

TOURISM AND ECONOMIC GROWTH: SPATIAL PERSPECTIVE

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ABSTRACT

As Indonesian people have shifted their focus towards leisure activities, tourism has become a prospective sector for economic development in many regions of the country. This study analyses whether spillover of tourism growth occurs or not and the impact of the tourism sector on gross domestic regional product (GDRP) in 33 provinces of Indonesia compared to their neighbours. In particular, this study aims to identify what factors influence tourism development and to estimate the impact of tourism growth on regional economic growth. Spatial analysis was performed using Moran's I test and spatial regression. The results show a positive spatial spillover of tourism among 33 provinces. Furthermore, accommodation, tourism labour productivity and education have a positive significant effect and increase the number of tourists in a province. However, investment and budget utilization for public infrastructure are not significant. Furthermore, the number of foreign tourist has positive significant value, while domestic tourist not significant to GDRP growth.

Keywords: Tourism, economic growth, spillover, spatial econometrics

1. INTRODUCTION

The historic agreement among world leaders at the United Nations in 2015 on a universal 2030 Agenda for sustainable Development committed all countries to pursue 17 Sustainable Development Goals (SDGs) that would lead to a better future for all. Tourism has the potential to contribute, directly or indirectly to all of the goals. Therefore, it is important to know how to make sustainable tourism through the analysis what factors can give an impact to tourism development and the impact of tourism itself to economic growth. As the 17 SDGs and the corresponding 169 SDG targets offer the world a new direction, tourism can and must play a significant role in delivering sustainable solutions for people, the planet, prosperity and peace.

The tourism industry is expected to be a major contributor to the Indonesian economy. Tourism has experienced continuous expansion and diversification and has become one of the largest and fastest-growing economic sectors in the world (United Nations World Tourism Organization, 2015). Despite the occurrence of several global crises, the number of international tourist trips has still showed positive growth, with the highest level of tourist growth in Asia and the Pacific (UNWTO, 2016).

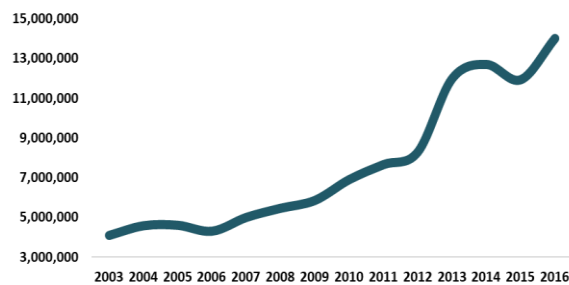


Figure 1. Total foreign tourists to Indonesia from 2003 to 2016 (number of persons)

Source: Statistics Indonesia (processed by author)

It can be seen from Figure 2 that from 1969 to 2014 the number of foreign tourists visiting Indonesia increased at an average growth rate of 11.6% per year (Statistics Indonesia, 2015). Since 2007, the number of foreign tourists visiting Indonesia has shown an upward trend. In 2014, the number of foreign tourists visiting increased by 7.19 per cent to the highest number of foreign tourist visits compared to previous years. Indonesia's tourism growth has improved, but from Figure 2 it can be seen that from 2003 to 2016 its tourism was still focused on Bali, with more than 50% of foreign tourists visiting that location in every year. It is necessary to spread tourism so that tourists do not focus only on Bali.

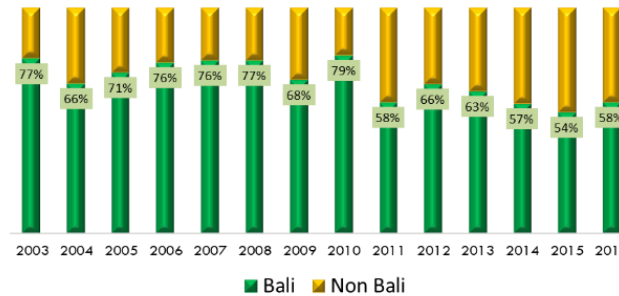


Figure 2. Foreign Tourist Percentage (Bali and Non-Bali) 2003-2016

Source: Central Bureau of Statistics

On the other hand, Indonesia's GDP is still very centralized and comes predominantly from Java. Statistically, Java's GDP contributed more than 50% of total GDP from 2010 to 2016. This indicates that the regional economy in Indonesia is still centralized on Java and that regional economies outside Java play a small role. It is therefore necessary to strengthen the other regional economies so that the Indonesian economy is no longer dominated by Java alone.

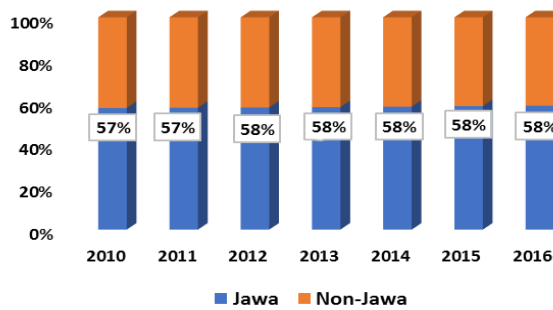


Figure 3. GDP Percentage Java and Non-Java from 2010 to 2016

Source: Central Bureau of Statistics

In order to develop regional tourism, the central government, regional governments and state-owned enterprises have together created a new policy focusing on the ten priority destinations of Borobudur, Bromo-Tengger-Semeru, Thousand Islands, Labuan Bajo, Mandalika, Morotai, Tanjung Kelayang, Tanjung Lesung, Toba and Wakatobi (Ministry of Tourism, 2016). These ten destinations are expected to become 'new Balis' that will not only increase the number of tourists overall, but will also spread tourism so it is no longer focused on Bali.

