




## The Economy Behind Tourism: An Input-Output Approach in Measuring Contribution



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### ABSTRACT

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Central Java Province has the potential with a high number of tourist attractions, however, it has not provided optimal contribution yet to the tourism sector. This research aims to analyze the relationship between the economic sectors, the distribution impact, and the multiplier effect of output, income and labor in tourism sector on the economy in Central Java Province. This research uses secondary data, the Input-Output Table of Central Java Province, published in 2021, which is then analyzed using the Input-Output method. The result of the research indicates that the tourism sector for forward linkage is in the third highest position, and the highest supporting sub-sector of the tourism sector is the information and communication services sub-sector. Meanwhile, for the result of the backward linkage value, the tourism sector is in the third highest position, and its supporting sub-sector with the highest value is the accommodation and food and beverage provision sub-sector. The analysis result of the distribution impact indicates that the tourism sector is a leading sector. For the multiplier effect of output, the tourism sector is in the third highest position, while for the multiplier of income and labor, it is not too high in the sixth and fifth positions.

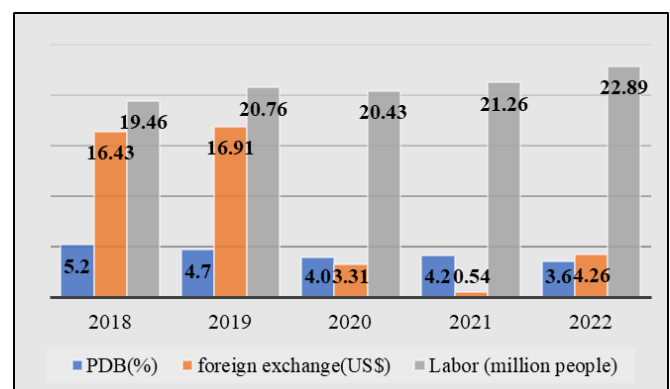
## 1. INTRODUCTION

Tourism is an economic activity that has the potential to increase economic growth [1]. According to Hasibuan et al. [2], the tourism sector is one of the opportunities that needs to be fully maximized by the government, because Indonesia's tourism resources may benefit the Indonesian economy. Nowadays, the contribution and existence of the tourism sector are very much required to support the economy [3]. This is in accordance with data on the contribution of the tourism sector to Gross Domestic Product (GDP), foreign exchange, and labor. The following is data on the contribution of tourism to GDP, foreign exchange, and labor in the Indonesian tourism sector in 2018-2022.

Based on Figure 1, the contribution of tourism to GDP in the last five years indicates the fluctuating numbers. In 2018, the contribution of the tourism sector to GDP was 5.2% with foreign exchange earnings of US\$ 16.43 billion and absorbing the labor of 19.46 million people. In 2022, the contribution decreased to 3.6%, but the foreign exchange earnings increased to US\$ 4.26 billion with the labor of 22.89 million people.

The development of Indonesian tourism is also related to the development of tourism in Central Java Province, which has developed in recent years. Central Java Province is one of the provinces in Indonesia with various tourist objects that can be used as a capital in positioning Central Java Province as a tourist destination [4-6]. Tourist attractions are factors that

may attract the tourists to visit the available tourist objects. Susianto et al. [7] state that tourist attractions are places that have beauty, uniqueness, and natural diversity value so that they influence tourists to determine which places to visit.



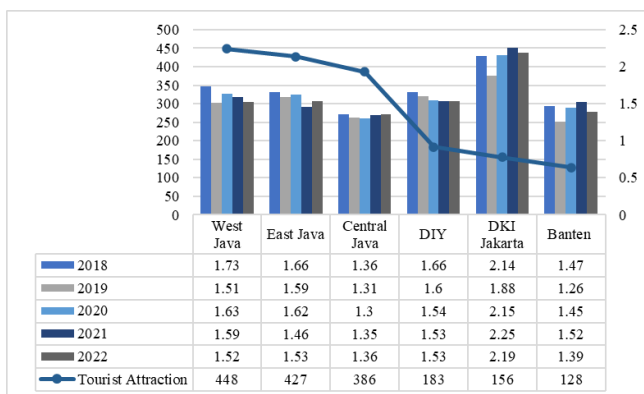
**Figure 1.** Contribution of tourism to Indonesian economy  
Source: Central Bureau of Statistics and Ministry of Tourism and Creative Economy, 2023

