



Impact of Environmental Policy Factors on Tourism Industry: A Study from Indonesia Over Last Three Decades

Andriansyah Andriansyah^{1*}, Taufiqurokhman², Ismail Suardi Wekke³

¹Universitas Prof. Dr. Moestopo (Beragama), Indonesia. ²Universitas Prof. Dr. Moesto (Beragama), Indonesia, ³Sekolah Tinggi Agama Islam Negeri (STAIN) Sorong, Indonesia. *Email: andriansyah@dsn.moestopo.ac.id

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ABSTRACT

The purpose of the present study analysis is to empirically examine the impact of various environmental factors on the Tourism industry in Indonesia. To achieve this objective, data is collected from World Development Indicators during the time of 1996-2016 under the title of environmental factors as defined by the experts of the world bank. A time of 22 years has been finalized for the predictors of tourism industry like forest area (FA), population growth, energy use, agriculture, forestry and fishing along with CO₂ emissions. Both descriptive and regression analysis techniques have been applied while adding the lagged predictors of both tourism industry and environmental factors. Eight regression models have been developed and results are generated through statistical tools like STATA-14. Findings of the study indicate that FA and population growth are the significant determinants of the tourism industry. Among the lagged predictors, international tourism (lagged), Nitrous oxide emissions, and lagged values of FA are significantly affecting international tourism receipt (ITR) in the region of Indonesia. For the 2nd proxy; tourism expenditures, the key determinants under model 5–8 are, international tourism (lagged), Nitrous oxide emissions (lagged), CO₂ emission (lagged) and population growth. As per the practical implications, this study is very much useful for both the industry experts and policymakers at macro-level. Considering the set of factors as explained in the present study will provide new insight regarding sustainable development through environmental factors of the tourism industry. However, the key limitations are the lack of advance time series investigation, ignoring the impact of macroeconomic indicators and cross region analysis.

Keywords: World Development Indicators, Environmental Factors, Tourism Industry, Indonesia

JEL Classifications: Q56, R11

1. INTRODUCTION

In various studies, the field of tourism and related industries have been examined both theoretically and empirically. For the development of tourism, various developed and developing economies have taken initiatives and corrective measures as this sector are significantly contributing to the economic growth. Many efforts have been made and several ideas have been promoted and implemented to solve the problems regarding the development and sustainability in the field of tourism (Puczko and Ratz, 2000). Most of the studies have focused on the context of regional tourism indicators and their impact on the overall outcome of the industry. Various method lies have been applied which are explaining

the fact that tourism activities are carried out under the title of sustainability. However, the question of sustainable tourism can only be achieved if various factors from the environment are under consideration. Nonetheless, the tourism industry has various components which need reasonable attention. Meanwhile, the field of tourism has been examined from the context of nature area tourism and ecotourism as well.

The idea of nature idea tourism is concerned with the wide categories of alternative forms like the natural environment. Various visitors left their homes to visit those places which are very close to the natural environment (Khan and Rasheed, 2016; Min et al., 2016; Hosseinnia and Shoja, 2017; Goral and Akgoz, 2017;

Haseeb, Hassan, & Azam, 2017; Wekke et al., 2017; Taqi et al., 2018). On the other hand, the concept of ecotourism covers the theme like ski running, fishing, nature photography, observation of animals and plants, climbing and hiking and finally sailing as well. Besides, the sustainability of the tourism is a very complex idea as one must cover the long run theme of charm and guarantee associated to the field of tourism with the growth of the industry, capital and country progress. Sustainable tourism concept deals with the protection of the environment, biological diversity and similar other concepts.

From the context of Indonesia, its tourism industry is booming since 2017 and almost 14 million tourists have been welcomed by the country. This number is >2 million as compared to the year 2016. This increase in the visitors has brought a significant flow of foreign currency and growth in the local industry as well. Back in the year 2015, the ministry in Indonesia has established a 5-year strategic plan with a clear objective up to the year 2019. This plan has covered the goals like 20 million visitors, target to get Rp. 240 trillion or 17.2 billion dollars in foreign exchange and provision of employment to almost 13 million in the local economy. To achieve these strategic objectives, the ministry of tourism and creative economy, financing and other production firms have been added to the model. To provide good transportation services, a countrywide road contribution projects are also under consideration in recent years by the local Government. The graph below explains the trend of the tourism industry in Indonesia regarding ITR and international tourism expenditures for travel items in US dollars from 1995 to 2016 (Figure 1).