The government is also building new centres of regional economy. Based on Law No. 39 of 2009, 'Special Economic Zones' (SEZ) is a government breakthrough programme designed to develop regional models to drive national and regional economic growth. The SEZ programme is aimed at accelerating economic development and building a balance of development between regions. In particular, it is intended to maximize industrial production, exports, imports and other economic activities that have high economic value (Republic of Indonesia National Council for Special Economic Zone, 2017). Each SEZ consists of one or several main activity zones focused on export processing, logistics, industrial, technology development, tourism, energy and other economic activities. There are four SEZ with the main economic focus of tourism: Tanjung Kelayang, Tanjung Lesung, Mandalika and Morotai.

In light of these new policies for regional tourism and economic development, this study aims to analyse whether there is spillover from tourism growth, and if there is, to assess its impact on regional economic growth in 33 provinces of Indonesia. Specifically, this study aims to identify what factors influence the distribution of tourism growth in a province and its surroundings and to estimate the impact of tourism growth on regional economic growth.

Investigation into the impact of the tourism industry on economic growth in a region and on its neighbours has been carried out in several countries and regions with different approaches and different research focuses. Naudé and Saayman (2005) analysed the determinants of tourist arrivals in 43 African countries using cross-sectional Ordinary Least Squares (OLS), while Zhang and Jensen (2007) analysed the factors affecting the flow of foreign tourists from the supply side using OLS and panel models. Majewska (2015) analysed the effects of inter-regional spatial agglomeration by noting how large the impact of geographic spillover was. Yang and Fik (2014) and Yang and Wong (2012) analysed factors that explained regional tourism growth rates in 342 cities in China, and the impact of spillover flows of foreign and domestic tourists in all cities in China using the spatial Durbin model (SDM). Marrocu and Paci (2010) examined the impact of tourists on regional efficiency levels in the European region using OLS. Paci and Marrocu (2013) analysed the impact of foreign and domestic tourists on economic growth in ten European countries using GLS. Proença and Soukiazis (2008) examined how important tourism is for economic growth and how tourism impacted the interstate convergence process in Greece, Italy, Portugal and Spain using OLS, Least Square Dummy Variable and Generalized Least Squares, while Ma, Hong and Zhang (2014) investigated the impact of tourism and its spatial linkages on the economic growth of cities in China.

In Indonesia, several studies of tourism have been carried out. However, these studies are limited to only one province or region and so do not analyse spatial linkages. Sudapet, 2017 conducted modelling, mapping and economic feasibility testing of maritime, economic and tourism integration in eastern Indonesia in order to improve the economy of the region, along with the creation of a geographic information system to support such economic development. Primadany (2013) analysed the strategy of the Nganjuk Regency Regional Culture and Tourism Office in the development of regional tourism and the factors influencing regional tourism development in the region using descriptive analysis, while Rani (2014) described the factors that explain tourism development in Sumenep Regency, Madura, East Java using descriptive methods. Qadarochman (2010) analysed the factors that influence regional revenues from the tourism sector of the city of Semarang and the influence of these factors on the regional income of Semarang, using a multiple linear regression approach.

Thus until now, research that analyses the effects of tourism spillover and its impact on economic growth in a region and surrounding regions in Indonesia remains unavailable. This study was therefore

conducted with a spatial approach that analyses spatial linkages at the provincial level, so that it is expected to be able to identify indicators that cause tourism growth to spread between regions. This research uses a spatial approach: that is, analysis of spatial linkages at the provincial level. With data from 33 provinces in Indonesia from 2011 to 2016, spatial analysis was carried out using Moran's I test and spatial regression.

This paper is organized as follows. The first section provides an overview of the importance of the research and its novel aspects. The second part describes the data and variable construction along with empirical modelling and related estimation issues. The fourth section provides results and analysis and the final section provides our conclusions.

Mankiw, Romer and Weil (1992) modified the Solow model by adding accumulation of human capital and physical capital as aspects of the model. The Solow model uses savings rates, population growth and technological progress as exogenous factors. There are two inputs, capital and labour, which are paid according to the marginal product. After adding human capital the assumption is $\alpha + \beta < 1$, which means decreasing return to scale for all capital and production over time t is

$$Y_t = K_t^\alpha H_t^\beta (A_t L_t)^{1-\alpha-\beta} \quad (1)$$

where Y is output, K is capital (capital), L is labour (labour), A is the level of technology and H is the stock of human capital. Thus in this model, output is generated from physical capital, human capital and labour, which is used for physical capital investment, investment in human capital and consumption.

A common specification of agglomeration economies is that aggregate urban external effects emerge as the sum of a large number of individual externalities. In their research, Rosenthal and Strange illustrate externalities as being between companies, even though they can also be between individuals. Consider two companies, j and k . The influence of development on development depends on the scale of activities in both companies. In addition, the impact of k on j also depends on the distance between the two companies, where distance is measured by three different dimensions. First, the effect of j on k depends on the geographical distance between the two companies, denoted as d_{jk}^G . Second, it also depends on the type of industrial activity that occurs in the two companies, denoted as dd_{jk}^I . Two companies that carry out the same type of production will have $d_{jk}^I = 0$, and d_{jk}^I will increase because the production process becomes increasingly unequal. Third, the impact of the interaction can be extended temporally. At any time, development of j can benefit from interaction with the establishment at some point in the past. This temporal time dimension is denoted as d_{jk}^T .

