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THE EFFECT OF LOGISTICS PERFORMANCE ON MANUFACTURING EXPORTS: A CASE STUDY OF ASIA PACIFIC ECONOMIC COOPERATION (APEC) COUNTRIES 2010-2018

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ABSTRACT

This study aims to analyze the effect of logistics performance on manufacturing export in 18 members of Asia-Pacific Economic Cooperation (AEPC) during 2010-2018 period. Logistics performance was represented by the Logistics Performance Index published by the World Bank biennially. This study uses panel data regression method to see the effects of LPI overall, each component of LPI, Gross Domestic Product (GDP) Per capita, total population, and real exchange rate on manufacturing export. The result showed that the LPI overall had no significant effect on manufacturing export in 18 APEC's members. However, the estimation of each component shows significant result. Custom, Infrastructure, and Logistics Quality and Competence have a significant positive effect. Meanwhile, Shipment has no significant effect, and Tracing, Timeliness components showed significant negative effect.

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Introduction

Basically, a country's trade volume is determined by the attractiveness of each country's exports and imports, which will eventually become one of the sources of economic growth. However, the expansion of trade reach also poses a challenge for each country to provide effective, efficient and appropriate facilities to compete in the international sphere.

One of the main facilitating elements that is very important in trade is the logistics system. The logistics system can affect a country's competitiveness in the international market because it is closely related to the incursion of indirect costs incurred in the delivery process, decreased product value as transit time increases, and the possibility of lost opportunity costs due to goods not reaching the market at the specified time (Hausman et al., 2013). Good logistics quality in trade, accompanied by economic liberalization will encourage an increase in a country's trade volume (Hausman et al., 2013). Vice versa, low-quality logistics will become a barrier to trade (Devlin & Yee, 2005).

Puertas et al. (2014) stated that synchronizing logistics in international trade will create a better supply chain system, accuracy and efficiency in the transportation of goods, and offer more competitive prices. One of the international calculations regarding the performance of the logistics system is the Logistic Performance Index (LPI) published by the World Bank. The LPI

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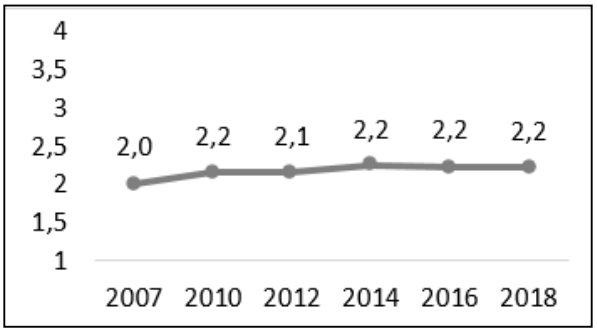
score is the range between 1-5, where the higher the score indicates the better the country's logistics performance. LPI is used as a comparison and identification element for challenges and opportunities in improving the logistics performance of each country (Karaduman et al., 2020). Subekti & Jayawati (2018) state that LPI is used as one of the considerations for investors in making industrial investments in a country.

Figure 1 shows the average increase in LPI compared to the first year of publication which indicates that there have been efforts to improve performance in the world.

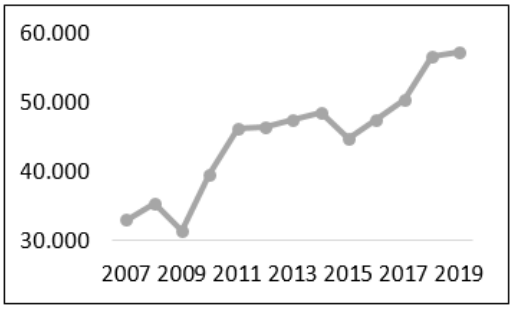


Source: World Bank (2018)

Figure 1: World LPI Average Growth

In addition to the increase in the role of logistics, trade from the manufacturing industry sector is also considered to have increased along with economic openness, technological advances, and an increase in the value chain. Manufacturing as a part of the processing industry has gone global along with the increase in international trade with the development of the national value chain in each country's export and import activities (Odularu, 2020). The manufacturing industry has an advantage because its products are tradable goods, so they are able to move the value chain from producers to consumers (Silalahi, 2014). The role of logistics in the manufacturing industry is related to the packaging of manufactured goods, transportation according to the mode of transportation (The economist 2012 in (Erkan, 2014), storage of goods in warehouses, and repackaging until they are sent to the final consumer. Therefore, efficiency in logistics performance can reduce production costs which in turn can increase the competitiveness of the domestic manufacturing industry in the scope of international trade.

