# Quality of Transportation Infrastructure and Trade Facilities: Opportunities and Challenges in Increasing Trade and Economic Productivity

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ABSTRACT: This study seeks to develop a conceptual model for increasing the productivity of a province in Indonesia. Based on trade facilities, it is hoped that it will become a key factor or strategy to increase trade that is oriented towards increasing the productivity of the provinces in Indonesia. Model In this study, in 34 provinces in Indonesia using secondary time series data and primary cross-sectional data. Self-data analysis using Amos 25 And from the results of data analysis all hypotheses proposed in this study is accepted, it shows that trade facilities are a key strategy for increasing trade and its orientation towards productivity growth of the gross regional domestic product.

## 1 INTRODUCTION

Trade facilities are needed for both domestic and international trade [1] . Success in the market will be determined by the government's ability to provide environmental support that can provide an existence of encouragement for efficiency in improving services and trading strategies that exist in a country. Trade facilities have provided a role that can be essential for international trade. Remains a form of economic development for a country [2]. The government's efforts are expected to provide an idea of how effectively the trade facilities established by the government can contribute to economic growth and development. Initially, the concept of trade facilities was implemented in a dance decline and this has been the focus of previous studies and was followed by the existence of non-tariffs which has recently been implemented in globalization which is a cross-border activity [3]. When free trade liberalization has given sufficient pressure to implement competitive actions and advantages between market areas, this becomes a form of action that must be anticipated in a domestic market [4]. It is hoped that this will become a strategy to provide an efficient allocation of resources in achieving stability [5]. This increase in globalization will produce a production network and attractiveness for exporting countries to be able to meet the needs of other countries [5] (Dornbusch, 1992). Is it possible? When a country achieves an improvement toward better trade, other people will be able to have benefits and economic relations [6] . The conceptualization of trade varies considerably across time and across institutions [7] . A fairly general definition can be considered an application of procedures to reduce costs[2], [8]. Understandably, many companies will be involved in international trade and will be faced with quite high costs in terms of logistics transportation and government policies this will prevent these companies from utilizing their capacity [9].

In addition, some factors influence the internalization and localization decisions of multinational companies. Foreign investment [10]. Trade usually involves various unavoidable transaction costs related to transportation coupled

with the burden of documentation procedures which are once higher than expected [11] . Small and medium enterprises can benefit from the use of transaction costs which can result in increasing their opportunities to participate in the Global Value Chain [1] . One of the most relevant drivers of economic growth and income does not only rely on trade [12], [13]. Transportation and logistics are quite significant and fundamental in increasing economic growth [14] . There is still no clear correlation between trade and economic growth, but a better understanding has provided a policy framework to address this progress. And this is considered part of trade facilitation efforts [7] . Although it is difficult to provide an identification of the extent to which transportation will be able to help increase competitiveness [15] , the core components of competitiveness always provide access to markets and resources [14], [16] . There is the availability of transportation infrastructure that will be able to provide opportunities to reduce the overall cost and turnaround time, but various focuses on a systemic view related to logistics are also needed to optimize this development [17] . This research seeks to propose a conceptual model for increasing the productivity of economic growth in Indonesia. What are the factors that influence economic growth in Indonesia and how will the role of transportation infrastructure increase the productivity of economic growth in Indonesia? This study aims to answer these questions through the role of the mediating variables of trade and trade facilities.

## 2 LITERATURE AND HYPOTHESIS DEVELOPMENT

### 2.1 *Quality of Infrastructure and Trade Facilities*

The quality of transportation infrastructure plays an essential role in increasing global competitiveness [18], [19]. Because it will be able to provide a tactical direction toward increasing productivity to allow a reallocation of capital and labor [20]. Transportation infrastructure will be able to support the emergence of a global public network organization and be able to provide facilities for solving problems in international markets [11]. Increased trade has been able to provide a boost to the development and economic growth of the transportation transformation bastion has supported a variety of quite optimal practices by improving the governance of electronic connectivity and being able to simplify processes to avoid additional time and costs [21]. Some agencies do not provide certainty regarding infrastructure progress for transportation in countries caused by various exogenous and endogenous factors. However, a fairly consensus about benefits for the economy has been reviewed by [22]. Economic value has been researched by [18], [23].