Assume that all the benefits of interaction with the development of $k \in K$ are equal to $q(x_j, x_k)a(d_{jk}^G, d_{jk}^I, d_{jk}^T)$. The first expression, $q(x_j, x_k)$, reflects the benefits of interactions that depend on the scale of activities of j and k , which are indicated by their input vectors x_j and x_k . After that, assuming the scale of interaction is constant, the benefits of interaction with the formation of $k \in K$ at d_{jk}^G geographical distance, d_{jk}^I industrial distance and d_{jk}^T temporal distance are defined as $(d_{jk}^G, d_{jk}^I, d_{jk}^T)$. The total benefits of the agglomeration enjoyed by development of j are then equal to the above number of interactions of agglomerative effects as a function of geographical, industrial and temporal distance:

$$A_j = \sum_{k \in K} q(x_j, x_k)a(d_{jk}^G, d_{jk}^I, d_{jk}^T) \quad (2)$$

In empirical studies of factors that affect tourist development it is identified that R&D in tourism comes from the tourism infrastructure itself. The proxy that can be used is the number of accommodations available. Naudé and Saayman (2005) and Zhang and Jensen (2007) use the number of hotels available. Yang and Fik (2014) and Yang and Wong (2012) use the number of starred hotels in each city.

Tourism is also related to infrastructure in other sectors, such as transportation and telecommunications (Yang and Wong, 2012). According to Paci and Marroccu (2013), tourism activities tend to form territorial groups that have large infrastructure (airports, ports, conference centres, museums). This infrastructure can help ease accessibility between one region and another, so that the transportation costs borne by the tourist will be reduced. Marroccu and Paci (2010) use an accessibility index, while Naudé and Saayman (2005) use the number of internet users.

In terms of technological developments and transfers in the tourism industry, previous research used foreign direct investment (FDI) (Zhang and Jensen, 2007), FDI in hotels and restaurants (Yang and Fik, 2014), and total FDI relative to GDP (Yang and Wong, 2012) to measure technological developments and the openness of the tourism industry in an area. The results indicate that FDI has a significant and positive influence, so that as FDI increases, especially in tourism-related sectors, the number of tourists will also increase.

Unlike the manufacturing industry, tourism is based on service, and the tourism industry's productivity is therefore more dependent on knowledge and human skills than mechanical equipment. At the regional level, according to Rauch (1993, quoted in Marroccu and Paci, 2010, p.7), the availability of a highly-educated workforce is an advantage for innovative company localization, thus encouraging local productivity. Marroccu and Paci (2010) use the ratio of the population who have obtained a bachelor's degree per thousand of population as a measure. Marroccu and Paci (2010), Paci and Marroccu (2013), Yang and Fik (2014) and Zhang and Jensen (2007) all find that human capital has a significant and positive effect on the number of tourists coming to an area.

Furthermore, according to Proença and Soukiazis (2008), at the regional level, tourism can help overcome the problem of unemployment and replace the economic activities of regions that have lost their competitive advantage (especially in the agricultural sector). Tourism also has a spillover effect on many economic activities, such as transportation, trade, construction, accommodation, the food and beverage industry and other services. According to Naudé and Saayman (2005), tourism is very important for economic development through its influence on employment, exports, stimulation of infrastructure provision and tax generation.

2. METHODS

2.1. Empirical techniques

Moran's I is used to test whether there is spatial linkage of tourism. The Moran's I index estimates whether there is a relationship between X_i and X_j , where i and j are notations for location i and location j . The Moran I index is calculated using the following formula:

$$I = \frac{N}{\sum_i \sum_j w_{ij}} \frac{\sum_i \sum_j w_{ij} (x_i - \bar{x})(x_j - \bar{x})}{\sum_i (x_i - \bar{x})^2} \quad (3)$$

Equation 3 is the Moran I index, where N is the number of observed regions. In this study, the number of regions that will be observed are 33 provinces in Indonesia. X is the variable to be analysed, and W_{ij} is a spatial weighting matrix. The value of I has an interval of between -1 and 1. If the value of

$I > 0$ then there is a positive spatial autocorrelation of the variables. Otherwise, if the value of $I < 0$ there is a negative spatial autocorrelation.