In Indonesia, manufacturing export activities are carried out within the scope of regional, bilateral, multilateral and inter-multilateral cooperation. One of them is the Asia-Pacific Economic Cooperation (APEC), which in its growth shows an increasing trend as shown in Figure 2.



Source: World Bank (2018)

Figure 2: World LPI Average Growth

APEC member countries have diverse economic conditions. Several member countries are developed, developing, and emerging market countries. Differences in economic conditions provide variations in logistics performance and the size of manufacturing exports in the sample countries that are the basis of the research. On the other hand, APEC also helped improve

logistics and transportation networks by addressing regulatory barriers, customs procedures, and infrastructure barriers to improve chain performance. Global conditions that encourage logistics and manufacturing improvements underlie the conduct of this research. Because of this, it is expected to know the effect of logistics performance on manufacturing exports of APEC countries.

Literature Review

International Trade Theory

International trade is the activity of trading goods and services between countries that provide benefits for the countries involved. A country conducts international trade based on two main reasons: gaining advantage from the differences it has and achieving economies of scale (Krugman et al., 2018).

Comparative Advantage Theory

The assumption in this theory is that even though a country is less efficient than other countries in the production of two commodities, there is still a basis for mutually beneficial trade, namely by specializing its export commodities which have smaller losses and importing commodities with larger absolute losses (Salvatore, 2014). Based on these assumptions, export commodities are referred to as comparative advantages, and imported commodities are comparative losses which are then known as the law of comparative advantage. The existence of wage efficiency in a country can also be a comparative advantage because it can make related commodity prices cheaper. (Salvatore, 2014).

The Heckscher-Ohlin Theory

This theory is expressed in two theories, namely the theory of the proportion of production factors and the theory of balancing factors of production. The theory of factor proportions states that a country will export commodities with relatively abundant and inexpensive production factor incentives and import commodities with more expensive production factor incentives (Salvatore, 2014). Meanwhile, the theory of factor price balancing theory (H-O-S theorem) states that international trade will bring equity in relative and absolute yields for homogeneous factors in each country (Salvatore, 2014).

New Trade Theory

Basically, the trade model in this theory is based on economies of scale, market imperfections, and technological changes between countries. There is a clear difference between returns to scale and external economies. Economies of scale refer to the reduction in the average cost of production as the firm increases. Meanwhile, external economics refers to reducing the average cost of production for each company as industrial output increases (factors outside the company) (Salvatore, 2014). In other words, external economies of scale can be seen from the increased efficiency of each company in the industry. Because external economies of scale originate from outside the company, the government's role in setting policies is one of the main factors influencing external economies of scale. Government policies in providing adequate trade infrastructure and facilities will increase efficiency in the distribution of goods and logistics costs.

Apart from the difference with the H-O theory in terms of economies of scale, product differentiation, and dynamic technological changes between countries, this theory also states that transportation costs determine international trade. Transportation costs or also known as logistics costs include costs of transportation, warehousing, loading and unloading, insurance premiums, and interest when goods are in transit from one country to another. Salvatore (2014) states that higher logistics costs are a significant barrier to international trade. These logistics costs are influenced by the geographic location of a country, the quality of the infrastructure, and the management techniques of the company. Higher logistics costs for

delivering goods to markets and importing the necessary input commodities will become a barrier to trade, especially in developing countries.

Logistics in Trade

Odularu (2020) stated that logistics is a process of planning, implementation and control procedures to create efficiency and effectiveness in transporting and storing goods, services and related information from the area of origin to the consumer. The flow of trade liberalization will encourage every country to benefit from the global market. This allows the country to improve logistics services as an element of trade facilitation without many obstacles and at a lower cost (Gani, 2017). Erkan (2014) stated that logistics can be the best source of competitive advantage for companies because it is not easy to publicize compared to other marketing mix elements such as product, price and promotion. Good quality logistics and infrastructure services in a country will have a significant impact on goods distribution facilities. Conversely, logistical inefficiencies will increase costs and time which can be detrimental to the state and companies Martí et al. (2014). It will be difficult for the manufacturing sector to export or import at competitive prices and costs if the logistics and transportation systems are inefficient.