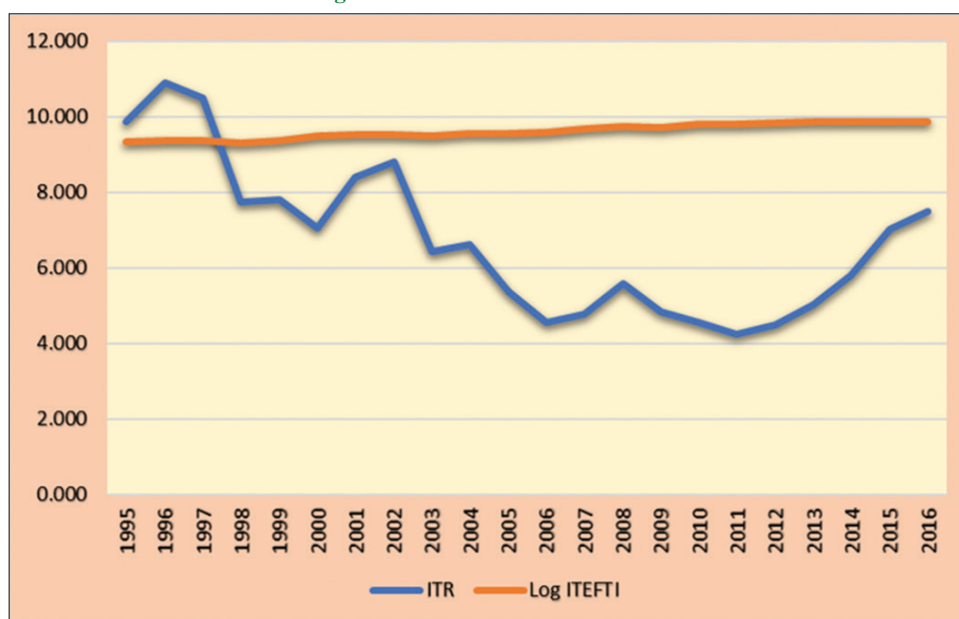
2. LITERATURE REVIEW

In the present literature, the field of tourism and the related destination is known as a significant topic. For instance, in the study of (Milovanović, 2013) explains that tourism destination generally

consists of various organizations, multiple sectors, infrastructure and various public and private sector firms. The field of tourism covers the idea of environmental factors and their linkage with the overall progression in the country as well. It is capable of prop up conservation through both domestic and international funds, and environmental cost factors as well (Balmford et al., 2009; Buckley, 2012). The idea of sustainable development was under significant attention since the last couple of decades. It is defined as the development which can meet the current requirement without hurting the future perspective or generation (Hopwood et al., 2005). In the field of tourism, this idea is covered by numerous authors and have defined sustainable development in the field of tourism (Coccosis, 2016). However, the most significant definition is provided by world tourism organization which covers the fact that sustainable tourism development can meet the needs of current time with the provision hosting services to various regions and protection from uneven natural harms (Halme, 2001; Honey, 2008; Sharpley, 2000; Okon, 2014; Khan and Rasheed, 2016; Hussien and Jones, 2016; Erdogan, 2016; Mayan and Nor, 2017; Yu-Chi and Lin, 2018; Taqi et al., 2018; Yu-Chi, 2018).

Meanwhile, the negative impact of tourism also occurs when the number of visitors increases as compare to the environmental stability of a specific place (Agarwal, 2002; Palmer and Riera, 2003). The problem of this type arises with the unplanned tourism and extra burden on many natural areas around the globe. Meanwhile, problems like this can create various problems and develop pressure on the local areas like soil erosion, increasing pollution, putting of waste materials into the sea, increasing pressure on endangering species and finally higher natural issues. In the existing body of literature (Dryzek, 2013). Meanwhile, environmental factors like population growth is another threat to tourism and economic development (Henry, 2014; Jones et al., 2014; Ghasemi, 2016; Zomorodi and Zhou, 2017; Kamran and Omran, 2018). A study conducted by (Sánchez-Rivero and