Statistically, Moran's I test can be performed to test the significance of the existence of spatial autocorrelation with the hypotheses:

H_0 = There is no spatial autocorrelation

H_1 = There is spatial autocorrelation

Hypothesis testing is carried out by calculating the Moran's statistical value using the following formula:

$$I^* = \frac{I - E(I)}{\sqrt{V(I)}} \quad (4)$$

This research will use SDM, which is an autoregressive model with spatial lag influence on the dependent and independent variables, where this model is formed if $\lambda = 0$. The spatial lag model is developed to accommodate the effects of spatial linkages on the independent variables. SDM is chosen to reveal the effects of endogenous and exogenous interaction effects. The effects of endogenous interactions occur when the dependent variable in region i affects the dependent variable in region j where $i \neq j$ (i and j are notations for the region). Exogenous interaction effects occur when the independent variables in region i affect the dependent variable in region j where $i \neq j$ (Elhorst, 2011). Thus, SDM can reveal the spatial lag impact of both the dependent and independent variables. In general, the form of SDM is as follows:

$$Y = \rho WY + \alpha I_n + X\beta + WX\theta + \varepsilon \quad (5)$$

2.2. Model specification

Based on the general model of SDM and the determination of the variables used, the authors create the following specification model to estimate the factors that can affect tourism growth and the factors that can provide tourism spatial externalities between provinces in Indonesia.

$$\begin{aligned} \text{numberoftourists}_{it} = & \rho W \text{numberoftourists}_{it} + \alpha + \beta_1 \text{accomodation}_{it} + \beta_2 \text{productivity}_{it} \\ & + \beta_3 \text{lasteducation}_{it} + \beta_4 \text{loginvestment}_{it} + \beta_5 \text{loginfrastrucurebudget}_{it} \\ & + \beta_6 \text{populationdensity}_{it} + \beta_7 \text{internetaccess}_{it} + \gamma_1 W \text{accomodation}_{it} \\ & + \gamma_3 W \text{productivity}_{it} + \gamma_4 W \text{lasteducation}_{it} + \gamma_5 W \text{loginvestment}_{it} \\ & + \gamma_7 W \text{infrastructurebudget}_{it} + \varepsilon_{it} \end{aligned} \quad (6)$$

Next, a model to estimate the impact of tourism on regional economic growth or GDRP is created. The following equation also uses SDM.

$$\begin{aligned} \text{gdrpgrowth}_{it} = & \rho W \text{gdrpgrowth}_{it} + \alpha + \beta_1 \text{gdrp}_{it} + \beta_2 \text{foreigntourists}_{it} \\ & + \beta_3 \text{domestictourists}_{it} + \gamma_1 \text{gdrp}_{it} + \gamma_2 \text{foreigntourists}_{it} \\ & + \gamma_3 \text{wdomestictourists}_{it} + \varepsilon_{it} \end{aligned} \quad (7)$$

This study will use a distance matrix of 200 km from a provincial land border to determine the status of 'neighbour'. Provinces that enter the radius will be considered as neighbours and be given the value 1, while provinces outside this radius will have the value of 0.

$$W_{ij}^c \begin{cases} 1 & \text{if } i \text{ is in } 200 \text{ Km radius from } j \\ 0 & \text{if } i \text{ is not in } 200 \text{ km radius from } j \end{cases} \quad (8)$$

This study also uses a contiguity matrix. Considering the unique conditions of the Indonesian archipelago, the matrix of contiguity or proximity is appropriate for use in examining the impact of spatial autocorrelation (Vidyattama, 2014). The spatial weighting matrix for proximity is represented as a binary condition of 1 if there are general limits and 0 otherwise.

$$W_{ij}^c \begin{cases} 1 & \text{if } i \text{ intersects with } j \\ 0 & \text{if } i \text{ does not intersect with } j \end{cases} \quad (9)$$

The SDM panel model in this study will be processed using the XSMLE command in Stata developed by Belotti et al. (2013), which will be estimated by the quasimaximum likelihood technique using random effects for the first model and fixed effects for the second model. Estimation using random effects or fixed effects is decided after conducting the Hausman test to choose which is more suitable for estimating the data panel model. Estimation using XSMLE is performed by making the spatial lag dependent variable an exogenous regression. This is done as a solution to the bias that occurs (Belotti, 2013).

2.3.Data and variables

In analysing the factors that influence tourism growth and that can create externalities which impact on neighbouring provinces, the dependent variable is the total number of tourists. The total number of tourists comprises the total number of tourists both domestic and foreign. In the second model, the proxy used to analyse the impact of tourism on regional economies is GDRP growth.

The independent variables for the first model are tourism infrastructure, public infrastructure, labour productivity, human capital and technology transfers. The proxy for tourism infrastructure is the number of accommodations (hotel and non-hotel). The proxy for human capital is education measured by the number of residents whose highest level of education is high school or university from total population. Investment is also used in this research to represent technology transfers or means that investment will create innovations, both tourism innovations or other innovations that will also give an impact to tourism. Labour in this study refers to the labour productivity of hotels and restaurants. Lastly, the proxy for public goods infrastructure is the total public goods budget. In this research, used not only public expenditure that directly impacting tourism, but all or total public infrastrutre expenditure, in expect that public infrastructure will improve accessibility to destinations and convenience for tourists. Population density and internet access are also included as control variables. Population density is a control variable for additional information on the impact of human capital on tourism. Also, internet access is a control variable for additional information on the impact of technology on tourism. All independent variables are expected to be positively correlated with tourism.

In the second model, the independent variables used are GDRP in region *i*, foreign tourists and domestic tourists. The SDM includes spatial lags from independent variables, so there are spatial lags from GDRP, the number of foreign tourists and the number of domestic tourists, which also become independent variables of the model to reveal the spatial relationship of the number of tourists with regional economic growth. All independent variables are assumed to be positively correlated with the rate of regional economic growth.

This study uses panel data at the provincial level, consisting of 33 provinces in Indonesia from 2011 to 2016, drawn from secondary data. In the model to estimate the factors that influence tourism growth, the variables used and their hypotheses and sources are presented in Table 1.

