	60	9.86	2.48	8.05	9.26	2.28

Source: Data processed with Eviews 12, 2024

In panel data regression analysis techniques, there are several models that can be applied, including the *Common Effect* , *Fixed Effect* and *Random Effect models* . Several tests need to be carried out to determine which model is appropriate to apply to the data estimation in this research, including the *Chow test* , *Hausman test* , and *Lagrange multiplier test* .

Tabel 2.

Chow Test Results

Effect Test	Statistics	df	Prob.
Chi-square cross-section	22.81	9	0.01

Source: Data processed with Eviews 12, 2024

Tabel 3.

Hausman Test Results

Test Summary	Chi-Sq. Statistics	Chi-Sq. df	Prob.
Random cross-section	6.20	4	0.18

Source: Data processed with Eviews 12, 2024

Tabel 4.

Lagrange Multiplier Results

	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	0.85	34.44	35.29
	(0.36)	(0.00)	(0.00)

Source: Data processed with Eviews 12, 2024

From the results of model selection through the *Chow* test , *Hausman test* and *Lagrange multiplier test* concluded that the most appropriate model for conducting panel data regression tests in this research is model *Random Effects* . There is heterogeneity between countries in this analysis, so a random effects model is used, which models individual effects that vary

between observation units and takes into account the heterogeneity present in the data. *Generalized Least Square* (GLS) is *an* approach method used in *random effect models* .

GLS is a method that automatically solves problems in classical assumption tests. It is assumed that if the results selected in the model selection test are consistent with the *Random Effects Model* (REM) approach, then the classical assumption testing problem has been solved. Gujarati & Porter (2009) explained that only heteroscedasticity tests and autocorrelation tests are mandatory in the GLS method .

It is also clarified that the GLS method is considered BLUE for heteroscedasticity, so the GLS approach method does not require heteroscedasticity testing. The GLS approach also incorporates autocorrelation parameters in its estimation so that it is considered BLUE and does not need to carry out an autocorrelation test, in contrast to the OLS estimation formula which ignores autocorrelation parameters therefore it is necessary to carry out an autocorrelation test.

Tab e l 5.

***Random Effect* Model Regression Coefficients**

Variables	Coefficient	t-Statistics	Prob
C	6,472,813	3.98	0.00
Log(X_1)	-405,068	-3.25	0.00
Log(X_2)	-292,809	-3.36	0.00
X_3	1,071,698	3.97	0.00
Log(X_4)	38,069	0.77	0.45
Weighted Statistics			
R-squared	0.36		
F-statistic	7.69		
Prob(F-statistic)	0.00		

Source: Data processed with Eviews 12, 2024

From the results of the *random effect model analysis* , then Equation (4) can be converted into linear form using logarithms, as follows:

$$Log(Y) = 6.472.813 - 405.068\, Log(X_1) - 292.809\, Log(X_2) + 1.071.698\, X_3 + 38.069\, Log(X_4)$$

the random effects model analysis show that there is a statistically significant influence of the relative distance variables (X_1), GDP per capita (X_2), tourism sector integration (X_3) and exchange rate (X_4) on Indonesian tourism demand. The *R-squared* value of 0.36 explains that the contribution of the influence of all independent variables in the research model simultaneously to changes or increases and decreases in tourism demand in Indonesia (Y) is 36%, then the other 64% is influenced by other factors outside the model this research.

The four independent variables in this research model have a small percentage of simultaneous influence on tourism demand in Indonesia, and are mostly influenced by factors outside the research model, because the Indonesian tourism sector itself is a sector that is influenced by many economic factors and is very sensitive in terms of being influenced by factors. external or non-economic. From previous years it can be seen that the Indonesian tourism sector is often influenced by temporary external non-economic factors such as promotional factors, for example Indonesia hosting the SEA Games, ASEAN Summit, G20, etc., which indirectly functions as a means of promoting Indonesia's tourism potential.

Apart from promotion, tourism is also influenced by security factors, political relations and openness between the tourist's country of origin and Indonesia, the culture or customs of the tourist's country of origin (whether or not they conflict with the culture or customs of the tourist destination country). The country's image can also influence tourists' interest in choosing Indonesia as a destination country, during the reform era in 1997 it also affected tourist arrivals because Indonesia's image was considered bad in the eyes of the world.

Several years later, in 2002, there was the Bali Bombing terror incident, most of the victims of which were foreign tourists. This incident made tourists reluctant to travel to Indonesia during that period of the year, especially Bali, because of *the travel warning* from the tourists' country of origin. In this research, the number of tourist visits cannot be separated from external influences originating from non-economic factors. In 2020 and 2021, the world is facing a health emergency, the COVID-19 pandemic, which also causes a global socio-economic crisis, where the tourism sector is one of the sectors most negatively affected, especially the decline in tourism visits in 2020. due to the travel restriction policy implemented during the pandemic in almost all countries in the world.

the random effect model analysis also show that there is a partially statistically significant influence of the relative distance variable ($X1_{)}$ on Indonesian tourist demand (Y). The coefficient value of -405,068 indicates that an increase in Relative Distance of one kilometer results in a decrease in the number of tourist visits to Indonesia by around 405,068

people. These results show that the farther the tourist's country of origin is from the tourist destination, the lower the number of tourist visits will be. The results of this research confirm the *Gravity Model theory* and are consistent with the research results of Alawin & Abu-lila (2016) and Deluna & Jeon (2014) whose empirical results show that the distance variable has a negative effect on tourism demand.

the random effects model analysis also show that there is a statistically significant influence of the GDP per capita variable (X_2) on Indonesian tourism demand (Y). The coefficient value of -292,808 indicates that an increase in the GDP per capita of the country of origin by one USD, reduces the number of tourist visits to Indonesia by around 292,808 people. These results indicate that GDP per capita in the country of origin of tourists has a partially negative influence on Indonesian tourism demand. The results obtained are not in accordance with the hypothesis and demand theory which states that income and demand are positively correlated with each other, assuming that increasing income means demand for a good or service will also increase.

