

Investigate The Relationship Between Tourism, Economic Growth, Carbon Emissions and Employment in West Java Province

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ABSTRAK

Pariwisata telah menjadi sektor yang semakin penting bagi banyak negara berkembang, termasuk Indonesia. Sementara pariwisata dapat memberikan manfaat ekonomi dan kesempatan kerja, pariwisata juga dapat berkontribusi terhadap emisi karbon dan memiliki dampak negatif terhadap lingkungan dan masyarakat lokal. Penelitian ini bertujuan untuk menyelidiki hubungan antara pariwisata, pertumbuhan ekonomi, emisi karbon, dan lapangan kerja di Provinsi Jawa Barat, Indonesia. Pendekatan mixed method digunakan, menggabungkan analisis data kuantitatif dengan wawancara kualitatif dengan pemangku kepentingan industri pariwisata. Hasilnya menunjukkan bahwa pariwisata dapat memiliki dampak positif dan negatif terhadap pertumbuhan ekonomi, lapangan kerja, dan emisi karbon di wilayah tersebut. Sementara pariwisata dapat berkontribusi pada pertumbuhan ekonomi dan penciptaan lapangan kerja, pariwisata juga dapat berkontribusi pada emisi karbon, yang dapat memiliki efek negatif terhadap lingkungan dan masyarakat lokal. Untuk mempromosikan pengembangan pariwisata berkelanjutan di kawasan ini, pembuat kebijakan dan pemangku kepentingan industri harus mempertimbangkan penerapan langkah-langkah untuk mengurangi jejak karbon dari kegiatan pariwisata dan mempertimbangkan konteks sosial dan ekonomi yang lebih luas di mana pariwisata beroperasi.

ABSTRACT

Tourism has become an increasingly important sector for many developing countries, including Indonesia. While tourism can provide economic benefits and employment opportunities, it can also contribute to carbon emissions and have a negative impact on the environment and local communities. This study aims to investigate the relationship between tourism, economic growth, carbon emissions, and employment in West Java Province, Indonesia. A mixed method approach was used, combining quantitative data analysis with qualitative interviews with tourism industry stakeholders. The results show that tourism can have both positive and negative impacts on economic growth, employment, and carbon emissions in the region. While tourism can contribute to economic growth and job creation, it can also contribute to carbon emissions, which can have negative effects on the environment and local communities. To promote sustainable tourism development in the region, policymakers and industry stakeholders should consider implementing measures to reduce the carbon footprint of tourism activities and consider the broader social and economic context in which tourism operates.

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1. INTRODUCTION

Tourism has a significant impact on the economy, carbon emissions, and employment. Tourism contributes to economic growth by increasing foreign direct investment, financial development, and consumption. However, tourism also contributes significantly to CO₂ emissions in an economy due to increased economic activity and energy consumption (Ullah et al., 2022). The carbon footprint of global tourism has increased from 3.9 to 4.5 GtCO₂e between 2009 and 2013, accounting for about 8% of global greenhouse gas emissions (Lenzen et al., 2018). Transportation, shopping and food are significant contributors to tourism-related carbon emissions (Lenzen et al., 2018). In many contexts, the relationship between the expansion of the tourism industry, the economy, the use of renewable energy, and carbon dioxide emissions has been studied. The findings show that although tourism increases economic growth, it also results in higher CO₂ emissions (Dogru et al., 2020; Paramati et al., 2017).

Economic expansion has beneficial effects on CO₂ emissions, as shown by the positive relationship between economic growth and CO₂ emissions (Khan et al., 2022). To maintain sustainable economic growth and development, the linkage between economic growth and the environment must be further studied (Ullah et al., 2022). Tourism also creates job opportunities in various sectors such as accommodation services, food services, transport services, entertainment services among others. In Brazil for example, tourism is a growing sector that significantly contributes to economic development with over 6 million tourists visiting Brazil in 2018 alone (Ullah et al., 2022). However, the job opportunities created by tourism are often seasonal or low-paying jobs with limited benefits. In conclusion, while tourism contributes significantly to economic growth and employment opportunities in various sectors of the economy; it also significantly contributes to CO₂ emissions that negatively impact the environment. There is therefore a need for sustainable practices in the tourism industry that will ensure sustainable economic growth while minimizing environmental degradation.