In addition, there are various indicators in facilitating the concept of trade, including business environment regulations, the efficiency of border technology transportation, and the physical infrastructure of ducks that have a higher impact on a country's economy than the volume of export trade. Meanwhile, improvements in related fields are expected to be able to provide border efficiency that

may be able to provide promising results, especially for developing countries, but these results are not sufficient to determine whether one physical infrastructure is more relevant than another because the individual transport infrastructure index must be calculated individually. aggregated to form a definite indicator. In this sense, development is interdependent on an asset and it needs to be underlined that the provision of infrastructure is said to be irrelevant if it does not capture the operator in providing support and benefits from the involvement of cassava from an economic dynamic perspective, the findings of [23]. So that it can be said that an effort is needed to provide an identification of aspects that are quite specific and relevant to infrastructure for much better policies. Based on this argument, the hypothesis can be drawn as follows H1: transportation infrastructure positively influences trade facilities, and the higher the trading facilities.

### 2.2 *Transportation and Trade Infrastructure*

The quality of transportation infrastructure has a fairly fundamental role in regulating western movements. This can have a pretty bad impact on the low quality of infrastructure. Meanwhile, the lack of quality infrastructure will be able to have a significant impact on a country's ability to integrate into the world economy [22]. Infrastructure that is sufficiently well developed will be able to reduce the impact on distances between regions and be able to provide better decision-making regarding the location of economic activities. Immediately can create lower transportation costs [24]. Complementary concepts in the factors of production of labor and capital [20]. Previous studies have shown that differences in the existence of infrastructure efficiency will have a positive impact on a country's imports and export. This can be implemented through greater time variations between countries for the same purpose [25]. Efficiency is also able to provide increased costs and this will have an impact on the concept of reducing trading activities [26], which will directly affect the performance of domestic companies such as MSMEs [3].

A fairly good level of quality of transportation infrastructure will be able to provide a reflection for a decrease and increase in transportation costs [27]. Therefore we can provide a systemic approach when logistics and transportation infrastructure investment can be said to be a sufficiently fundamental factor that can contribute to timely delivery and can reduce costs incurred. Increased investment in transportation infrastructure will contribute to improving its quality. However, this does not always lead to lower transportation costs [16], [28]. Variations in transportation costs will provide an opportunity to compete in international markets and achieve global competitiveness that is quite competitive [29]. Transportation costs will affect international trade, how is the quality of the infrastructure owned is an interesting consideration [15]. This cost reduction will have a significant impact on increasing the combined turnaround logistics of their service companies that cover the main modes of transportation [17]. In principle, sea transportation modes, land transportation modes, and air transportation modes

have different implications on how traded goods can be moved from one country to another, this is determined based on the commodity. export import activities of goods [30]. This will determine a country's competitive position and dependency on various just diamond requirements that affect the global time production network [21].

Based on the description above, the hypothesis can be drawn as follows:

H2: The quality of transportation infrastructure has a positive effect on trading activities. The higher the quality of transportation infrastructure, the higher the trading activities.

### 2.3 *Trade Facilities Mediate the Influence Between the Quality of Transport Infrastructure and Trade*

Teleportation is an industry that is capable of vitally influencing economic activity and is also shaped by these economic activities [15], [31]. From here transportation infrastructure refers more to an aspect that is quite important in the transportation system. In addition, transportation can also be a key strategy for increasing competitiveness in countries because it provides access to markets for resources and labor [15]. Trading facilities that include hard and soft infrastructure such as examples of bank hard infrastructure on capital-based transportation assets such as railways, ports, airports, and roads are components of the quality of hard infrastructure that provide sufficient evidence of contribution to the increase in trading activities [16], [32]. soft infrastructure transportation which includes various components such as environmental policies and border procedures also provides a form of significant impact on the development of transportation trade activities, indeed providing an opportunity for foreign market competition [30]. Indeed, in a fairly competitive environment like this, increased transportation from the infrastructure side will produce quite optimal results [16]. For example, when a country's quality measurement is said to be low in terms of its infrastructure, this needs to be compared with the conditions of competitors who are involved in other international trade activities.

H3: trade transport facilities mediate the influence between transport infrastructure and trade.