Logistic Performance Index (LPI)

The Logistic Performance Index (LPI) is a multidimensional assessment of a country's logistics performance issued by the World Bank and is used as an international comparison tool in trade and transportation facilitation, so that it can assist countries in identifying obstacles, opportunities and improvements. Martí et al. (2014) stated that the LPI was built on a survey of companies in each country that are responsible for transporting goods and facilitating trade globally. LPI is published every 2 years since 2007 with the latest data for 2018. LPI data was obtained based on a survey conducted of logistics professionals in 160 countries regarding logistics efficiency which is influenced by six components, namely:

1. *Custom*: this component measures the procedural efficiency and effectiveness of shipping through customs, including the speed, simplicity, and predictability of the customs agency as measured through administrative procedures related to the implementation of existing trade regulations and the collection of export or import taxes on goods and services.
2. *Infrastructure*: this component measures the quality of a country's transportation and telecommunications infrastructure related to the procedure for delivering goods to the end consumer.
3. *Services*: assessment of the competence and quality of logistics services, such as trucking, freight services, and customs brokerage as shown by the organizational structure in optimizing service quality.
4. *Timeliness*: is the frequency of sending goods until they are received at the final destination according to the scheduled and expected time.
5. *Tracking and tracing*: shows the ability and ease in tracking and tracing shipments.
6. *International shipments*: the convenience of arranging international shipments at competitive prices.

According to the World Bank, the six dimensions of LPI are divided into two main categories, the main category related to the main inputs in the supply chain, namely custom, infrastructure and services, while the other three components are included in the category involving service delivery performance results. LPI is built from six components using Principal Component Analysis (PCA) which is a standard statistical technique for reducing data sets (World Bank, 2018). The results of the PCA are the LPI values which are the weighted average scores that have been adjusted for the loading of each component. To account for sampling error, LPI scores are presented with approximate 80 percent confidence intervals which allow giving upper and lower bounds of a country's LPI scores and ratings (World Bank, 2018). The

formula for calculating the upper and lower limits of the confidence level of the LPI score is as follows:

$$LPI \pm \frac{t(0.1,N-1)S}{\sqrt{N}} \quad (1)$$

where:
N = Number of respondents
S = Standard error of each country
t = t-distribution

Research Methods

The dependent variable used in this study is Manufacturing Exports, while the independent variables consist of per capita Gross Domestic Product (GDP), Total Population, Real Exchange Rate, Custom Index, Infrastructure, Shipments, Logistic Quality and Competence, Tracking and Tracing, and Timeliness. and LPI Overall.

The composition of the panel data used consists of 18 APEC countries as a cross section and five time series consisting of 2010, 2012, 2014, 2016 and 2018 as published by the World Bank LPI data. Three other countries, namely Brunei Darussalam, Papua New Guinea and Taiwan, were not used due to data limitations. This study uses panel data regression analysis. The combination or pooling produces 90 observations, so the model to be estimated is as follows:

$$\begin{aligned} Ln(EM_{it}) = {} & \beta_0 + \beta_1 Ln(PDB_{it}) + \beta_2 Ln(Pop_{it}) + \beta_3 (Exch_{it}) \\ & + \beta_4 (Custom_{it}) + \beta_5 (Infrastructure_{it}) \\ & + \beta_6 (Shipments_{it}) + \beta_7 (QualityLogistic_{it}) \\ & + \beta_8 (Tracing_{it}) + \beta_9 (Timeliness_{it}) \\ & + \beta_{10} (LPI_{it}) + \mu_{ij} \end{aligned} \quad (2)$$

where:

EM	= Manufacturing exports
PDB	= Gross Domestic Product Per Capita
Pop	= Total population
$Exch$	= Real exchange rate
$Custom$	= Customs component index
$Infrastructure$	= Infrastructure quality component index
$Shipments$	= International shipping component index
$Quality$	= Component index of quality and logistics competence
$Tracing$	= Traceability component index
$Timeliness$	= Timeliness component index
LPI	= LPI overall
β_0	= Intercept
$\beta_1 - \beta_{10}$	= Coefficient to be estimated
i	= Data cross section of 18 APEC member countries
t	= Research year 2010, 2012, 2014, 2016, 2018
μ	= *Error term*

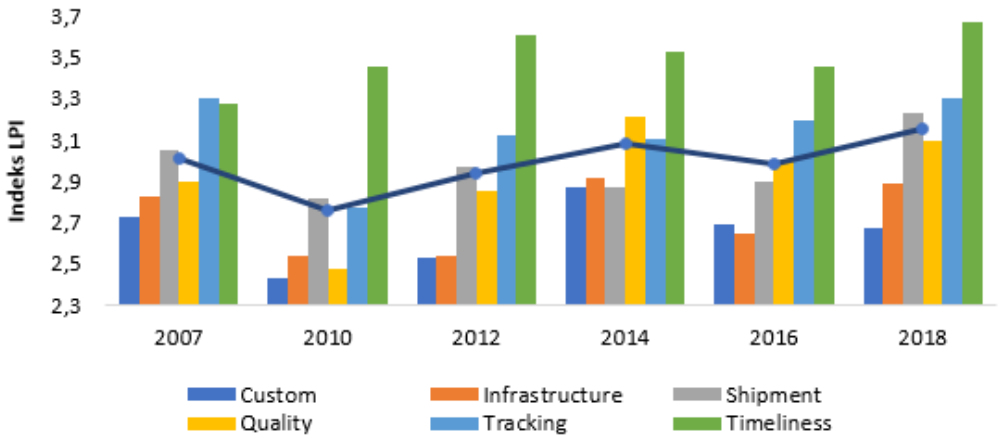
To see the significance of each LPI component, estimation is done separately for each component to avoid multicollinearity problems and result errors.

To determine the specification of the regression model, the Chow test and Hausman test were carried out. While deviation detection the classic assumptions used are

heteroscedasticity, multicollinearity, and normality. The autocorrelation test was not carried out because autocorrelation only occurs in time series data, so testing on panel data will not provide significant results (Basuki, 2016). The nature of autocorrelation only has one value in one regression model, besides that the results of the autocorrelation test will change if the cross-section data arrangement is changed.

Results and Discussion

Overview of Indonesia's LPI



Source: World Bank (2018)

Figure 3: Indonesian LPI Growth

Based on Figure 3, it appears that Indonesia's LPI achievements have fluctuated quite a bit with declines in 2010 and 2016. Components with low performance are customs, while components with high performance are tracing and timeliness.

The distribution of LPI scores is categorized into four quintiles, namely logistic-unfriendly, partial performers, consistent performers, and logistic-friendly. Logistic-unfriendly contains countries with severe logistical constraints (bottom quintile of LPI). Partial performers include countries with the most frequent level of logistical constraints seen in low-middle countries (the third and fourth quintiles). Consistent performers consist of countries with better logistics performance scores than the majority of other countries with the same income level (second quintile). Logistic-friendly is the highest quintile containing the best performing countries, most of which are high-income groups (World Bank, 2018). Based on the acquisition of Indonesia's LPI score in 2018, Indonesia is included in the second quintile category or consistent performers. This shows that Indonesia's logistics performance is quite good in a group of countries with the same income level.

Table 1 shows a comparison of the achievements of the LPI of APEC countries. From the table, it appears that countries with high LPI scores are owned by countries with advanced economic levels. Meanwhile, Indonesia's LPI achievement is still below the average of 17 APEC countries.