Central Java Province offers tourist destinations that have various tourist attractions, such as natural, cultural, culinary, and artificial tourism that may attract tourists to visit. Compared to other provinces in Java Island, Central Java Province has quite high tourist attractions with 386 tourist objects (Data Indonesia, 2023). However, the average length

of stay of tourists at non-star hotels in Central Java Province is in the lowest average length of stay compared to the other six provinces in Java Island [8].

The average length of stay of tourists is a factor that determines how much tourism income can be obtained by each region. The average length of stay is the number of nights or days spent by tourists outside their residential area [6, 9]. The following is data on tourist attractions in 2022 and the average length of stay in Central Java Province in 2018-2022.

According to Figure 2, in 2018 the average length of stay of foreign tourists in Central Java Province was 1.36 days, then in 2019 it decreased to 1.31 days. The same thing happened in the following year in 2020 to 1.30 days. In 2021 it increased slightly to 1.35 and the same for 2022 to 1.36 days. However, the average length of stay in Central Java Province is the smallest one among other provinces in Java. This condition made the contribution of the tourism sector to the economy in Central Java Province not optimal.



**Figure 2.** Tourist attractions in 2022 and the average length of stay in six provinces in Java Island in the period of 2018-2022

Source: Central Bureau of Statistics, 2023

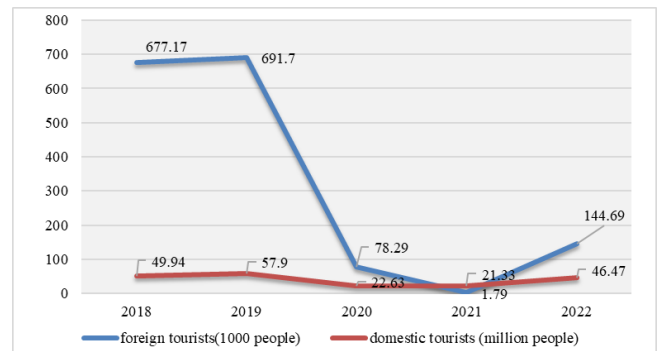
As one of the provinces that has the potential to develop the tourism sector and good tourist attractions, Central Java Province will certainly provide benefits and good impacts on the economy, one of which is in its contribution to GRDP. This is in accordance with data from the Central Java BPS for 2018-2022, which shows that the contribution of the tourism sector increased to 1.5 percent from 2018 to 2019. In 2020, the contribution of the tourism sector decreased to 7.8 percent due to the pandemic. In 2021, the contribution of the tourism sector increased to 7.85 percent compared to the previous year, until 2022 it increased to 8.41 percent.

In addition to contributing to the GRDP of Central Java Province, the tourism sector also contributes to the increase in the number of workers in the tourism sector. Tourism has a significant contribution to the increase in employment because tourism sector is included in the labor-intensive industry [10, 11]. Based on the publication of Central Java Tourism Statistics in 2022 that has been published by the Youth, Sports and Tourism Office of Central Java Province, in 2022 tourism sector was able to absorb 23,337 labors. The labors that can be absorbed by the tourist attractions has indicated an increase over the past five years. In 2018 it was able to absorb 17,818 labors. The number of labors in tourist attractions in Central Java continues to increase along with the increasing number of tourist attractions that appear in Central Java Province.

The role of the tourism sector in Central Java Province has become increasingly important along with the development

and contribution made by the tourism sector through Gross Regional Domestic Product (GRDP) and labor [12]. The development of tourism sector has an influence on attracting the tourists to visit Central Java Province, thus increasing the number of tourist visits. The following is data on the number of foreign and domestic tourist visits in central java province in 2018-2022.