### 2.4 *Trade facilities, trade, and productivity*

Trade can be considered as an activity to provide barter in the form of goods or services between countries and this is an important component of an economy. In addition, state income can also be increased through this international trade activity [15]. Broadly speaking trade represents economic conditions [6]. Prosperous conditions but in particular the effects of the industrial revolution on the effect of doubling trade have welcomed several impacts, including increased production and consumption. into the global market and it is hoped that this strategy will be able to bring about an increase in SME trade [19]. No definition is formal enough to define the concept of trade facilities but this concept is subject to every perspective or contact from

stakeholders in practice [1], [6], [7]. However, there are some similarities in the actual definition, for example, the international chamber of commerce defines trade as a trade facilitator as a package of actions to assist to reduce bureaucracy in the region. Meanwhile, the WTO defines trade facilitation as a simplification of modernization and harmonization in an export and import process. [28], determines the main objective of an act of trade facilitation is to make trade outside borders faster, more predictable, low cost, reducing barriers and procedural problems and others that arise, expected to smooth the flow of goods in international trade. In addition, trade measurements often use the aggregate ratio of exports accumulated with imports to the value of the gross domestic product as an indicator of trade openness or globalization. [12], [33]. Can be used to explain why countries can trade more through a variety of specific Identifications and measures. In particular, there is little consideration of logistics and transportation infrastructure in the facilitated study of a trade facility as a selected indicator. Based on the above arguments, the following hypothesis can be drawn

H4: trade facilities have a positive effect on trade the higher the trade facilities the higher the trade

H5: trade has a positive effect on productivity the higher the trade the higher the productivity

## 3 RESEARCH METHOD

The design of this study uses a quantitative research design with a structural study methodology adopted by using samples from 34 provinces in Indonesia to test the models in this study. This research is an ex post facto and cross-sectional study that uses secondary data for various provincial levels in Indonesia from 2017 to 2021. Data was collected from various sources from the Central Bureau of Statistics. The variable measurements in this study are shown in the same direction for the same numerical position. Ratio variables such as trade-related gross regional domestic product would be converted to Napier logarithms to standardize the results. The number of samples was accumulated from the number of provinces in Indonesia multiplied by 5 years from the cross-sectional period, obtaining a sample of about 5 times 34, totaling 170 samples.
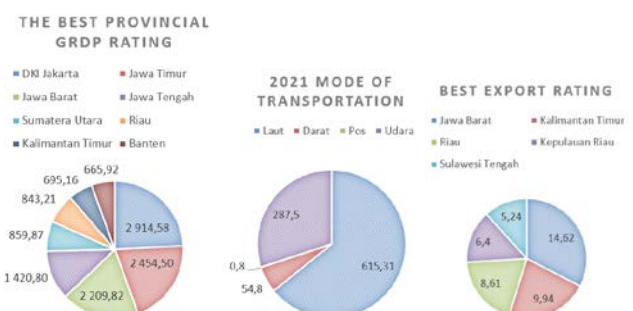
## 4 DISCUSSION



Figure 1. Source: Results of the 2022 research study

Table 1. Model Fit Test

| Goodness of fit indices | Cut-off value | Cut-off value of the Results |
|---|---|---|
| X² (Chi-Square) | Expected small | 87.29 |
| Significant Probability | ≥ 0,05 | 0,02 |
| CMIN/DF | ≤ 2,00 | 69 |
| RMSEA | ≤ 0,08 | 0,04 |
| GFI | ≥ 0,90 | 0,941 |
| TLI | ≥ 0,95 | 0,973 |
| CFI | ≥ 0,95 | 0,969 |

Source of the results of the 2022 research study

Structural equation based on variance (SEM) is the model used by researchers, namely SEM of least squares, to analyze the data in this study by including formally measured constructs with a value of 0.03 < RMSEA < 0.08, and although the GFI, TLFI, and CFI figures show a value less than 0.9, there is no problem with modeling, as described in the table. The test results show that the fit criteria have been fulfilled as indicated by the Chi-Square value of 127.89 and the probability value of 0.03. Both assumptions are complete. TLI score = 0.973, GFI = 0.902, CFI = 0.969, and RMSEA = 0.04 which indicates that the score meets the specified requirements. This means that the research model is accepted and meets predetermined criteria.

### 4.1 Validity and Reliability Test

Testing research data using [34]Structural Equation Modeling with the AMOS program. This approach is carried out by testing the parameters resulting from good fit and directly testing the hypothesis about the causality relationship developed in the validity and reliability testing criteria model if the loading factor value is > 0.6 then the indicator is said to be invalid and vice versa if the Cronbach alpha value is > 0 .6 is said to be valid. This can be seen in Table 2.