Table 1. Definition of variables and data sources for estimate model 1

	Variable name	Definition	Hypothesis	Unit	Source
Dependent	Number of tourists	Total number of foreign and domestic tourists		Person	Statistics Indonesia
Independent	Accommodation Tourism infrastructure	Total number of star and non-star hotels	Positive significant	Unit	Statistics Indonesia
Independent	Highest education level – high school or university Human capital	Residents whose highest education level is high school or university	Positive significant	Person	Indonesia Economic Census
Independent	Investment Technology transfers	Total domestic and foreign direct investment	Positive significant	Billion rupiah	Investment Coordinating Board
Independent	Tourism labour productivity Labour productivity	GDRP generated per worker in the hotel and restaurant sector	Positive significant	Rupiah/person	Statistics Indonesia
Independent	Public infrastructure budget Public infrastructure	Utilization of government budget for public infrastructure	Positive significant	Rupiah	Directorate General of Financial Balance
Control	Population density	Number of residents per 100 km ²	Positive significant	Person/km ²	Statistics Indonesia
Control	Internet access	Percentage of residents able to access the internet in the previous three months	Positive significant	Per cent	Statistics Indonesia

Source: processed by the author

In the model to estimate the impact of tourism on the regional economy, the variables used and their sources are presented in Table 2.

Table 2. Definition of variables and data sources for estimate model 2

	Variable name	Definition	Hypothesis	Unit	Source
Dependent	GDRP growth	GDRP growth at constant price		Per cent	Statistics Indonesia
Independent	GDRP	GDRP at constant price	Positive significant	Billion rupiah	Statistics Indonesia
Independent	Foreign tourists	Total number of foreign tourists	Positive significant	Person	Statistics Indonesia
Independent	Domestic tourists	Total number of domestic tourists	Positive significant	Person	Statistics Indonesia

Source: processed by the author

3. RESULTS

3.1. Tourism distribution

According to tourist figures for 2016, the most visited areas in Indonesia are Java, Bali, Sumatra and Kalimantan. The lowest number of tourists visit eastern Indonesia. This reflects ease of access in the western regions of the country. The economy and government are centred on Java and so development continues to be focused on the Java region and its surroundings. Access difficulties make the attractiveness of eastern Indonesia poor because travel costs are higher. Intra-island access is also still underdeveloped, so the travel time to tourist destinations is long and this limits the number of places that tourists can visit at a time.



Figure 4. Distribution Map of Indonesia's Total Tourist in 2005



Figure 5. Distribution Map of Indonesia's Total Tourist in 2010



Figure 6. Distribution Map of Indonesia's Total Tourist in 2016

Source: processed by the author

The spread of Indonesian tourism from 2005 to 2016 experienced a changing trend. From quantile scale on the top left, inform that the bolder the color, the higher the number of tourist in that province. Figure 4 shows that the number of tourists in 2005 in most regions in eastern Indonesia were in quantile 3. In 2010, Maluku moved to quantile 4, while West Nusa Tenggara also moved to a higher quantile. In 2016, tourism to Papua lagged behind, but in contrast there was an increase in several provinces of Sulawesi. This indicates that the spread of tourism is expanding. However, the disparity in tourist numbers is also rising with increasing distance; that is, in being farther away from Java or other tourism centres.

3.2. Spatial autocorrelation

Moran's I test estimates spatial autocorrelation with the number of tourists, as an explanation of the development of tourism and GDRP which in turn explains development in regional economies. The test results show a spatial autocorrelation of the number of tourists and GDRP. The Moran's I estimation results suggest significant numbers of tourists with considerable value. This indicates that there is a linkage between tourism development and GDP between provinces in Indonesia.

Table 3. Moran's I of the number of tourists

Variable	I
Total tourists 2011	0.125 ***
Total tourists 2012	0.123 ***
Total tourists 2013	0.089 ***
Total tourists 2014	0.094 ***
Total tourists 2015	0.111 ***
Total tourists 2016	0.118 ***

Source: processed by the author

Table 4. Moran's I of GDRP

Variable	I
GDRP 2011	0.086 ***
GDRP 2012	0.087 ***
GDRP 2013	0.09 ***
GDRP 2014	0.091 ***
GDRP 2015	0.092 ***
GDRP 2016	0.093 ***

Source: processed by the author

3.3. Estimation results

3.3.1. Descriptive summary

The observations used in this study were 33 provinces in Indonesia from 2011 to 2016, so the total number of observations for each variable was 198. *Numberoftourists* was the dependent variable from the first estimation model which estimates the factors affecting tourism. In explaining physical capital, two measures are used: accommodation, which is an independent variable in explaining tourism capital, and public infrastructure budget. *Accommodation* variables are the number of accommodations in each province in units. *Loginfrastructurebudget* is the utilization of public infrastructure budget.. The value of *loginfrastructurebudget* is transformed into log form to resolve scale differences. In explaining human capital in terms of education, *lasteducation* is the number of residents whose highest level of education is high school or university. *Loginvestment* in this research is total investment, in all sectors, not tourism investment only. The investment referenced in this research comprises foreign investment and domestic investment. *Investment* is also transformed into log form to overcome the problem of scale differences. Next, *productivity* is an independent variable in explaining labour, represented by labour productivity in the hotel and restaurant sector. *Population density* and *internet access* are control variables, where *population density* is the population per km², while *internet access* is the percentage of internet users in the population in the previous three months.