Figure 3 shows that the number of foreign tourist visits experienced a significant decline after the Covid Pandemic which began in 2020, from 677.17 thousand people in 2018 to 78.29 thousand people in 2020. The visit of foreign tourists in 2022 increased by 144.69 thousand, while the visit of domestic tourists increased by 46.47 million people. Compared to the previous year, in 2021 there were only 1.79 thousand foreign tourists and 21.33 million domestic tourists.



**Figure 3.** The number of visits of foreign and domestic tourists in the period of 2018-2022

Source: Pocket Book of Tourism and Creative Economy Profile in 2023

Thus, it can be concluded that Central Java Province has a potential tourism sector development with a fairly high number of attractions that have an influence in attracting tourists to visit Central Java Province. However, viewed from the average length of stay of tourists, Central Java is the province with the smallest average length of stay compared to other provinces in Java. This has an impact on the number of tourism income obtained by each region, so the contribution of tourism sector to the economy in Central Java Province is not optimal.

The contribution of tourism sector is not only viewed from the high rate of GRDP growth in tourism sector and the number of tourist visits that always increase every year. It is also to find out and analyze the forward and backward linkages between the tourism sector and other economic sectors in Central Java Province, and how the tourism sector is able to bring impact on the activities of other economic sectors, considering that the tourism sector has a multiplier effect that can drive the economy comprehensively and sustainably.

In general, economic development can be interpreted as a process that causes the real per capita income of a country's population to increase in the long term and is accompanied by institutional improvements. The increase in per capita income may illustrate the existence of additional income and improvements in the people's economic welfare. Economic development is viewed as something that mutually influences and is related to economic development factors.

According to the classical theory of economic growth by Adam Smith, the growth process will occur simultaneously and there is a relationship between one and another. The emergence of performance improvement in a sector may increase the attraction to increase the capital, encourage the

technological progress, increase the specialization, and expand the market. Meanwhile, David Ricardo argues that the number of production factors such as land or natural resources will not increase so they act as limiting factors in the growth process of a society.

The turnpike theory by Paul A. Samuelson in 1955 states that each region needs to identify sectors with great potential that can be developed quickly. Regions with great potential should be developed well in order to encourage the growth of other sectors, so that in general the economy can grow together without a large disparity among other sectors.

The influence of tourism on the economy is through the process of increasing income, opportunities for business and employment for the community and also reducing unemployment and poverty [13]. This is in accordance with the relationship between tourism and economic growth through the Keynesian approach to the multiplier, which considers tourism as part of aggregate demand that has a positive effect on income and labor through the multiplier process [14]. Thus, it will open new business fields in the private sector, so the supply of labor will increase income and reduce unemployment. The increase in income will then increase people's ability to consume so that poverty can be reduced. Tourism activities have an important role along with the development and contribution of the tourism sector to foreign exchange earnings, balance of payments, regional income, regional development, including in the absorption of investment, labor and business development [15, 16].

The inter-sector linkages that occur in input-output analysis can be explained through the theory of general equilibrium that has been initiated in 1870 by Leon Walras, an economist from France. The theory explains that price and quantity of a good are not only determined by the strength of demand and supply of the good, but are also determined by other interrelated markets. The inter-sector linkages can have an impact on each economic sector that may influence the economy of a region and the inter-regional, inter-citizen, and inter-sector inequality that occur can be overcome. This research aims at analyzing the inter-sector linkages, the distribution impact, and multiplier effects of output, the income and labor.

## 2. METHOD

The approach used in this research is the quantitative method. The quantitative analysis method is an analysis conducted using research data in numerical form, which is then processed using statistical methods. The type of data used in this research is secondary data obtained from the Central Bureau of Statistics in Central Java Province. Secondary data is the data collected by institutions that are then used by the data users. The secondary data used in this research is the Input-Output Table of Central Java Province, which is the Domestic Transactions based on Producer Prices, classification of 17 sectors according to the 2021 publication business field. Then from the 17 sectors, it was aggregated into 10 sectors to find out how much the relationship is between tourism sector and other economic sectors, the distribution impact of tourism sector, and the multiplier effect of tourism sector in Central Java Province.