Table 2. Validity and Reliability Test

| Variable & Indicator | Std. estimate | Convergent Validity-AVE | Construct reliability |
|---|---|---|---|
| 1. Quality of Transportation Infrastructure [7], [8], [28], [34], [35] | | | |
| Road Quality | 0.906 | 0.874 | 0.879 |
| Port Quality | 0.887 | | |
| Airport Quality | 0.911 | | |
| Railway Quality | 0.884 | | |
| 2. Trade Facility [6], [8], [16], [28], [36] | | | |
| Irregular payments to bribes | 0.891 | 0.848 | 0.893 |
| Tariff complexity | 0.883 | | |
| Government policy making | 0.901 | | |
| Beacukai procedures | 0.806 | | |
| Prevalence of trade barriers | 0.894 | | |
| Openness to foreign markets | 0.917 | | |
| Technology absorption | 0.903 | | |
| 3. Trade [34], [37]–[40] | | | |
| Export | 0.805 | 0.845 | 0.829 |
| Imported | 0.814 | | |
| 4. Productivity [34], [37]–[40] | | | |
| Gross domestic product | 0.861 | 0.809 | 0.814 |

Source Results of the 2022 research study

The next step is to test the hypothesis for the clause relationship between variables using the criterion CR-Critical ratio equal to or greater than 2.0 [41]. Then tested the empirical analysis model (output model). The outer model is a model that determines the relationship between latent constructs and indicators.

In other words, the hypothesis defines how each indicator relates to other latent constructs, as described in Table 3

Table 3. Hypothesis Testing Results

| Hypotheses | Estimate | Critical Ratio | SE | Pvalue (=0,005) | Results |
|---|---|---|---|---|---|
| H1: Quality of Transportation Infrastructure → Trade Facilities | 0.46 | 3.285 | 0.37 | 0.00 | Received |
| H2: Quality of Transportation Infrastructure → Trade | 0.58 | 2.998 | 0.41 | 0.00 | Received |
| H3: Quality of Transport Infrastructure → Trade Facilities → Trade | | Z=5. 68201 | | 0.00 | Received |
| H4:Trade Facility → Trade | 0.43 | 3.128 | 0.39 | 0.00 | Received |
| H5: Trade → Productivity | 0.59 | 2.993 | 0.45 | 0.00 | Received |

H1. The quality of transportation infrastructure affects trade facilities. The structural path findings show that there is a significant relationship between the quality of transportation infrastructure and trade facilities (t = 3.285 > 2.0) with a significance value (0.00 <0.05). Therefore, Hypothesis 1 is accepted.

H2. The quality of transportation infrastructure affects trade. The structural path findings show that there is a significant relationship between the quality of transportation and trade infrastructure (t = 2.998 > 2.0) with a significance value (0.00 <0.05). Therefore, Hypothesis 3 is accepted.

H3. Trade facilities mediate the influence between the quality of transportation infrastructure on trade, this can be shown from the z value of the Sobel test results of Z = 5.68201 and the p-value <0.05

H4. Trade facilities affect trade. The structural path findings show that there is a significant relationship between trade and trading facilities (t = 3.128 > 2.0) with a significance value (0.00 <0.05). Therefore, Hypothesis 4 is accepted.

H5: trade affects productivity. The structural path findings show that there is a significant relationship between trade and productivity (t = 2.993 > 2.0) with a significance value (0.00 <0.05). Therefore, Hypothesis 5 is accepted.

Quality of transport infrastructure and trade facilities The quality of transport infrastructure has a fundamental value and has a large influence on trading activities. This has been investigated by previous researchers such as [25], [28]. In particular, airport quality road quality and low quality but is a sufficiently suitable asset that can relate and become quite an important requirement to make our deliveries on time as Is my determination air which handles various valuable goods shipments in a timely. While roads and railroads will focus on the distribution of miles. However, Port quality can be considered as a sector that has quite a value related to quality with transportation. Because the Port will be able to provide a connection that 80% of trade in the world is handled through international ports. The

large market demand has given the opinion that the occurrence of trade exchanges is very dependent on the efficiency and quality of sea transportation so the quality of port infrastructure is expected to be a very important sector for developing countries from the data above the quality of long-distance transportation infrastructure and can provide a significant influence to trade activities as a component of trade facilities. This is in line with research conducted which proves that the quality of port infrastructure and measurement of trade facilities in. Origin and destination should be considered jointly.[5], [28], the quality of port infrastructure and measurement of trade facilities. Origin and destination must have sufficiently accurate considerations together. Thus the quality of transportation products and trade facility reform is indispensable for international trade where the effect on transportation is directed to have linearity.