Figure 1: Tourism trend in Indonesia



Source: World Development Indicators (2016)

Cárdenas-García, 2014) have analyzed the association between the level of population in the 144 countries and its impact on the growth of tourism. It is found that those countries with the regressive population pyramids are facing more difficulties regarding the growth of population (Suryanto et al., 2018). To overcome this issue various international agencies are working for the effectiveness of tourism through poverty alleviation as well. Meanwhile, various studies have also discussed the link between forest areas (FA) and tourism. For instance, (Skłodowski et al., 2013) have conducted their study through questionnaire approach to analyze the association between preferences of visitors for the selection of FA for the tourism. findings of the study indicate that for the visitors, FA are presumed to be among the most interested ones. Some other environmental factors like Nitrous oxide emissions (thousand metric tons of CO₂ equivalent) and use of energy are also creating some issues for the global environment (Becken and Patterson, 2006). They have indicated the fact that various tourism activities require direct energy in both fossil and electricity, generated from petroleum and some other sources (Haseeb et al., 2018). Such consumption leads to the emission of greenhouse gases, and carbon dioxide as well (Becken and Simmons, 2002; Bilgen et al., 2008; Gössling, 2002; Kelly and Williams, 2007).

3. VARIABLES AND METHODS

The focus of the present study is to examine the impact selected environmental factors on the tourism industry from the context of Indonesia. For this purpose, environmental factors are considered as independent variables, while tourism measures like ITR as a percentage of total exports, and international tourism expenditures for travel items (measured through US dollars) are two dependent variables of the study. For independent variables, factors like FA, growth of population on annual basis, nitrous oxide omission (NOXIDE), Energy use (kg of oil equivalent per capita) or EUOILEQ, agriculture, forestry, and fishing, value added (% of GDP) or AFFVAD, and CO₂ emissions (metric tons per capita) or CO2E are added in the regression models. All these selected variables are entitled as “energy and environment” on the database of the world bank and same-titled is used in the present study. Data is collected from the official website of world development indicators (WDI) from 1995-2016.

All these variables are secondary in nature of the data. To analyze the empirical association between the environmental factors and tourism in Indonesia descriptive analyses are covering the portion of trends in the data set. While regression analyses are covering the empirical association between them. To conduct the regression analysis, eight regression models are examined for both the proxies of tourism in the region of Indonesia. Besides, lagged predictors of both dependent and independent variables are also added in the analysis portion to check the dependency of present values on past values.

4. RESULTS AND DISCUSSIONS

Table 1 expresses the value of descriptive results for all the variables of the study. For the first dependent variable; International tourism,

Table 1: Descriptive statistics

Variable	Obs	Mean±Standard deviation	Min	Max
ITR	22	6.724±2.032	4.243	10.89
FA	22	53.915±2.81	49.86	60.156
PG	22	1.352±0.094	1.137	1.541
NOXIDE	22	126000±65055.96	91312.67	370000
EUOILEQ	22	786.329±78.09	664.357	914.498
AFFVAD	22	14.963±1.808	12.974	19.613
CO2E	22	1.592±0.384	1.041	2.56
ITL1	21	6.687±2.074	4.243	10.89
FAL1	21	54.109±2.726	50.238	60.156
PGL1	21	1.362±0.083	1.181	1.541
NOXIDEL1	21	127000±66326.29	91312.67	370000
EUOILEQL1	21	780.226±74.448	664.357	898.408
AFFVADL1	21	15.034±1.821	12.974	19.613
CO2EL1	21	1.593±0.394	1.041	2.56

FA: Forest areas, ITR: International tourism receipt

receipts (% of total exports) or ITR has indicated a mean value of 6.724 with a standard deviation of 2.032. The minimum value for IT is found to be 4.243 and maximum is 10.89 during 1995-2016 in the region of Indonesia. The add the effect of environmental factors various indicators have been considered while taking the data from the WDI during last three decades. The first determinant from the overall environmental head is FA or FA with the average value of 53.915 indicates a good area covered in the region for the forest since last 22 years. This FA indicates a minimum area of 49.86% and a maximum of 60.156% respectively for the overall area of Indonesia. International tourism, receipts (% of total exports) or PG is also added to the model. the mean score of PG is 1.35 indicates a reasonable growth of population in the country with the very low deviation of 0.094. The maximum value of PG is 1.541 indicates that overall last 22 years, PG growth is found to be in the range of 1.50-2 as well. In the present world, the issue of Nitrous oxide emissions (thousand metric tons of CO₂ equivalent) is among the significant issues, indicating a mean score of 126,000 with the maximum value of 91312.67. Meanwhile, the environmental factor under the title of Energy use (kg of oil equivalent per capita) or EUOILEQ is 786.329 with the standard deviation of 78.09 and the maximum value of 664.357 and a minimum value of 914.498.