The analysis method used in this research is input-output analysis. The Input-Output Model was proposed by Wassily Leontief, a Soviet-American economist, and was developed in the 1930s. Leontief's economic model is a model that is useful

for analyzing the input and output of an economic system.

An input-output table is required in using the input-output analysis. Basically, the input-output table is a statistical description in the form of a matrix that provides information on transactions of goods and services and the interrelationships between one sector and another within a period of time in a certain area [17]. In this research, the input-output table was used for several main analyses, including analysis of inter-sector linkages, analysis of the distribution impact, and the multiplier impact.

Linkage analysis is used to indicate the linkages among sectors in carrying out production activity that has an effect on other sectors, which is the effect of increasing demand and supply in an economy. Linkage analysis consists of direct forward linkages, direct backward linkages, and direct and indirect forward linkages, direct and indirect backward linkages.

The analysis of direct and indirect forward and backward linkages is not adequate when used as a basis for determining key sectors. Thus, both indices need to be normalized by comparing the average impact of all sectors. The analysis consists of two analyzes, the distribution power and the degree of sensitivity. The distribution power has the benefit of knowing the ability of a sector to increase the growth of its upstream industry. The following formula is to find out the distribution power:

$$Pd_j = \frac{n \sum_{j=1}^n \alpha_{ij}}{\sum_{i=1}^n \sum_{j=1}^n \alpha_{ij}}$$

where,

$Pd_j$  = Distribution power of sector j  
 $\alpha_{ij}$  = Leontief inverse matrix element  
 $n$  = A number of sectors

Then degree-of-sensitivity analysis was conducted to determine the ability of a sector to drive the growth of production of other economic sectors that use input from the sector. The following formula is to determine the degree of sensitivity:

$$Sdi = \frac{n \sum_{j=1}^n \alpha_{ij}}{\sum_{i=1}^n \sum_{j=1}^n \alpha_{ij}}$$

where,

$Sdi$  = Degree of sensitivity of sector i  
 $\alpha_{ij}$  = Leontief inverse matrix element  
 $n$  = A number of sectors

Effect multiplier analysis is one that aims at finding out something occurring in endogenous variables if there is a change in exogenous variables in an economy. In this research, effect multiplier analysis is conducted to analyze three types: output multiplier analysis, income multiplier, and labor multiplier.

The output multiplier is calculated according to the change in output per unit as the initial effect, in the form of an increase or decrease in output by one monetary unit. The following formula is to find out the output multiplier in the Leontief inverse matrix element column:

$$O_j = \sum_{i=1}^n \alpha_{ij}$$

where,

$O_j$  = output multiplier number of sector j  
 $a_{ij}$  = Leontief inverse matrix element (I-A)<sup>-1</sup>

The income multiplier is useful for viewing the increase in income as a result of changes in output in an economy. The following formula is to find out the income multiplier in the Leontief inverse matrix element column:

$$H_j = \sum_{i=1}^n a_n + 1^i \cdot a_{ij}$$

where,

$H_j$  = income multiplier number of sector j  
 $a_n + 1^i$  = Leontief inverse matrix element (I-A)<sup>-1</sup>  
 $a_{ij}$  = Leontief inverse matrix element

The labor multiplier indicates the change in labor as a result of initial changes in final demand. The following formula is to see the labor multiplier:

$$E_j = \sum_{i=1}^n w_n + 1^i \cdot a_{ij}$$

where,

$E_j$  = labor multiplier number of sector j  
 $w_n + 1^i$  = average output of every laborer  
 $a_{ij}$  = Leontief inverse matrix element

### 3. RESULT AND DISCUSSION

Forward linkages explain the sectors that use a particular output either directly or indirectly per unit increase in total demand. According to Firmansyah [18], the total direct and indirect forward linkages is obtained from the sum of rows of the Leontief inverse matrix (I-A)<sup>-1</sup>. While the backward linkages explain the sectors that provide input among certain sectors directly or indirectly per unit increase in total demand. The total direct and indirect backward linkages is obtained from the sum of columns of the Leontief inverse matrix (I-A)<sup>-1</sup>.