Transport has a positive effect on trade facilities and has been investigated by previous researchers. This suggests that empirical evidence from previous researchers became the basis for the classification of this study [28]. In particular, the quality of railroads airports, and port facilities are quite important and very relevant assets that can connect regions with certain requirements for the timeliness of delivery of goods. This can be seen as the existence of air cargo transportation that can handle goods that are quite valuable in demanding fast delivery. [42]. While railroads have a focus on overland miles and provide a fairly smooth contribution to land transportation [15], the quality of ports can be considered quite valuable in terms of quality. in the transport document. It is guessed This is because 80% of world trade uses international ports [11]. The demand that makes trade growth will depend heavily on the constant efficiency of the quality of shipping ports from several regions which have been shown with the Port option being the most optimal [15]. The need will be able to take advantage of access from neighboring ports. However, the quality of Port infrastructure has a fairly fundamental domain for developing countries. International trade has been proven to be able to demonstrate the productivity of a country's development. This has been stated by various previous researchers such as [43]. Exports of goods and imports of semi-finished goods or capital goods are quite relevant as an example of the productivity of various provinces in Indonesia regardless of the size of the province. Trade has a significant influence on productivity. This will support the value of gross domestic product productivity based on the level of extensive income from exports and imports that has a positive and significant effect on the value of a trade which will lead to a fairly strong interest in oriented which will be able to push exports towards quite optimal growth. Various empirical evidence has shown that an increase in imports of semi-finished goods and capital goods will be able to reduce the value of trade, even though this happens is a result that cannot be postponed and it is quite surprising that there is a link between trade and activity.

The export performance will be considered to have a fundamental side that shows the best export performance compared to imports. This interpretation seems careful because the impact of imports in this study is not convincing, but apart from imports of intermediate goods and technology-related capital goods that are having engagement and an abundance of knowledge can improve company operations where the urgency of imports can be substituted locally [44], [45]. when imports may be related to increased state participation in a production process and differences related to the import content of exports of manufactured goods [9]. Therefore, various possibilities for provinces in Indonesia are expected to increase imports of semi-finished goods and capital goods so that they can increase their productivity as suggested by the data containing various assumptions that the allocation of resources that will have accuracy will be able to increase the strength of ITF local demand. In addition, participation in the global market and structural changes in the value chain shows an increase in terms of company efficiency. It will be noted that it is expected to be able to increase considerable benefits towards increasing people's purchasing power [13].

## 5 CONCLUSIONS AND RESEARCH IMPLICATIONS

The scientific investigation carried out in this study seeks to expand the literature review on the productivity of a province in integrating various components of international trade such as the quality of transportation infrastructure, trade facilities and trade. the productivity of a country the various multidisciplinary approaches in this study have provided an echo for the adoption of various theoretical perspectives which are quite different but provide roots for the social capital literature which recognizes the importance of a network concept. The literature included in this study provides evidence and academic implementation related to strengthening the theory of resource-based theory in providing a resource allocation and network of stakeholder theory to provide different and interdependent emphases on each different actor. In addition, the theory of resource dependence also provides relevance to access to resources when faced with trading activities. The measurement of trade facilities which are quite relevant in this study is expected to be able to provide comprehensive benefits and have variations according to the needs of each province. this consideration is not only sufficient to be used in inter-provincial considerations but must involve an understanding of trade needs in a country where there is an attractive compressibility, for example, this will provide a form of reduction to the economy from the income side because it will enhance the level of income so that participation in trade assistance programs is sufficient is shown to exist to help with this.