The factor of Agriculture, forestry, and fishing, value added (% of GDP) or AFFVAD explains an average value of 14.963 with the deviation of 1.808 as well. The value of CO₂ emissions (metric tons per capita) of CO2E has a mean score of 1.592 and standard deviation of .384 indicating. For the various lagged values of both independent and dependent variables, the mean score for the first lagged value of international tourism or lagged ITR (ITL1) is 6.687 is observed. For the FA, the lagged predictor has an average score of 54.109, for PGL1 this score is 1.362. These lagged values are considered with the first difference due to check the impact of their past values on the present values of the dependent variable under the title of ITR and International tourism, expenditures for travel items (current US\$) or Log ITEFTI over last three decades of the study. These lagged values provide the best predictions of present values of tourism-related variables.

After the descriptive trends of the data set, regression Tables 2 and 3 explains the findings for the various models as explained under the

Table 2: Regression models 1-4

Variables	(1)	(2)	(3)	(4)
	Model 1	Model 2	Model 3	Model 4
ITL1		0.588** (0.217)	0.582** (0.203)	0.104 (0.314)
FAL1		0.876* (0.474)	1.005** (0.384)	-1.944* (1.068)
PGL1		-22.88** (9.076)	-22.00** (8.673)	15.27 (21.85)
NOXIDEL1		-1.20e-05*** (2.36e-06)	-1.16e-05*** (2.24e-06)	-9.19e-06** (3.14e-06)
EUOILEQL1		-0.00619 (0.00900)		
AFFVADL1		-0.366* (0.197)	-0.254* (0.122)	0.0345 (0.210)
CO2EL1		-0.448 (0.531)		
FA	1.489*** (0.321)			3.347* (1.571)
PG	-27.79*** (8.668)			-43.34** (15.28)
NOXIDE	2.54e-07 (3.73e-06)			
EUOILEQ	0.00790 (0.0116)			
AFFVAD	0.171 (0.272)			0.231 (0.227)
CO2E	-0.516 (0.529)			-0.687 (0.432)
Constant	-44.00* (21.98)	-1.058 (22.86)	-16.41* (7.701)	-32.71* (17.85)
Observations	22	21	21	21
R-squared	0.821	0.892	0.884	0.937

Robust standard errors in parentheses. ***P<0.01, **P<0.05, *P<0.1

Table 3: Regression models 5-8

Variables	(1)	(2)	(3)	(4)
	Model 5	Model 6	Model 7	Model 8
ITL1		-0.0301** (0.0107)	-0.0287* (0.0151)	-0.0132 (0.0131)
FAL1		0.0270 (0.0192)	-0.00129 (0.0325)	-0.00651 (0.0593)
PGL1		-0.931* (0.506)	-1.126 (0.740)	5.960*** (1.015)
NOXIDEL1		-3.54e-07*** (1.09e-07)	-4.37e-07** (1.92e-07)	-1.68e-07 (1.34e-07)
EUOILEQL1		0.00138** (0.000549)		
AFFVADL1		0.00397 (0.0110)	-0.0206 (0.0136)	0.00306 (0.0104)
CO2EL1		0.0965*** (0.0309)		
Fa	-0.000390 (0.0122)			-0.123 (0.0849)
PG	-0.376 (0.228)			-3.921*** (0.719)
NOXIDE	-2.68e-07** (1.17e-07)			
EUOILEQ	0.00136*** (0.000395)			
AFFVAD	-0.00906 (0.00895)			-0.00526 (0.00822)
CO2E	0.113*** (0.0363)			-0.0228 (0.0199)
Constant	9.067*** (0.878)	8.402*** (1.083)	11.79*** (0.712)	13.89*** (0.822)
Observations	22	21	21	21
R-squared	0.961	0.966	0.926	0.987