Table 1 explains the forward and backward linkage value of the economic sector in Central Java Province. It is visible that tourism sector has a high forward linkage value (value > 1.502) of 1.611, which means that when final demand increases by one unit of money, the output of economic sector including tourism sector itself will increase by 1.611 units of money directly or indirectly. In accordance with this value, it can be interpreted that the output of tourism sector is used as an input for other economic sectors in Central Java Province. This is in accordance with the theory of Leon Walras about general equilibrium, in which the theory explains that each economic sector of a region is interrelated in buying and selling transactions, in which the output of a sector is sold to other economic sectors in order to meet the demand for input from other economic sectors.

**Table 1.** Forward and backward linkages of economic sector in Central Java Province

No.	Sector	Forward Linkage			Backward Linkage		
		Direct	Indirect	Total	Direct	Indirect	Total
1	Agriculture, Forestry, and Fisheries	0.220	1.219	1.439	0.203	1.092	1.295
2	Mining and Excavation	0.101	1.060	1.162	0.268	1.141	1.410
3	Processing Industry	1.118	1.582	2.700	0.375	1.171	1.547
4	Procurement of Electricity and Gas	0.481	1.338	1.819	0.498	1.390	1.888
5	Water Supply, Waste, Waste and Recycling Processing	0.014	1.000	1.015	0.345	1.191	1.537
6	Construction	0.145	1.044	1.190	0.429	1.210	1.640
7	Wholesale and Retail Trade; Car and Motorbike Repair	0.395	1.204	1.599	0.268	1.137	1.405
8	Tourist	0.426	1.185	1.611	0.399	1.1197	1.597
9	Finance and Insurance, Real Estate, Corporate, Government and Social Security	0.271	1.114	1.386	0.187	1.095	1.282
10	Services	0.077	1.021	1.099	0.276	1.142	1.419
	<b>Average</b>	<b>0.325</b>	<b>1.177</b>	<b>1.502</b>	<b>0.325</b>	<b>1.177</b>	<b>1.502</b>

Source: Input-output table of Central Java Province, Publication in 2021, processed

Meanwhile, the total backward linkage value of tourism sector is high (value > 1.502), which is 1.597. This can be interpreted that when final demand increases by one unit of output money from tourism sector, the demand for its input will increase by 1.597 units of money directly or indirectly from other sectors including the tourism sector itself. This is in accordance with the theory of Leon Walras about general equilibrium, in which the theory explains that each economic sector of a region is interrelated in buying and selling transactions, in which the output from other economic sectors is purchased to meet the input of a particular sector. In addition, the results of analysis in this research are in accordance with the research conducted by Muryani and Siswahto [15] entitled Analysis of the Tourism Sector and the Impact of Tourist Spending on the Economy of North Sulawesi Province. The research explains that the tourism sector has a fairly high backward linkage value among other economic sectors.

Table 2 describes the results of analysis of the total forward

and backward linkages of the tourism sub-sector in Central Java Province. In this table, tourism sector for the total forward and backward linkage value is divided into three supporting sectors, which are the transportation and warehousing sub-sector, the accommodation and food and beverage provision sub-sector, and the information and communication services sub-sector. This is because the tourism sector is a sector that cannot stand alone but is supported by several other economic sectors related to the tourism sector.

Table 2 indicates the total value of forward and backward linkage of the supporting sectors of tourism sector. The information and communication sub-sector has the highest forward linkage value of 1.623. This means that when there is an increase in final demand of one unit of money, the output of the information and communication services sub-sector increases by 1.623 units of money used by other sectors and the information and communication services sub-sector itself, both directly and indirectly. The information and communication services sub-sector has an important role in

supporting the tourism sector, which is required in conveying information about tourist destinations through social media. The results of this research analysis are different from the research conducted by Nilam [4] entitled Analysis of the Role

of Tourism Sector in Central Java (Input-Output Approach). The research explains that tourism sub-sector with the highest forward linkage value is the entertainment and recreation services sub-sector.