However, several provinces are lagging in government transparency, such as the quality of transportation infrastructure, logistics performance, and customs procedures. It is hoped that there will be an identification of opportunities that can be inhibited, especially when some of these economies can experience a transition from an agriculture-based economy to an industrial approach, efforts to facilitate

sustainable trade are expected to be able to reduce the various prices between exported and imported goods Middle-finished and goods capital so that it will provide a sufficiently competitive increase in opportunities for developing countries to lead to the concept of industrialization. Simultaneously the company can provide an import for production in the Global value chain network which is expected to have a lot of research successfully proving various combinations of resources and allocations owned by a province appropriately to support the economic productivity of a country Therefore fast implementation and The full stakeholder approach is expected to be able to have a multidisciplinary concept of understanding because it is expected to be able to improve and carry out the efficiency of trade exchanges based on public planning and transportation management.

### 5.1 *Theoretical Implications*

Theoretically, this research has contributed to the development of basic theories in economics, for example, the theory of resource-based theory and stakeholder theory. The stakeholder theory aspect of this study provides a fairly holistic view of the concept of public management. which is global. Greater participation, in this case, is the private sector as a logistics provider which is expected to be able to increase investment from the capital side provided by the government. The second contribution of this research to academics is to become a concept of thinking scientifically about the factors that trade crosses in the economy and opportunities to broaden understanding of country productivity in this case this research will be able to provide an academic recommendation in integrating academic fields such as engineering management economics and Commercial Shipping Science in postgraduate schools it is expected that students can provide a form of understanding of the reality of the existence of a form of vision and views that are quite broad as well as the complexity of the international market.

### 5.2 *Practical Implications*

At the practical or user level, this research provides recommendations for policy actors, in this case, the government or maybe company leaders. This research provides a form of practical recommendations for the implications that are quite broad for leaders in companies and the government. First, related to a large enough interest to have a form of participation in the global market. carried out on an international and regional scope. This reality requires a form of focusing attention on various components that have quite a variety of complexities from various sectors, not only components provided exclusively by a state or government but also an increase in service networks in various provinces to increase the possibility of businesses in reducing resource costs and inventory. Opportunities and input substitution can also arise and this should be a concern for corporate and government leaders in maximizing local and foreign resources to support a vertical Global value chain. So it can be assumed that the

company is expected to be able to increase the possibility of making operational plans at the short-term level and be able to provide various concepts of flexibility which are expected to be able to develop strategies and implement them at the last time. In addition, company leaders are expected to decide what to produce and what goods will flow across borders between provinces or between countries. The government is expected to provide a form of the decision in terms of motivational encouragement so that it can implement ways of trade facilities directed at every decision made by companies that will be able to influence a form of network in a country to be affected, including for end customers.

## 6 RESEARCH LIMITATIONS AND FUTURE RESEARCH AGENDA

This study has various limitations both partially and holistically related to the results presented as the basis for statistical analysis. Various investigations have been argued to provide a form of limitation in this study, including research in this study focused on several basic components in the concept of trade between countries, but this review is more emphasized on a micro scale, this adopts regional areas. The basic component of trade is expected to be able to increase the productivity of a country, but various integration of other components such as the quality of education should also be expected to be a contribution to understanding this concept. the existence of the province of the center can be measured through the level of export import of a resource that has been made available to the public and this will be a measure of the level of trade produced by each Province of NTT even though it is aligned with data from the Central Bureau of Statistics and other companies related companies that contributed from secondary data but there are various reasons for distrust related to understanding the potential of each province in depth. So ideally a comparison based on the stage of development will be able to provide a progressive strategy that is able to provide challenges to answer the country's needs in a comprehensive manner. Furthermore, there is no form of investigation in this study that tries to analyze the effects of transportation infrastructure, trade facilities and models on trading volume using a complex form of relationship so that this will become a form of controversy. The results in this study are limited by the existence of research results. quite the contrast.

The future research agenda can be carried out in the form of providing recommendations on spatial studies to provide a focus on trade facilities in the form of formulating an appropriate strategy. In addition, factor analysis is needed to assess progress on the trade side in the concept of facilities, especially in provinces that have low income levels and are categorized as developing groups. Further studies are also expected to be able to encourage the existence of a form of prevention of bribe payments in conservation and trade that will be able to prevent corruption from a productivity standpoint, it is hoped that there will be a comprehensive form of investigation related to differences in the identification of provinces that are either developed

or poor in terms of the performance of transportation infrastructure, we can carry out a form of research on the impact on activity effectiveness individuals who use airport commodities. In addition, various forms of longitudinal studies are also needed that are able to use performance indicators of productivity and modes of transportation in the form of secondary data.

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