Table 1: Comparison of LPI of APEC countries

Country	2010		2012		2014		2016		2018	
	LPI	Rank	LPI	Rank	LPI	Rank	LPI	Rank	LPI	Rank
Japan	3.97	7	3.93	8	3.91	10	3.97	12	4.03	5
Singapore	4.09	2	4.13	1	4.00	5	4.14	5	4.00	7
Hong Kong	3.88	13	4.12	2	3.83	15	4.07	9	3.92	12
United States of America	3.86	15	3.93	9	3.92	9	3.99	10	3.89	14

Country	2010		2012		2014		2016		2018	
	LPI	Rank	LPI	Rank	LPI	Rank	LPI	Rank	LPI	Rank
New Zealand	3.65	21	3.42	31	3.64	23	3.39	37	3.88	15
Australia	3.84	18	3.73	18	3.81	16	3.79	19	3.75	18
Canada	3.87	14	3.85	14	3.86	12	3.93	14	3.73	20
Korea	3.64	23	3.70	21	3.67	21	3.72	24	3.61	25
China	3.49	27	3.52	26	3.53	28	3.66	27	3.61	26
Thailand	3.29	35	3.18	38	3.43	35	3.26	45	3.41	32
Chile	3.09	49	3.17	39	3.26	42	3.25	46	3.32	34
Malaysia	3.44	29	3.49	29	3.59	25	3.43	32	3.22	41
Indonesia	**2.76**	**75**	**2.94**	**59**	**3.08**	**53**	**2.98**	**63**	**3.15**	**46**
Mexico	3.05	50	3.06	47	3.13	50	3.11	54	3.05	51
Philippines	3.14	44	3.02	52	3.00	57	2.86	71	2.90	60
Russia	2.61	94	2.58	95	2.69	90	2.57	99	2.76	75
Peru	2.80	67	2.94	60	2.84	71	2.89	69	2.69	83
Vietnam	2.96	53	3.00	53	3.15	48	2.98	64	3.27	39
Average	3.41		3.43		3.46		3.44		3.45	

Source: World Bank (2018)

Chow test

The Chow test was conducted to determine the best estimation model between pooled least squares or fixed effects. Chow test results are shown in Table 2. The probability value in each regression model is 0.0000 which is smaller than the significance level α = 5%, so H0 is rejected. In other words, the fixed effect model is more efficient than pooled least squares.

Table 2: Chow Test Results

Model	Prob
Custom	0.0000
Infrastructure	0.0000
Quality	0.0000
Shipment	0.0000
Timeliness	0.0000
Tracing	0.0000
LPI	0.0000

Hausman Test

Table 3: Hausman Test Results

Model	Prob
Custom	0.0000
Infrastructure	0.0000
Quality	0.0000
Shipment	0.0000
Timeliness	0.0000
Tracing	0.0000
LPI	0.0000

The Hausman test was carried out to determine which fixed effect or random effect model is better to use. Based on Table 4.12, the probability value of each model is less than α=5%, then H0 is rejected, so the more effective model is the fixed effect.

Regression Estimation Results

The estimation results on table 4 show that the custom component has a significant positive effect at a significant level of 10% with a regression coefficient of 0.141908. In other words, every 1 percent increase in customs performance can increase manufacturing exports by 0.14 percent. The results of this estimation are in line with Bugarčić et al. (2020), Puertas et al. (2014), Gani (2017), Rezaei et al. (2018). Within the scope of APEC membership, there are efforts to utilize technology in the customs process through the Single Window System (SWS). The Sub-Committee on Custom Procedures (SCCP) emphasizes international interoperability of each member country to increase supply chain efficiency. This shows that there is a joint effort in realizing efficiency in the customs process within APEC.

The infrastructure component has a significant positive effect on manufacturing exports at a significant level of 5% with a regression coefficient of 0.166381. In other words, every 1 percent increase in infrastructure performance can increase manufacturing exports by 0.17 percent. This result is in line with Martí et al. (2014), Gani (2017), Rezaei et al. (2018) and Martí et al. (2014). The efficiency and effectiveness of physical and telecommunication infrastructure will make it easier for every country to participate in the global network.

The logistics quality and competence components show a significant positive effect at the 5% level with a coefficient of 0.159935. In other words, every 1 percent increase in quality component performance can increase manufacturing exports by 0.16 percent. Several studies have also shown similar results to Martí et al. (2014), Bugarčić et al. (2020), Gani (2017), Rezaei et al. (2018) and Puertas et al. (2014). The improved performance of this component indicates that overall logistics services are getting better, both in terms of roads, transportation, warehousing, shipping and customs.