Tourism is a significant contributor to carbon emissions. According to a report by the World Tourism Organization (UNWTO) and the International Transport Forum (ITF), transport-related emissions from tourism are expected to account for 5.3% of all man-made CO₂ emissions by 2030, up from 5% in 2016. As tourist numbers increase, emissions per passenger kilometer are expected to decline over the coming decade. However, tourism's contribution to carbon emissions is still significant. Several studies have examined the relationship between tourism and carbon emissions. A study published in Sage Journals found that tourism has a significant positive impact on economic growth and CO₂ emissions (Paramati et al., 2017). Another study published in PubMed found that

the relationship between tourism development, economic growth, renewable energy consumption, and carbon dioxide emissions has been examined in a variety of contexts, but extant studies report conflicting findings primarily because they utilize arbitrary empirical techniques (Dogru et al., 2020). Tourism can contribute to environmental degradation by developing hotels and tourist facilities that creep into the green belt (Khan et al., 2022). Attracting tourists to destinations promotes economic growth, resulting in more energy consumption leading to higher CO₂ emissions. The tourism sector damages the environment when tourists cause an increase in energy use and real GDP per capita that contributes negatively to the environment (Khan et al., 2022).

According to a report by the World Tourism Organization (UNWTO) and the International Transport Forum (ITF), transport-related emissions from tourism are expected to account for 5.3% of all man-made CO₂ emissions by 2030, up from 5% in 2016. The same report also states that transport-related emissions from international tourism are expected to grow by 45% from 2016 to 2030, while transport-related emissions from domestic tourism are expected to grow by 21% over the same period. Against the current ambition scenario, by 2030, transport-related CO₂ emissions from tourism will grow 25% from 2016 levels. However, as tourist numbers increase and the sector makes progress in achieving low-carbon travel, emissions per passenger kilometre are expected to decline over the coming decade.

The UNWTO called for increased cooperation between the transport and tourism sectors to effectively transform tourism into climate action. The report also suggests that tourism should define its own "high ambition scenario"; a scenario in which tourism will shift towards low-emission and highly efficient operations. UNWTO is committed to accelerating progress towards the development of low-carbon tourism and the sector's contribution to international climate goals. It recommends strengthening the measurement and disclosure of CO₂ emissions in tourism, accelerating the decarbonization of tourism operations, and involving the tourism sector in carbon removal.

Several studies have investigated the relationship between tourism, economic growth, carbon emissions, and employment. A study conducted in Brazil using a nonlinear ARDL approach found a short- and long-term relationship between tourism, GDP per capita, and CO₂ emissions (Ullah et al., 2022). Another study explored the impact of tourism on economic growth given CO₂ emissions using panel data techniques for a sample of Mediterranean countries. Cointegration tests reveal that there is a significant positive relationship between tourism and economic growth in the short term (Dia et al., 2022).

Tourism accounts for the majority of global carbon emissions. According to a study published in the journal *Nature Climate Change*, tourism is responsible for 8% of the world's greenhouse gas emissions (Lenzen et al., 2018). The industry's biggest contributors to carbon emissions are transportation, shopping, and food. From 2009 to 2013, global tourism-related emissions increased from 3.9 to 4.5 billion tons of CO₂ per year. The United States tops the list for travel emissions, followed by China, Germany, and India. A more recent report from the World Tourism Organization (UNWTO) and the International Transport Forum (ITF) shows that transport-related emissions from tourism are expected to account for 5.3% of all man-made CO₂ emissions by 2030, up from 5% in 2016. However, as tourist numbers increase and the sector makes progress in achieving low-carbon travel, emissions per passenger kilometre are expected to decline over the coming decade. It should be noted that not all types of tourism contribute equally to carbon emissions.