The second estimation model is a proxy of how tourism contributes to the regional economy, in this case GDRP. The data set consists of 198 observations. The dependent variable of this model is GDRP growth rate based on constant prices. The independent variables are *GDRP*, *foreigntourists* and *domestictourists*. GDRP is the total GDRP of each province. *Foreigntourists* is the number of foreign tourists who come to the province, while *domestictourists* is the number of domestic tourists. These sources of tourists are separated so that it is possible to assess which is likely to have a greater impact.

Table 5. Descriptive summary

Variables	Unit	Obs	Mean	Std dev	Min	Max
<i>numeroftourists</i>	Person	198	1436618	1686446	48837	8325966
<i>accommodation</i>	Unit	198	516.8788	529.6286	76	2294
<i>productivity</i>	Rupiah/person	198	7388719	8329764	579241.4	4.30E+07
<i>lasteducation</i>	Person	198	2041316	2599868	217531.3	1.27E+07
<i>loginvestment</i>	Billion rupiah	198	6.968996	2.164547	0.536309	10.74943
<i>loginfrastructurebudget</i>	Billion rupiah	198	7.739376	0.87808	4.201121	9.532972
<i>populationdensity</i>	Person/km ²	198	907.0806	2953.404	2	15478
<i>internetaccess</i>	%	198	33.41167	13.12755	10.49	76.96
<i>gdrpgrowth</i>	%	198	5.844697	2.501229	-4.28	21.77
<i>loggdrp</i>	Billion rupiah	198	11.72758	1.168049	9.680497	14.24689
<i>foreigntourists</i>	Person	198	343736.7	1058501	0	7177955
<i>domestictourists</i>	Person	198	2553537	3280702	48730	1.76E+07

Source: processed by the author

According to the data sets, the lowest tourist arrivals were 48,837 tourists in the province of West Sulawesi in 2011, while West Java had the highest tourist arrivals. More specifically, the provinces with the lowest numbers of foreign and domestic tourists are West Sulawesi in 2014 and 2011, namely 0 and 48,730 tourists, respectively. The highest arrivals of foreign tourists are in Bali from 2011 to 2016. The highest domestic tourist arrivals are West Java in 2016, at 555,755 tourists. The lowest GDRP growth was -4.28% in Papua in 2011 and the highest was East Nusa Tenggara in 2015, at 21.77%. Jakarta has the highest GDRP while the lowest is Maluku.

Provinces with the fewest accommodations according to the data set are Gorontalo in 2011, namely 76 accommodations. The largest number of accommodations is 2294 in East Java Province in 2016. The least educated (high school or university) population and the lowest labour productivity in the hotel and restaurant sector is found in West Sulawesi Province in 2011. The most highly-educated population is in West Java, at 12,673,223 residents. The highest labour productivity in the hotel and restaurant sector is in DKI Jakarta.

The province which received the lowest investment was Maluku in 2011, at Rp 1,709,684,000 and the highest was East Java in 2016 at Rp 46,603,318,160,000. Bangka Belitung Islands is the province with the lowest public infrastructure budget utilization, while the highest is East Kalimantan. The lowest population density in each year from 2011 to 2016 is West Papua and the most populous is DKI Jakarta. The province with the lowest percentage of internet users was East Nusa Tenggara and the highest was DKI Jakarta, at 10.49% and 76.96%, respectively.

Based on a summary of data sets, the highest values are generally found in provinces in Java, while the lowest are generally found in provinces in eastern Indonesia. This indicates that most economic and tourism-related development was carried out in Java from 2011 to 2016. Thus it can be inferred that tourism and the regional economy in Indonesia need to be spread, so that not only the Java provinces are improved and so that development is not concentrated only in Java.

3.3.2. Factors affecting tourism

The first model analyses the factors that affect tourism. The main variables will explain the influence of a province's independent variables on its dependent variables. In addition, weighted

variables explain how the influence of the independent variables of neighbouring provinces impact upon the province itself.

From the estimation results presented in Table 6, it is apparent that the rho value is significantly positive in the category of the contiguity matrix. Rho is the coefficient of the weighted dependent variable, namely the number of tourists. That is, an increase in the number of tourists in the provinces that intersect with it will increase the number of tourists in a province. Thus, tourist arrival in a province in Indonesia will encourage tourists in the neighbouring provinces.

Table 6. Factors that affecting tourism estimation

Dependent variable: <i>numberoftourists</i>		
VARIABLES	Distance: 200 km	Contiguity
Main		
<i>accommodation</i>	652.7*** (144.1)	497.5*** (148.6)
<i>productivity</i>	0.0181* (0.00984)	0.0357*** (0.00866)
<i>degree</i>	0.526*** (0.0575)	0.572*** (0.0522)
<i>loginvestment</i>	17,437 (23,006)	3,400 (25,025)
<i>loginfrastructurebudget</i>	-5,976 (43,252)	-57,390 (46,355)
<i>populationdensity</i>	-33.13 (26.03)	-28.46 (23.26)
<i>internetaccess</i>	5,381 (5,611)	7,668* (4,581)
Weighted		
<i>accommodation</i>	466.5 (903.1)	603.7 (438.6)
<i>productivity</i>	-0.103* (0.0596)	-0.0188 (0.0206)
<i>degree</i>	-0.0648 (0.134)	-0.272*** (0.0934)
<i>loginvestment</i>	17,685 (100,129)	18,953 (26,115)
<i>loginfrastructurebudget</i>	-2,224 (168,973)	12,763 (30,263)
rho	0.229 (0.166)	0.179*** (0.0631)
lgt_theta	0.618 (0.470)	0.657 (0.530)
sigma2_e	1.372e+11 (0)	1.314e+11 (0)
Constant	-85,339 (978,546)	-115,227 (343,313)
Observations	198	198