This may happen if tourists do not choose a country as a tourist destination when their income increases, but choose other tourist destinations that may provide greater satisfaction. This relationship was described by Stabler et al. (2010) that increasing tourism income will actually reduce tourist visits if the tourism product is of lower quality. Dewi and Novianti (2013) also explained that Indonesian tourism is an *inferior product* for tourists in the ASEAN market. This may happen because in its development, Indonesian tourism has faced challenges due to the presence of several regional countries as competitors in this sector.

In the tourism sector, the success of its development is determined by several important factors, namely the existence of tourist attractions, availability of access and services provided to tourists (Yoeti, 1996). Malaysia is at the forefront in developing tourist attractions and promotional strategies and is supported by high taxes from the Malaysian government to develop competitiveness in the tourism sector. This is achieved through the development of infrastructure and amenities that can provide comfort and convenience to foreign tourists visiting Malaysia. Apart from Malaysia, Singapore has a tourism strategy that offers sustainable tourist attractions.

The Singapore Green Plan 2030 provides a tourist destination in the form of a *Nature City concept* which will attract tourists from various countries to Singapore. Thailand also has an important tourism strategy, by offering well-packaged and more diverse tourism products. Thailand, which is rich in natural, cultural and historical heritage, makes this heritage a tourist attraction by combining the concepts of natural tourism and cultural tourism. Apart from

developing tourism marketing with the slogan " *Thailand Lifestyle* " and developing creative tourism.

Based on this explanation, if tourism income increases, tourists will not choose Indonesia as a tourist destination, but rather other countries that are considered attractive and can offer quality tourism products. Packaging a more diversified Indonesian tourism product not only from Bali, as well as access such as direct flights from Indonesia to potential areas in the Indonesian tourism sector market, are aspects that need to be developed in Indonesia to provide easy access for tourists and reduce costs incurred by tourists.

the random effects model analysis also show that there is a statistically significant influence on the Tourism Sector Integration variable between partner countries (X_3) on tourism demand in Indonesia (Y) partially. The coefficient value of 1,071,698 shows that if the *GL-Index value* increases by one percent, there will be an increase in the number of tourist visits to Indonesia by 1,071,698 people. So it is concluded that integration of the tourism sector has a partially positive and significant influence on tourism demand in Indonesia.

These results confirm the theory of Helpman and Krugman (1985) which states that the integration of the tourism sector between one country and another country plays a major role in commercial activities and has a positive impact on trade activities between these countries, and also applies to commercial activities in terms of tourism services. The integration of the tourism sector as indicated by the GL index measurement also describes the relationship of integration, namely familiarity and openness between two countries.

The results of partial regression analysis show that the influence of the exchange rate variable ($X4_)$ on Indonesian tourism demand (Y) is not statistically significant. The probability value (0.45) which is greater than the α value (0.05) indicates that the high and low ratio of foreign currency exchange rates to the rupiah does not have a significant impact on the high and low number of tourist visits to Indonesia. The results of this research confirm the results of Prabowo's (2020) research, namely finding that the exchange rate variable does not have a significant impact on foreign tourists visiting Indonesia.

The impact of the exchange rate in this case is that if the rupiah exchange rate is relatively weak or depreciates, it is considered to reflect the unstable state of the Indonesian economy. An unstable economy is considered a less profitable business sector where the business sector is considered to have low prospects and high risks. This condition can reduce investors' interest in investing capital in the Indonesian business sector, including tourism. The lack of capital investment in the tourism sector in Indonesia affects the growth and development of Indonesian tourism. The delay in development of this sector means that the

availability of facilities and services in this sector is not yet optimal and is believed to be unable to provide tourist satisfaction, thereby reducing tourist motivation to choose Indonesia as a tourist destination.

This statement shows that the factor that influences tourists' motivation to come is not the exchange rate directly, but rather the availability of facilities supporting the tourism sector which are unable to provide maximum satisfaction to tourists which is believed to influence tourists' motivation to come.

CONCLUSION

From the results of observations, several conclusions can be drawn to answer the research problem formulation, namely, Relative Distance (X_1), GDP per capita (X_2), Tourism Sector Integration (X_3) and Exchange Rates (X_4) have a significant influence on tourism demand. in Indonesia (Y) simultaneously. Partially, relative distance (X_1) and GDP per capita (X_2) have a negative and significant impact, the tourism sector integration variable (X_3) has a positive and significant impact, while the exchange rate (X_4) has no significant impact on Tourism Demand (Y) in Indonesia from ten countries in 2017-2022.

From the description of the conclusions obtained from the results of this research, there are several things that can be suggested, including: the government in charge of the tourism sector should pay more attention to countries that are close to each other, to allied countries that speak the same language, have openness and cultural similarities with Indonesia as the main target for Indonesian tourism promotion. Striving to increase the competitiveness of the Indonesian tourism sector, in particular by diversifying product packaging and tourist destinations, focusing on ease of access for tourists, and increasing promotion of tourist destinations in Indonesia other than Bali. Plus encouraging investment in the tourism sector and development of this sector must also be stimulated, which of course will increase the availability and quality of Indonesia's tourism infrastructure.

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