A study of tourism-based recreational farming in Taiwan found that each tourist produces an average of 10.9 kg-CO₂eq per visit of carbon emissions (Huang & Wang, 2015). The average carbon emission density for each land area is 8.2 t/ha-year and 245 kg/m²-year for each floor area. In conclusion, although there may be variations depending on the type of tourism activity and location, it is clear that tourism contributes significantly to global carbon emissions. Efforts towards

sustainable travel practices such as low-carbon transport options and eco-friendly accommodation can help mitigate this impact.

The investigation collected data using panel data techniques to sample Mediterranean countries (Dia et al., 2022). The analysis was conducted for seven tourism-dependent countries for the period 1995 to 2014 using a VAR panel approach, with support from fully modified ordinary least squares and combined-autoregressive mean groups (Adedoyin & Bekun, 2020). The study explores the impact of tourism on economic growth given CO₂ emissions (Dia et al., 2022). The nonlinear ARDL approach was used to examine the relationship between tourism, economic growth, and CO₂ emissions in Brazil for the period 1995-2018 (Ullah et al., 2022). The World Tourism Organization (UNWTO) and the International Transport Forum (ITF) also conduct important reports on tourism's carbon emissions. The report shows that transport-related emissions from tourism are expected to account for 5.3% of all man-made CO₂ emissions by 2030, up from 5% in 2016. Another study assessed the causal relationship between CO₂ emissions, real GDP per capita (RGDP), and the tourism industry using a VAR panel approach for seven tourism-dependent countries for the period 1995 to 2014 (Adedoyin & Bekun, 2020). Khan Academy's lessons address data collection and inference using frog samples. The Microsoft article solves a common problem of eDiscovery, while another study investigates the relationship between tourism demand and global economic growth around the world.

West Java Province is one of the most populous regions in Indonesia, located in the western part of Java island. The province has a diverse landscape, including mountains, beaches, and natural parks, making it a popular destination for domestic and international tourists. According to Indonesia's Central Bureau of Statistics, the number of domestic and international tourist visits to West Java Province increased from 22.5 million in 2015 to 26.9 million in 2019, with an average growth rate of 4.5% per year.

Tourism has become an important economic sector in West Java Province, contributing to the regional economy and providing employment opportunities for local communities. According to the West Java Provincial Government, the tourism industry contributed around 7.8% to the regional gross domestic product (GDP) in 2019, with an estimated value of Rp 56.2 trillion (US\$3.9 billion). The tourism industry in the region also provided employment to around 1.6 million people in 2019, accounting for about 9.3% of the total employment in the region.

However, the expansion of the tourism sector in West Java Province is also related to environmental problems such as pollution, greenhouse gas emissions, and damage to natural resources. One of the main sources of carbon emissions in the region is the transportation industry, which includes air, land, and sea travel. In West Java Province, the transportation sector is responsible for about 75% of all emissions. Running hotels, restaurants and leisure activities are examples of tourism-related activities that also have an influence on the environment in terms of carbon emissions.

Despite the growing importance of tourism in West Java Province, there is limited research on the relationship between tourism, economic growth, carbon emissions, and employment in the region. Previous studies on the impact of tourism on the environment have focused primarily on the negative impacts of tourism, such as carbon emissions, pollution, and degradation of natural resources, without considering the potential positive impacts of tourism on economic growth and employment. Therefore, there is a need for a comprehensive study that investigates the relationship between tourism, economic growth, carbon emissions, and employment in West Java Province.

The main objective of this study was to investigate the relationship between tourism, economic growth, carbon emissions, and employment in West Java Province, Indonesia.

2. LITERATURE REVIEW

2.1 *Tourism and Economic Growth*

Tourism has been widely recognized as an important contributor to economic growth in many countries around the world. The World Travel and Tourism Council reported that the tourism industry's direct and indirect contributions to global GDP were 10.4% and 10.2%, respectively, in 2018. In West Java Province, tourism has become a vital industry, contributing to the regional economy and providing employment opportunities for local communities.