Robust standard errors in parentheses. ***P<0.01, ** P<0.05, *P<0.1

portion of the methodology. For the first regression model, factors like FA, population growth, Nitrous oxide emissions (thousand metric tons of CO₂ equivalent), Energy use (kg of oil equivalent per capita), Agriculture, forestry, and fishing, value added (% of GDP), CO₂ emissions have been added in the model. For FA, it is found the effect is 1.489 with the standard error of 0.321, significant at 1% level of significance. It indicates a higher increasing level of FA, is significantly increasing the value of ITR in the region of Indonesia. For the population growth or PG, the effect of ITR is -27.79, significant with the 99% level of confidence, indicating that increasing population is negatively affecting tourism receipt and causing a declining in tourism earnings for Indonesia. For, the factors like NOXIDE, EUOILEQ, AFFEVAD, CO2E have shown their insignificant impact on the value of ITR during 1995-2016. The overall value of robust R-square is 82% approximately indicating a good variation in the dependent variable; ITR. For the 2nd regression models, lagged values for all the explanatory variables including ITR are under observed to predict the tourism receipt. The effect of ITL1 indicates 0.588 significant change in the value of ITR. It means that present values of ITR significantly and positively affecting ITR. For the lagged value of FA or FAL1, the effect of.876 indicates past lagged values of FA are significantly and positively affecting the ITR with the standard error of 0.474 respectively. For the population growth, the effect of lagged PG is -22.88 indicates that past values of the growth rate are negatively affecting the value of ITR in Indonesia. Such findings indicate

that the Government should pay serious attention towards the control of PG which in return positively increasing the revenue for the tourism industry. The effect of lagged of NOXIDE also explains a significant & negative effect on the value of ITR for the 21 years of observations. The similar negative effect is recorded for the value of AFFVADL1 which indicates lagged predictor of AFFVAD. However, for CO2E the lagged values indicate the effect of -0.448 which is not significant at 10 % level of significance.

For model 3, the effect of lagged predictors, except EUOILEQL1 is not considered as it is representing an insignificant effect which is finally eliminated. It is found that under regression equation 3 only significant indicators in terms of lagged values like ITL1, FAL1, PGL1, NOSIDEL1 and finally AFFVADL1 are added in the model. For ITL1 and FAL1, the significant positive impact is recorded and for the rest of the indicators, significant negative effect is recorded. Under the title of the 4th model, both lagged predictors and independent variables have been finally added to check their individual and overall impact on ITR. It is observed that when the lagged predictors are added in the model, the effect of ITL1, PGL1, AFFAVADL1, and AFFAVAD along with CO2E is found to be insignificant. The value of Robust-R-square is found to be 88.4% and 93.7 for the regression models under three and four respectively. Total number of observation for the first model is 22 indicating a full-time period, while under rest of the models is 21, explains the consideration of lagged 1 predictors.

For the 5th regression model, factors like FA, population growth, Nitrous oxide emissions (thousand metric tons of CO₂ equivalent), Energy use (kg of oil equivalent per capita), Agriculture, forestry, and fishing, value added (% of GDP), CO₂ emissions are again for the robust findings. A second dependent variable under the title of International tourism, expenditures for travel items (current US\$) with the log values in the title of log ITEFTI is added. For FA, it is found the effect is -0.00039 with the standard error of 0.0122 , insignificant at all level of significance. It indicates a higher increasing level of FA, is insignificantly decreasing the value of ITR in the region of Indonesia. For the PG, the effect on ITR is -376.79 , significant with the 99% level of confidence, indicating that increasing population is negatively affecting tourism receipt and causing a declining in tourism earnings for Indonesia. For the factors like NOXIDE, EUOILEQ, and CO2E have shown their significant impact on the value of ITR during 1995-2016. The overall value of robust R-square is 96% approximately indicating a good variation in the dependent variable; ITR.