**Table 2.** Forward and backward linkages of tourism sub-sector of Central Java Province

No.	Sector	Forward Linkage			Backward Linkage		
		Direct	Indirect	Total	Direct	Indirect	Total
1	Transportation and Warehousing	0.327	1.131	1.458	0.397	1.204	1.601
2	Provision of Accommodation and Food and Drink	0.172	1.040	1.213	0.470	1.218	1.689
3	Information and Communication Services	0.434	1.189	1.623	0.287	1.128	1.415
	<b>Average</b>	<b>0.311</b>	<b>1.120</b>	<b>1.431</b>	<b>0.384</b>	<b>1.183</b>	<b>1.568</b>

Source: Input-output table of Central Java Province, Publication 2021, processed

Meanwhile, the accommodation and food and beverage provision sub-sector has the highest backward linkage value of 1.689 (value > 1.568). This means that when there is an increase in final demand of one unit of money, the output of the accommodation and food and beverage sub-sector requires input of 1.689 units of money directly or indirectly from other economic sectors including the accommodation and food and beverage sub-sector itself. The accommodation and food and beverage sub-sector has a high total backward linkage because this sub-sector is directly related to consumers, such as selling services or goods in the form of final goods as final consumers. In addition, the accommodation and food and beverage sub-sector is also a sub-sector that cannot be separated from basic human needs in meeting food and shelter needs. This is different from research conducted by Nilam [4] entitled Analysis of the Role of Tourism Sector in Central Java (Input-Output Approach). In this research, the supporting tourism sub-sector that has a high backward linkage value is the travel agency services sub-sector.

The distribution power explains the ability of a sector to increase the growth of its upstream industry through the input market transaction system. The distribution power of sector *j* is said to be high if  $P_{dj}$  has a greater value than one, and vice versa if  $P_{dj}$  has a less value than one. Meanwhile, the degree of sensitivity explains the ability of a sector to increase the growth of its downstream industry through the output market transaction system. The degree of sensitivity of sector *i* is said

to be high if  $S_{di}$  has a greater value than one, and vice versa if  $S_{di}$  has a lower value than one.

Table 3 indicates that tourism sector has a distribution power value of 1.063 (> 1), which can be interpreted that tourism sector is able to stimulate more than one production growth. Thus, tourism sector is included in the strategic sector that can help the growth of its upstream sector.

According to Table 3, the sector that has a sensitivity degree value (> 1) is the manufacturing industry sector of 1.797. Furthermore, the electricity and gas procurement sector is 1.210, followed by the tourism sector of 1.072 and the wholesale and retail trade sector, car and motorcycle repair with a value of 1.064. From the four sectors including the tourism sector, it can be interpreted that the sector has the ability to encourage the growth of its downstream sector.

According to these results, it is visible that tourism sector has a distribution power value of 1.063 (> 1) and a sensitivity degree value of 1.072 (> 1). Thus, it can be interpreted that tourism sector is included in the category of leading sectors. This is in accordance with research by Muryani and Siswahto [15] entitled Analysis of the Tourism Sector and the Impact of Tourist Spending on the Economy of North Sulawesi Province. The research contains the conclusion that tourism sector is a leading sector in North Sulawesi Province because it has a distribution power and sensitivity level above average or more than one.