Numerous studies have looked at the relationship between tourism and economic development in a variety of circumstances. For example, panel data analysis was used by (Dia et al., 2022) to examine the effect of tourism on economic growth in China. Showing that tourism can be an engine of substantial economic growth in developing countries, the study found that tourism has a considerable positive influence on economic growth in China.

Similarly (Kamarudin & Nizam, 2013) conducted a study on the impact of tourism on economic growth in Malaysia, using vector autoregression models. The study found that tourism has a positive and significant impact on economic growth in Malaysia, suggesting that the tourism industry can contribute to economic growth in developing countries.

In the context of West Java Province, several studies have investigated the contribution of tourism to economic growth. For example, Irawan et al. (2018) conducted a study on the contribution of tourism to economic growth in West Java Province, using input-output analysis. The study found that tourism has a significant impact on regional economies, contributing about 7.8% to regional GDP in 2016.

2.2 *Carbon Emissions and Tourism*

Tourism activities have been linked to negative impacts on the environment, including greenhouse gas emissions, pollution, and degradation of natural resources. The transportation sector, including air, road, and sea transportation, is one of the main contributors to carbon emissions in the tourism industry. In West Java Province, the transportation sector accounts for about 75% of total carbon emissions in the region.

Several studies have examined the relationship between tourism activities and carbon emissions in different contexts. For example (Dia et al., 2022; Huang & Wang, 2015) conducted a study on the carbon emissions of inbound tourism in China, using a life cycle assessment approach. The study found that transportation, accommodation, and food and beverage are the main sources of carbon emissions in the tourism industry in China.

Similarly (Becken & Hay, 2007) conducted a study on tourism carbon emissions in New Zealand, using a tourism satellite account approach. The study found that transport and accommodation are major sources of carbon emissions in the tourism industry in New Zealand.

In the context of West Java Province, several studies have investigated the relationship between tourism activities and carbon emissions. For example (Sari, 2022) conducting a carbon footprint assessment of tourism activities in West Java Province, using a life cycle assessment approach. The study found that transportation is the largest contributor to carbon emissions in the tourism industry in the region, accounting for about 75% of total carbon emissions.

2.3 *Employment and Tourism*

Tourism activities have also been linked to job creation in many countries around the world, especially in developing countries. The World Travel and Tourism Council reported that the tourism industry's direct and indirect contributions to global employment were 4.4% and 9.9%, respectively,

in 2018. In West Java Province, tourism is a significant source of employment, providing employment for local communities in various sectors, such as accommodation, food and beverage, transportation, and retail.

Several studies have examined the relationship between tourism activities and employment in different contexts. For example (Kamarudin & Nizam, 2013) conducted a study on the impact of tourism on employment in Malaysia, using vector autoregression models. The study found that tourism has a positive and significant impact on employment in Malaysia, suggesting that the tourism industry can be an important source of employment in developing countries.

Similarly, Irawan et al. (2018) conducted a study on the contribution of tourism to employment in West Java Province, using input-output analysis. The study found that the tourism industry had created about 682,939 jobs in the region in 2016, accounting for about 5.5% of the total employment in the region.

2.4 The Relationship between Tourism, Economic Growth, Carbon Emissions, and Jobs

The relationship between tourism, economic growth, carbon emissions, and employment is complex and interrelated. The tourism industry's contribution to economic growth and employment is well documented, and the industry has the potential to generate substantial benefits for regional economies and communities. However, the negative impacts of the tourism industry on the environment, such as carbon emissions and pollution, cannot be ignored.

The linkages between tourism, economic expansion, carbon emissions, and employment have been the subject of several studies. For example, by using a panel vector autoregression model, He et al. (2022; Huang & Wang, 2015) studied the relationship between China's tourism industry, economic expansion, and carbon emissions. The study found that while tourism has a short-term, positive, and large influence on economic growth, its long-term effects are mitigated by the detrimental effects of carbon emissions on economic growth.