The shipment component showed insignificant results against manufacturing exports. This indicates that the private sector's competition in providing delivery services is still low, resulting in less competitive shipping costs and an inability to respond to market fluctuations. The results of this estimation are not in line with several studies which explain that the shipment component has a significant positive effect on trade, such as Martí et al. (2014), Gani (2017), and Puertas et al. (2014).

The tracing and tracking components show a negative but significant coefficient at the 1% level. In other words, a 1% increase in tracking and tracing performance will actually reduce manufacturing exports by 0.17%. Based on a comparison of manufacturing export data and the results of the tracing component, it shows a fluctuating trend with developments that are inversely proportional. This indicates that countries with high tracing index values do not also represent high manufacturing exports. The concentration of exports from countries with high index scores may affect the results of countries with low index scores.

The same thing also happened to the timeliness component which showed a negative relationship. The coefficient value is -0.139463, it can be said that every 1% increase in timeliness performance will reduce manufacturing exports by 0.14 percent. It can be said that this component is closely related to transportation controlled by trading companies. Cargo flows take into account predetermined schedules and require storage areas to support cargo movement. Delivery times are highly dependent on the nature of the goods, supply chain planning and management, logistics services, and the distance between the customer and the supplier.

Table 4: Regression Estimation Results

Variable	Model						
	Custom	Infras	Qual	Shipm	Trac	Time	LPI
Cst	0.141908*						
Inf		0.166381**					
Ql			0.159935**				
Shp				0.10922			
Trc					-0.11648***		
Tm						-0.13946*	
LPI							0.094776
PDB	1.28278***	1.244806***	1.227889***	1.312261***	1.33049***	1.297437***	1.287395***
Pop	-0.38802	-0.26252	-0.28304	-0.35384	-0.49175	-0.43269	-0.31282
RER	-0.00016***	-0.00016***	-0.00016***	-0.00016***	-0.00013***	-0.00016***	-0.00016***
Parameter Coefficient							
R-Squared	0.996395	0.996438	0.996446	0.996285	0.997133	0.996407	0.99631
Adj R-Squared	0.995282	0.995338	0.995348	0.995137	0.996247	0.995297	0.99517
F-Stat	894.9891	905.7514	907.8423	868.2772	1126.147	897.9198	874.2167
Prob(F-stats)	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000

Note: the numbers shown are the coefficients; signs *), **), and ***) are t-statistical significance at the significance level of 10%, 5%, and 1%

Meanwhile, LPI Overall does not have a significant effect. Although the LPI Overall index is not a factor capable of driving manufacturing export growth, some of its components can be considered to be a focus for the development of the logistics sector. Besides that, the GDP variable has a significant effect on all models at the 1% level. This indicates that greater state revenues can increase budget allocations to provide proper and standardized trade facilitation, which in turn can create efficiency and effectiveness for manufacturers in the manufacturing sector in exporting their products. The population variable appears insignificant to manufacturing exports. Meanwhile, the real exchange rate has a significant negative effect at the 1% level in all regression models. Any increase in the exchange rate (appreciation) will reduce manufacturing exports because the exchange rate strengthens and the price of domestic goods tends to be high for domestic consumers, thus encouraging imports and weakening exports. On the other hand, any decrease in the exchange rate (depreciation) will increase exports, because the price of foreign goods will increase and the price of domestic goods will be lower for foreign consumers.

Heteroscedasticity Detection

Heteroscedasticity detection was carried out to find out whether the residual variance was different between periods, whether the variance in the regression model was the same or it was called homoscedasticity. The method used is the Glejser test where the probability of the test results shows a value greater than 0.05, so the residual variance is homoscedastic. The detection results are shown in table 5 which shows that almost all models are homoscedastic except for the tracing component model. To overcome this, the GLS (Generalized Least Square) method is used which has been treated with white heteroscedasticity-consistent covariance.