Dependent variable: <i>numberoftourists</i>		
VARIABLES	Distance: 200 km	Contiguity
R-squared	0.941	0.942
Number of provincecode	33	33

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: processed by the author

The estimation results of accommodation variables have a significant positive effect on the number of tourists in both categories of matrices. On the distance matrix, the addition of one accommodation unit will increase tourists by 652, whereas in the contiguity matrix, the addition of one accommodation unit will increase tourists by 479.

Labour productivity in the tourism sector has a significant positive effect on both categories, that is an increase in labour productivity will increase the number of tourists in a province. On the other hand, human capital, measured as the population whose highest education is high school or university, has a significant positive influence on the number of tourists. Increasing population of high school and university graduates will increase the number of tourists in a province.

Investment have no significant effect on either category. This insignificance indicates that investment in a province does not affect the number of tourists. This may be because the author used investment in all sectors, not specifically investment in the tourism sector. The utilization of public infrastructure budget, as a proxy of public infrastructure, also has no significant effect on either category, so public infrastructure does not have an impact on the number of tourists in a province. On the other hand, the variable control by population density is negative but insignificant and Internet access has a significant positive effect on the number of tourists.

Weighted labour productivity in the hotel and restaurant sector is significant in the distance matrix category, while the population of high school or university graduates has a significant influence on the contiguity matrix, with both influences being negative. According to Yang and Fik (2014), positive associations describe the effects of agglomeration, while negative associations imply the effects of competition. Thus, the increase in productivity and the population of highly-educated neighbouring provinces will reduce the number of tourists coming to the province. Therefore, the results show that higher productivity and quality of the population in neighbouring provinces will hamper the growth of local tourism because of the effects of competition.

Weighting by physical capital, namely accommodation, investment and utilization of public infrastructure budgets, has no significant effect on the number of tourists. That is, accommodation, investment and budget utilization in neighbouring provinces will not affect the number of tourists in a province. This may be because people are easier to move than physical capital. To build physical capital requires more cost and time.

3.3.3. Tourism impact on economic growth

The second model analyses the impact of foreign and domestic tourists on the GDRP growth of a province. The estimation results show a significant positive rho value in the contiguity matrix category. That is, increasing GDRP growth in provinces that are directly in contact will increase the GDRP growth of a province.

Table 7. Tourism impact on economic growth estimation

Dependent Variable : <i>gdrpgrowth</i>		
VARIABLES	Distance: 200km	Contiguity
Main		
<i>loggdrp</i>	17.38*** (4.140)	18.31** (8.421)
<i>foreigntourists</i>	1.70e-07 (2.05e-07)	1.25e-06** (5.54e-07)
<i>domestictourists</i>	-1.65e-07 (1.07e-07)	1.18e-08 (1.26e-07)
Weighted		
<i>loggdrp</i>	-27.14*** (5.378)	-20.99*** (7.847)
<i>foreigntourists</i>	1.43e-05*** (4.25e-06)	6.72e-07 (1.09e-06)
<i>domestictourists</i>	-5.11e-07 (6.52e-07)	-4.07e-08 (1.49e-07)
rho	0.115 (0.0797)	0.194*** (0.0473)
sigma2_e	2.761** (1.172)	3.004** (1.466)
Observations	198	198
R-squared	0.012	0.002
Number of provincecode	33	33

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: processed by the author

From the estimation results of the main variables, *loggdrp* has a significant positive effect on both categories of matrix. A 1% increase of GDRP will increase GDRP growth by 0.17 in the distance matrix and by 0.18 in the contiguity matrix. However, the estimation results from the weighted GDRP have a significant and negative effect. That is, increase in the GDRP of neighbouring provinces within a 200 km radius or which have a direct border will reduce the GDRP growth of a province. This indicates that economic activities in Indonesia are competitive. Thus, an increase in GDRP by its neighbours will hamper the growth of a province's GDRP.

Foreign tourists also have a positive effect on GDRP growth in the matrix of contiguity. The arrival of one tourist will increase GDRP growth. Moreover, in both categories, foreign tourists have a significant positive effect. This implies that the increase of tourists in neighbouring provinces will increase the GDRP growth of a province.

Domestic tourist variables are positive and negative but do not have significant effect. Weighted domestic tourist variables were negative, but had no significant effect on GDRP growth. This suggests that an increase in domestic tourists in neighbouring provinces will reduce the GDRP growth of the province, but the insignificant value indicates that domestic tourists who do visit the

province will not affect its GDRP growth. Also, no matter how many domestic tourists come to neighbouring provinces, the GDRP growth of a province will not be affected.