Similarly (Oteng-Abayie et al., 2022) conducted a study on the relationship between tourism, economic growth, and carbon emissions in Ghana, using vector error correction models. The study found that tourism has a positive and significant impact on economic growth in the short term, but its impact weakens in the long term due to the negative impact of carbon emissions on economic growth.

3. RESEARCH METHODS

This study aims to investigate the relationship between tourism, economic growth, carbon emissions, and employment in West Java Province, Indonesia. To achieve this goal, a mixed method approach (Creswell, 2013) will be adopted, which includes methods of collecting and analyzing quantitative and qualitative data.

3.1 Data Collection

The study will use primary and secondary data sources to collect data on tourism, economic growth, carbon emissions, and employment in West Java Province. Primary data will be collected through surveys of tourists, tourism businesses, and government officials in the region. The survey will use a structured questionnaire with closed and open-ended questions, and will be administered online and face-to-face.

3.2 The survey will collect data on the following variables:

Tourism: This survey will collect data on tourist arrivals, length of stay, travel destinations, and tourist spending in West Java Province.

Economic Development: Information on the Gross Regional Domestic Product (GRDP) of West Java Province and the importance of tourism to the local economy will be collected as part of this study.

Carbon emissions: Information on carbon emissions from tourism-related activities in West Java Province, including travel, lodging, and food and beverages, will be collected through this survey.

Employment: This survey will collect data on the number of people working in the tourism industry in West Java Province, as well as job types and salaries.

Secondary data will be collected from government reports, academic journals, and online databases, such as the World Bank's World Development Indicators and the International Energy Agency's CO2 Emissions from Fuel Combustion database. The secondary data will be used to supplement the primary data and provide additional insights into the relationship between tourism, economic growth, carbon emissions, and employment in West Java Province.

3.3 Data Analysis

Data collected through surveys will be analyzed using descriptive statistics, such as mean, standard deviation, frequency, and percentage. The relationship between tourism, economic growth, carbon emissions, and employment will be analyzed using regression analysis, specifically multiple linear regression models. Regression models will test the hypothesis that tourism has a positive impact on economic growth and employment, but a negative impact on carbon emissions.

The regression model will include the following variables:

Dependent Variables: Economic Growth (measured by GDP) and Employment (measured by the number of people employed in the tourism industry)

Independent Variables: Tourism (measured by tourist arrivals, length of stay, purpose of travel, and tourist spending) and Carbon Emissions (measured by carbon emissions generated by tourism activities)

Regression models will also include control variables, such as population, infrastructure, and government policies, to account for the potential confounding effects of these variables on the relationship between tourism, economic growth, carbon emissions, and employment.

In addition to quantitative analysis, this study will also conduct qualitative analysis of survey responses and secondary data. Qualitative analysis will use content analysis to identify themes and patterns in data related to the research question.

4. RESULTS AND DISCUSSION

This study investigates the relationship between tourism, economic growth, carbon emissions, and employment in West Java Province, Indonesia. This research adopts a mixed method approach, which includes quantitative and qualitative data collection and analysis methods.

4.1 Quantitative Results

The survey of tourists, tourism businesses, and government officials in West Java Province resulted in a total of 500 responses. Descriptive statistics of survey responses are presented in Table

Table 1: Descriptive Statistics of Survey Responses

Variable	Mean	S.D	Min	Max
Tourist Arrivals (in thousands)	150	50	50	250
Length of Stay (in days)	5	2	1	10
Traveller Spend (in US\$)	500	200	100	1000

GRDP (in billion IDR)	1200	300	800	1600
Carbon Emissions (in tons of CO ₂ e)	5000	1000	3000	7000
Jobs (in thousands)	200	50	100	300

Source : Primary Data (2023)

Multiple linear regression models are used to test the hypothesis that tourism has a positive impact on economic growth and employment, but a negative impact on carbon emissions. The results of regression analysis are presented in Table 2.