**Table 3.** Distribution power & degree of sensitivity of economic sector of Central Java Province

No.	Sector	Spreading Power	Spread Sensitivity
1	Agriculture, Forestry, and Fisheries	0.862	0.958
2	Mining and Excavation	0.938	0.773
3	Processing Industry	1.030	1.797
4	Procurement of Electricity and Gas	1.257	1.210
5	Water Supply, Waste, Waste and Recycling Processing	1.023	0.675
6	Construction	1.091	0.792
7	Wholesale and Retail Trade; Car and Motorbike Repair	0.935	1.064
8	Tourist	1.063	1.072
9	Finance and Insurance, Real Estate, Corporate, Government and Social Security	0.853	0.922
10	Services	0.944	0.731

Source: Input-output table of Central Java Province, Publication 2021, processed

**Table 4.** Distribution power & degree of sensitivity of tourism sub-sector of Central Java Province

No.	Sector	Spreading Power	Spread Sensitivity
1	Transportation and Warehousing	1.089	0.992
2	Provision of Accommodation and Food and Drink	1.148	0.825
3	Information and Communication Services	0.962	1.104

Source: Input-output table of Central Java Province, Publication 2021, processed

In accordance with Table 4 that indicates the distribution power value of the supporting sub-sectors of tourism sector, the sub-sector with the highest distribution power value is the accommodation and food and beverage provision sub-sector, which is 1.148. This is followed by the transportation and warehousing sub-sector of 1.089. Both sub-sectors have a value ( $> 1$ ), which means that the sub-sector can drive the growth of its upstream sector and is included in the potential sub-sector. This is in accordance with research conducted by Yusroni and Chadhiq [5] entitled *The Influence of Tourism Sector on the Economy and Spatial of Bukittinggi City (Input-Output Analysis Approach)*. The research explains that the supporting sectors of tourism sector included in the potential sector are hotel, restaurant, entertainment and recreation sectors because they have high distribution power value or more than one but a low sensitivity degree value or less than one.

Meanwhile, the sensitivity degree value of the supporting sub-sectors of the tourism sector is in accordance with Table 4. The sub-sector with a high sensitivity degree value ( $> 1$ ) is the information and communication services sub-sector of 1.104, which can be explained as a supporting sub-sector of the tourism sector that can drive the growth of its downstream sector. It is visible that the sub-sector has no ability yet to drive growth in input sector production but has a high sensitivity to

external changes to its downstream sector. According to the opinion of Nuryadin and Purwiyanta [19] with research entitled *Multiplier Effect of Tourism Sector in Yogyakarta: Input-Output Analysis*, this research is not in accordance with the author's research because communication sub-sector is included in the leading sector.

Multiplier impact analysis is an analysis that aims at finding out something that occurs in endogenous variables if there is a change in exogenous variables in an economy. In this research, effect multiplier analysis was carried out to analyze three types, which are output multiplier analysis, income multiplier, and labor multiplier.

Output multiplier analysis aims at showing the impact of changes in final demand in a sector on the output of all sectors in the economy. The income multiplier is useful for viewing the increase in income as a result of changes in output in an economy. The income multiplier shows the number of household incomes generated due to increased final demand in the sector. The labor multiplier shows changes in the workforce as a result of initial changes in final demand. The labor multiplier is not obtained from the input-output table because the input-output table does not contain elements related to labor. The following is Table 5 regarding the results of analysis of output, income, and labor multipliers of the economic sector of Central Java Province.

**Table 5.** Output, income, labor multipliers of economic sector of Central Java Province

No.	Sector	Output Multiplier	Income Multiplier	Labor Multiplier
1	Agriculture, Forestry, and Fisheries	1.295	0.905	0.027
2	Mining and Excavation	1.410	0.865	0.005
3	Processing Industry	1.547	0.717	0.011
4	Procurement of Electricity and Gas	1.888	0.359	0.008
5	Water Supply, Waste, Waste and Recycling Processing	1.537	0.758	0.093
6	Construction	1.640	0.690	0.010
7	Wholesale and Retail Trade; Car and Motorbike Repair	1.405	0.850	0.019
8	Tourist	1.597	0.783	0.014
9	Finance and Insurance, Real Estate, Corporate, Government and Social Security	1.282	0.888	0.009
10	Services	1.419	0.833	0.017

Source: Input-output table of Central Java Province, Publication 2021, processed

Table 5 indicates the output, income and labor multiplier values of the economic sector of Central Java Province. It is visible from the tourism sector that places the output multiplier value in third place with a value of 1.597. This can be explained that the tourism sector has an effect on increasing final demand by one unit of money, then it will increase output by 1.597 units of money in all economic sectors of Central Java Province. In accordance with research conducted by Nilam [4] entitled *Analysis of the Role of the Tourism Sector in Central Java (Input-Output Approach)*, the research concluded that tourism sector is one of the sectors that has the largest output multiplier from other economic sectors.