For the 6th regression models, lagged values for all the explanatory variables including ITR are under observed to predict the tourism receipt. The effect of lagged ITR (ITL1) indicates -0.0301 significant change in the value of ITR. It means that the present values of log ITEFTI significantly and negatively affected by ITL1. For the lagged value of FA or FAL1, the effect of 0.0270 indicates past lagged values of FA are significantly and positively affecting the Log ITEFTI with the standard error of 0.0192 respectively. For the population growth, the effect of lagged PG is -0.931 indicates that past values of the growth rate are negatively affecting the value of ITR in Indonesia. The effect of lagged of NOXIDE also explains a significant and negative effect on the value of Log ITEFTI for the 21 years of observations. The similar negative effect is recorded for the value of AFFVADL1 which indicates lagged predictor of AFFVAD. However, for CO2E, the lagged values indicate the effect of 0.0965 , significant at 10 % level of significance.

For the 7th model, the effect of lagged predictors, like ITL1, and NOXIDEL1 have their significant contribution towards lagged ITEFTI. The value of Robust-R-square is found to be 0.926% and 0.987 for the regression models under seven and eight respectively. A total number of observation for the first model is 22 indicating a full-time period, while under rest of the models is 21, explains the consideration of lagged 1 predictor. For model 8, it is found that lagged values of PG have their significant and positive impact on the value of tourism proxy. While the impact of PG is found to be significant and negative for the whole time period of last 21 years. The rest of the indicators under model 8 has explained the insignificant impact on the value of tourism in the region of Indonesia.

5. CONCLUSION AND RECOMMENDATIONS

In the contemporary environment, both countries and business firms are facing the challenge of sustainability over the long run. Like other, tourism industry is among the key role players for the economic and financial progress in the country. In the world economy, tourism is recognized among the significant contributor for the revenue generation for both the regional economies and

business firms, who are linked to it. However, with the rapid changes in the environmental factors, this industry is also striving for the better future. From the context of Indonesia, the present study has focused on the tourism industry and its association with the various environmental actors during the time of 1996-2016. A time of last 22 years have been selected and various environmental factors are under consideration. Data for these factors have been collected from the official database of WDI. For the tourism, two proxies have been added in the model under the title of ITR as a percentage of total export and international tourism expenditure for the travel items through US dollars.

To consider the environmental factors, FA, population growth, nitrous oxide omission through thousands metric tons of CO₂, energy use, agriculture, forestry and fishing, and finally CO₂ omissions have been added in the model. To analyze the impact of past values of each predictor on tourism, lagged predictors have been added to the regression analysis. Both descriptive and empirical analysis has been conducted. The findings of the study through model 1 indicate the fact that FA and PG have their significant impact on the tourism industry. For model 2, lagged values of international tourism IT, FA, population growth, NOXIDEL1, AFFVADL1 has their significant impact on the tourism industry.

For model 3, the impact of ITL1, FAL1, PGL1, NOXIDEL1 and AFFVADL1 is found to be significant for tourism. While under model 4, FAL1, NOXIDEL1, FA, and PG have their significant impact on tourism earnings. Under model 5-8, a 2nd proxy of tourism has been considered for the empirical impact of selected environmental factors. For NOXIDE, EUOILEQ and CO2E, the impact is found to be significant for tourism expenditures. Under the title of model 6, lagged values of tourism ITL1, NOSIDEL1, and CO2EL1 have explained their significant impact. However, for model 7, the impact of ITL1, NOXIDEL1 is negative and significant and for model 8, the impact of PGL1 and PG the impact is found to be significant over tourism in the region of Indonesia over last 21 years. These impacts are found to be very much significant for the various policy makers and Government officials in the region of Indonesia. Based on these findings, policymakers can develop some strategic plans regarding how to control the impact of selected factors for the growth of the tourism industry in Indonesia. While at the same time, business firms like tourism agencies can also develop their business plans while taking the predictors of the study which are negatively and significantly impacting on the industry. However, as per the core limitations of the study, present research work is limited to only one region; Indonesia, while ignoring the other states in Asian perspective.

Adding more states and countries into future analysis can provide with better findings and more generalizability of the results. The 2nd limitation of the study is not adding some regional economic factors like inflation, GDP, unemployment which is significantly impacting the tourism industry in both developed and developing economies. Considering these factors in future studies can also provide more comprehensive empirical evidence. Future studies can be conducted also while improving the methodological improvements like time series and cross-sectional panel analysis.

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