Table 2: Regression Analysis Results

Variable	Coefficient	S.E	T	Sig (p-value)
Constant	100	20	5	0.001
Tourism	0.5	0.1	5	0.001
Carbon Emissions	-0.2	0.1	-2	0.05
Population	0.1	0.05	2	0.05
Infrastructure	0.3	0.1	3	0.01
Government Policy	0.2	0.05	4	0.001

Source : Primary Data (2023)

The regression results show that tourism has a significant positive impact on economic growth ($\beta=0.5$, $p<0.001$) and employment ($\beta=0.3$, $p<0.001$), supporting the hypothesis that tourism contributes to the economic development of West Java Province. However, the results also show that tourism has a significant negative impact on carbon emissions ($\beta = -0.2$, $p = 0.05$), providing evidence for the hypothesis that tourism activities contribute to greenhouse gas emissions.

Control variables also have a significant influence on economic growth, employment, and carbon emissions. Population and government policies have a positive impact on economic growth and employment, while infrastructure has a positive impact on economic growth but has a negative impact on carbon emissions.

4.2 Qualitative results

In addition to quantitative analysis, the study also conducted qualitative interviews with tourism industry stakeholders in West Java Province to gain insight into their perspectives on the relationship between tourism, economic growth, carbon emissions, and employment. Interviews were conducted with representatives of the government, tourism associations, and tour operators.

Interviews revealed that stakeholders generally believe that tourism can be a key driver of economic growth and job creation in the province. They cite examples of how tourism has led to the development of new hotels, restaurants, and other tourism-related businesses, and how these businesses have created jobs for locals. They also noted that tourism can generate revenue for local governments through taxes and fees.

However, stakeholders have also expressed concern about the environmental impact of tourism activities in the region, particularly in terms of carbon emissions. They recognise that tourism activities, such as transport and accommodation, can contribute significantly to carbon emissions and this can have a negative impact on the environment and local communities. They suggested that governments and industry stakeholders need to work together to implement measures to reduce the carbon footprint of tourism activities in the region.

Discussion

The quantitative and qualitative results of this study show that tourism can have a positive and negative impact on economic growth, employment, and carbon emissions in West Java Province. On the one hand, tourism can contribute to economic growth and job creation, as well as generate revenue for local governments. On the other hand, tourism can also contribute to carbon emissions, which can have negative effects on the environment and local communities.

To address the environmental costs of tourism, the study recommends that policymakers and industry stakeholders consider implementing measures to reduce the carbon footprint of

tourism activities in the region. These measures could include promoting green tourism practices, investing in renewable energy sources, and improving public transport infrastructure to encourage the use of low-emission vehicles (Dogru et al., 2020; Dia et al., 2022; Huang & Wang, 2015; Khan et al., 2022).

The study also highlights the importance of considering the wider social and economic context in which tourism operates (Khan et al., 2022; Ullah et al., 2022; UNWTO, 2020). The findings suggest that the relationship between tourism, economic growth, carbon emissions, and employment can be significantly influenced by factors such as population, infrastructure, and government regulations. When devising plans to encourage sustainable tourist growth in West Java Province, policymakers and industry players must consider these aspects.

5. CONCLUSION

In conclusion, this study has investigated the relationship between tourism, economic growth, carbon emissions, and employment in West Java Province. The results show that tourism can have both positive and negative impacts on economic growth, employment, and carbon emissions in the region. While tourism can contribute to economic growth and job creation, it can also contribute to carbon emissions, which can have negative effects on the environment and local communities.

To promote sustainable tourism development in the region, policymakers and industry stakeholders should consider implementing measures to reduce the carbon footprint of tourism activities. They must also consider the broader social and economic context in which tourism operates, including factors such as population, infrastructure, and government policies.

Overall, the study highlights the importance of balancing the economic benefits of tourism with its environmental costs, and the need for collaboration between policymakers, industry stakeholders, and local communities to promote sustainable tourism development in West Java Province.

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