4. DISCUSSION

The main variable of accommodation, labour productivity and last education has positive significant value, means that the increase of these three variables will also increase the number of tourists of that provinces. Accommodation in an area is an indicator of the capacity of the tourism sector, that is, the more rooms, the higher the capacity, and this will make the tourism sector in the area more competitive because it can offer cheaper prices in a state of *ceteris paribus*. Previous literature also presents the same results, suggesting that higher-quality human capital will create innovations, especially in the field of tourism. Thus, explain the positive significant value of last education and labour productivity. Labour is therefore an important factor that can increase the tourism attractiveness of a province. Labour productivity is a key indicator of labour performance. This estimation result reflects every worker in the tourism sector generating high income and a good management system.

The main variable of investment and spending on public infrastructure does not significant. This indicates that investment spending on public infrastructure has not been optimal in improving regional efficiency, suggesting that infrastructure needs to be improved, especially in supporting infrastructure for tourism growth.

The more dense the population in a province, the higher the economic activity. However, from the estimation results, denser population in a province will reduce tourist arrivals, or densely populated areas will become less attractive to tourists. This can happen because tourism in Indonesia is based on natural tourism and cultural tourism. However, results that are not statistically significant suggest that tourist arrivals are not affected by population density. The population density of a province will increase or decrease the number of tourists.

The estimation results also indicate that an increase in internet access in a province will increase the number of tourists visiting. The internet as a means of unlimited communication can help market tourism destinations in the province. More information will be obtained by tourists regarding tourist attractions, accommodation and accessibility.

The results of the weighted variables are not substantially different from the results of the main variables. Where the variables have been weighted with distance dimensions, only the population being highly educated and the productivity of the workers in the hotel and leisure sectors have a significant influence on the number of tourists, and this influence is negative. Meanwhile, physical capital such as tourism infrastructure has no significant effect. This may be because humans are more easily mobilized compared to physical capital. Also, this may be because tourism is a service sector, where its productivity is more dependent on knowledge and human skills than mechanical equipment.

The results of weighted variables that are not significant also indicate that tourism agglomeration has not occurred yet in Indonesia. Thus, the growth of neighbours in terms of tourism infrastructure, investment and public infrastructure has no impact on the growth of tourism in a province. This indicates that the flow of knowledge is still limited locally.

The beneficial impacts of geographical proximity have not been obtained from regional tourism in Indonesia: that is, the flow of tourists is limited to the province alone and has not been transmitted to neighbouring regions through spatial spillover. Regional tourism in Indonesia has not utilized geographical proximity to increase tourism growth. According to Capone and Boix (2008, quoted in

Yang and Fik, 2014, p. 6), tourism growth is very dependent on economic agglomeration rather than just on endowment of resources. It is unfortunate that tourism agglomeration has not been created in Indonesia, given the opportunities that exist.

Lastly, from the economy perspective, weighted GDRP has negative significant value. This indicate that provinces in Indonesia are compete with their neighbour provinces. The main and weighted variable of foreign tourist both has positive significant value. This means that an increase of foreign tourist whether from its own province or neighbour provinces, will increase GDRP growth of that province. However, domestic tourist does not significant to GDRP growth, both the main and weighted variables.

5. CONCLUSION

The tourism industry is expected to be a major contributor to the Indonesian economy. In addition, there has been a decline in the trend of the contribution of oil and gas exports, and an increase in the contribution of foreign exchange tourism has opened up opportunities for Indonesian tourism. The shape of the Indonesian archipelago makes the possibility of economic agglomeration possible. But Indonesian tourism is still focused on Bali and the regional economy is still centralized in Java.

The results of the Moran's I test indicate the spread of tourism in Indonesia. The results showing a significant positive spatial relationship found in the variable number of tourists and GRDP support the results of Marroccu and Paci (2010). They indicate that the level of tourism and economy in a particular province is positively influenced by the level of tourism and the economy of other provinces, in accordance with the disappearance of the distance effect and because of the transmission effect.

In efforts to increase tourism in every province in Indonesia, the influencing factors are tourism capital, labour productivity and human capital. In contrast, physical capital, namely investment and public infrastructure, does not have a significant effect on the number of tourists in a province. This shows that factors related to human resources are more supportive of tourism growth than physical capital. These results support Rauch (1993, quoted in Marroccu and Paci, 2010, p.7), who suggests that the tourism industry is service-oriented, unlike manufacturing industries, and so productivity is more dependent on knowledge and skills and human ideas than on mechanical equipment.

However, this indicates that tourism agglomeration has not yet taken place, so the growth of accommodation, investment and budget utilization of public infrastructure has no impact on the number of tourists in the province. That is, the flow of knowledge is still limited locally.

The main variables of GRDP and foreign tourists have a significant positive effect on GRDP growth. However, weighted GRDP has a significant negative effect, while weighted foreign tourists have a significant positive effect.

This research suggests that government should encourage educational development in provinces in Indonesia and focus on building tourism centres in provinces outside Java. It should also seek to improve productivity and management in tourism. These findings and recommendations relate to points contained in the 'Community in Tourism Destination Development Strategy' and 'Tourism Institution in Government Regulation No. 50 of 2011' concerning Master Plan for National Tourism Development in 2010–2025. Furthermore, government should more strongly encourage the development of tourism in provinces outside Java, because within Java the role of other sectors besides tourism is more important. This is related to the contents of Government Regulation No. 50 of 2011 concerning Master Plan for National Tourism Development in 2010–2025.

6. BIBLIOGRAPHY

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