Meanwhile, for the income multiplier value in Table 5, the tourism sector is in sixth place among other economic sectors in Central Java province. This indicates that tourism sector has an income multiplier value that is not too high of 0.783. This value means that if the final demand for the tourism sector

increases by one unit of money, income will increase in all economic sectors by 0.783 units of money. This can be interpreted that the agriculture, forestry and fisheries sectors are able to help increase the income of other economic sectors in driving the economy in Central Java Province. The results of this analysis are not in accordance with research of Annas [20] entitled *Analysis of Input-Output of the Tourism Sector in Banyuwangi Regency*. The research explains that the highest income multiplier effect is the manufacturing sector.

Furthermore, the labor multiplier value in Table 5 indicates that the tourism sector is in fifth place among other economic sectors in Central Java Province. The labor multiplier value in the tourism sector is not too high, only 0.014 when compared to other sectors. This value can be interpreted that when the final demand for the tourism sector increases by one unit of money, it can increase employment by 0.014.

**Table 6.** Output, income, labor multipliers of tourism sub-sector of Central Java Province

No.	Sector	Output Multiplier	Income Multiplier	Labor Multiplier
1	Transportation and Warehousing	1.601	0.749	0.010
2	Provision of Accommodation and Food and Drink	1.689	0.790	0.022
3	Information and Communication Services	1.415	0.825	0.006

Source: Input-output table of Central Java Province, Publication 2021, processed

Table 6 indicates the output, income and labor multiplier values of the supporting sub-sectors of the tourism sector in Central Java Province. The highest output multiplier value in the accommodation and food and beverage provision sub-sector is 1.689, which means that when the final demand for the output of the accommodation and food and beverage provision sub-sector increases by one unit of money, it may increase output in all economic sectors by 1.689 units of money, so that the accommodation and food and beverage provision sector is able to increase the growth of other related economic sectors.

Meanwhile, the sub-sector with the highest income multiplier value is the information and communication services sub-sector of 0.825, which means that if the final demand for the information and communication services sub-sector increases by one unit of money, it will increase income in all economies by 0.825 units of money. The information and communication services sub-sector has great potential in supporting sub-sector of the tourism sector to increase community income, the economic sector and regional income. This is not in accordance with research conducted by Nilam [4] entitled Analysis of the Role of Tourism Sector in Central Java (Input-Output Approach). In this research, it is concluded that the income multiplier effect of the sub-sector with the highest value is the restaurant sub-sector.

Furthermore, the sub-sector with the highest labor multiplier value is the accommodation and food and beverage provision sector with a value of 0.022, which means that if the final demand for the accommodation and food and beverage provision sub-sector increases by one unit of money, it may increase employment by 0.022. This sub-sector is able to support the tourism sector to increase the labor in other economic sectors to encourage the economy of Central Java Province. This is in accordance with a research conducted by Nilam [4] entitled Analysis of the Role of Tourism Sector in Central Java (Input-Output Approach). In this research, it is concluded that the restaurant sub-sector has the highest value in the labor multiplier effect.

#### 4. CONCLUSION

The result of research indicates that the tourism sector for forward linkage is in the third highest position, and the highest supporting sub-sector of tourism sector is the information and communication services sub-sector. While for the result of the backward linkage value, the tourism sector is in the third highest position, and its supporting sub-sector with the highest value is the food and beverage accommodation provision sub-sector. The result of distribution impact analysis indicates that the tourism sector is a leading sector because it has the value of distribution power and a degree of sensitivity of more than one. For the output multiplier effect, the tourism sector is in the third highest position, while for the income and labor multipliers, it is not too high in the sixth and fifth positions.

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