Table 5: Heteroscedasticity Detection

Model	*Custom*	*Infrastructure*	*Quality*	*Shipment*	*Tracing*	*Timeliness*	LPI
	0.77	0.94	0.12	0.37	**0.03**	0.09	0.09
PDB	0.42	0.49	0.53	0.58	0.61	0.30	0.68
Pop	0.49	0.63	0.54	0.48	0.55	0.51	0.61
RER	0.53	0.28	0.41	0.49	0.39	0.68	0.40

Multicollinearity Detection

Multicollinearity detection is carried out to find out whether the independent variables in the model have a linear relationship. Gujarati & Porter (2013) states that the correlation coefficient limit is 0.8. Another opinion says if the correlation coefficient is greater than 0.85, then it is suspected that there is a multicollinearity problem (Widarjono, 2005). The multicollinearity detection results shown in Table 6 show that all models do not experience multicollinearity.

Table 6: Multicollinearity Detection

		CUST	PDB	POP	RER
Model Custom	CUST	1	0.79	-0.40	-0.29
	PDB	0.79	1	-0.44	-0.56
	POP	-0.40	-0.44	1	0.18
	RER	-0.29	-0.56	0.18	1
		INF	**PDB**	**POP**	**RER**
Model Infrastructure	INF	1	0.82	-0.24	-0.34
	PDB	0.82	1	-0.44	-0.56
	POP	-0.24	-0.44	1	0.18
	RER	-0.34	-0.56	0.18	1

Model Quality and Competence		**QUAL**	**PDB**	**POP**	**RER**
	QUAL	1	0.79	-0.24	-0.29
	PDB	0.79	1	-0.44	-0.56
	POP	-0.24	-0.44	1	0.18
	RER	-0.29	-0.56	0.18	1
Model Shipment		**SHIP**	**PDB**	**POP**	**RER**
	SHIP	1	0.53	-0.28	-0.21
	PDB	0.53	1	-0.44	-0.56
	POP	-0.28	-0.44	1	0.18
	RER	-0.21	-0.56	0.18	1
Model Tracing		**TRAC**	**PDB**	**POP**	**RER**
	TRAC	1	0.76	-0.23	-0.26
	PDB	0.76	1	-0.44	-0.56
	POP	-0.23	-0.44	1	0.18
	RER	-0.26	-0.56	0.18	1
Model Timeliness		**TIME**	**PDB**	**POP**	**RER**
	TIME	1	0.74	-0.29	-0.23
	PDB	0.74	1	-0.44	-0.56
	POP	-0.29	-0.44	1	0.18
	RER	-0.23	-0.56	0.18	1
Model LPI		**LPI**	**PDB**	**POP**	**RER**
	LPI	1	0.78	-0.30	-0.29
	PDB	0.78	1	-0.44	-0.56
	POP	-0.30	-0.44	1	0.18
	RER	-0.29	-0.56	0.18	1

Normality Detection

Normality detection is performed to test whether the residuals of the regression model are normally distributed. Tests were carried out based on the Jarque-Bera probability values shown in Table 7. Based on the detection results, it appears that all models do not experience normality problems.

Table 7: Normality Detection

Model	Prob. Jarque-Bera	Conclusion
Custom	0.78	Normal distribution
Infrastructure	0.85	Normal distribution
Quality	0.53	Normal distribution
Shipment	0.91	Normal distribution
Tracing	0.11	Normal distribution
Timeliness	0.89	Normal distribution
LPI	0.77	Normal distribution

Conclusion

During the period 2010 to 2018, Indonesia's overall LPI achievements were still below the average of the 18 APEC member countries. The estimation results show that the custom component has a significant positive effect, where within the scope of APEC membership

there is a Sub-Committee on Custom Procedures (SCCP) which emphasizes the development of customs performance according to international standards which is an effort to increase the efficiency and effectiveness of customs performance. The infrastructure component also has a positive effect. This indicates that trade facilities and infrastructure have made it easier for each country to participate in the global trade network. The components of logistics quality and competence have a significant positive effect on manufactured exports. This indicates that the overall logistics services provided, both in terms of physical infrastructure and customs agents for each country, are getting better. The shipment component has no significant effect. This indicates low competition in the private sector that provides delivery services, thus creating uncompetitive shipping costs, and low ability to respond to market fluctuations. Meanwhile, tracing and timeliness had a negative effect on manufacturing exports, in line with data fluctuations that were inversely related to manufacturing exports. This indicates that ICT investment and development is still needed in the logistics system.

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