AGRISCIENCE
ISSN: 2745-7427
Volume 1 Nomor 3 Maret 2021
http://journal.trunojoyo.ac.id/agriscience

Determining Tourist Visits and Economic Valuation of Natural Attraction of Tretes Waterfall of Wonosalam

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ABSTRACT
The aims of the research to analyse the determinant of visits frequency and economic valuation of natural attractions of the Tretes waterfall. Two analysis methods are used by combining the negative-binomial and travel cost method (TCM) with an individual approach. The result showed that independent variables such as total travel expense, age, income, motivation, sex, and duration of enjoying tour partially do not significantly affect visits frequency. The only one independent variable which significantly toward visits frequency is distance. It means closer more often to visit. The amount of willingness to pay is IDR 50,000 with individual consumer-surplus is IDR 27,397.26, and economic value IDR 328,767,120 per year.

Keywords: Waterfall, Economic Valuation, Willingness to Pay.

INTRODUCTION
The future of the tourism sector road to based on the sustainability of social behaviour and wealth distribution (Yeoman, 2018). Besides, the influence of industry 4.0 will be integrating technology and communication to all stakeholders who have interests (Gül & Gül, 2019). The public policies about revolution industry 4.0 in which several countries launched across the continent while the US as the very first time started it since 2011 without explicit duration and end year (Liao, et al., 2018). To face it early, communication extremely important needed to achieve and to maintain tourism industry because many developing countries rely on the tourism sector as source income to estimate to be 5% (Hociung & Frâncu, 2012).

Indonesia has the top archipelago destination in south-east Asia enhance up to 15% and the third of tourists and visitors arrival in the amount of 3.1% international receipt (UNWTO, 2017a). Therefore, there are three put forward policies to trigger action for all level such as sustainable of the destination, the observatory, and the certification of tourism (UNWTO, 2017b). The highest distribution of visits frequency by local tourists based on destination is East Java in which 17.22% (CBS, 2016). Increasing the visits frequency might be used to tourism website as an impact of industry revolution 4.0 where the technology is the main support (Abidi & Ramadhani, 2012).

Based on government regulation of Indonesia in number 05 the year 2011 that has been supporting and expanse the existence of Indonesian's tourism both domestically and aboard (Tourism Ministry, 2017). In 2016 there was increasing visit frequency of foreign tourist in the amount of 15.54% to 12.2 million visits better than 2015 which only 10.41 million visits. State Ministry for Development Planning of Indonesia (2014) or BAPPENAS has targeted tourism contribution to GDP by 8% with foreign exchange of IDR 240 trillion and 20 million foreign tourist visits in 2019. In other cases, GDP is contributed by investment in tourism sector significantly in India (Kaur & Pooja, 2018). The facts, it has done by deputy

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for destination development of tourism ministry of Indonesia by exceed the target of GDP contribution up to 15% (Ratman, 2016).

Development of the tourism sector in sub-district of Wonosalam is gorgeous, its seen by the indicators like a legal instrument, institutional order, and operational mechanism (Novitasari, 2014). There are so many tourism destination, one of the best is Waterfall called Tretes or Pengajaran which located in Gelengdowo village, sub-district of Wonosalam, Regency of Jombang, East Java province. The characteristic of tourist who has visited such as sex is dominated by the men in range of ages 14-25 years old, and the typology is allocentric (Purbowo & Indrawati, 2018). Therefore, the aims of the study are analysing the determinant of visits frequency and count the total economic value of Tretes waterfall.

METHODOLOGY

This research conducted in Tretes waterfall, the place which has natural resource contain therein to, located in south of Jombang regency, East Java province, Indonesia. The collected data-technique used questionnaires to 40 tourists who has visit it which is based on minimum standard. The sample technique used incidental sampling because the population can't be defining certainly. All of the input data analysed using the Generalized Linear Model (GLM) with SPSS 20.00 and Travel Cost Method (TCM).

The GLM used to know how visits frequency affect significantly to its independent variable and TCM to count the consumer surplus, individual-consumers surplus and economic value of natural attraction. GLM is introduced by Nelder and Weddeburn in 1972 while they develop book materials (Faraway, 2016). There are two models of GLM namely Poisson and Negative Binomial has similarly criteria like link function, linier predictor, and random component which has specific requirement one another (Dupont, 2009). Its an alternative regularly used to analyse natural resource by recreational users to create model of visits frequency to a distinct site as a function of the cost of usage and the economic and demographic characteristics of the users (Colin & Pravin, 2013).

Poisson regression needs a requirement that too difficult to applied because of over-dispersion effect. Furthermore, negative binomial is one of several solutions to resolve it. The negative binomial resolves it failure by attach a parameter α reflects unobserved heterogeneity between scrutinises. Its created on formulas below.

Poisson

$$f(y \mid \theta, \Phi) = e^{-\mu}\mu^{y}/y! = exp\ (y \log \mu - \mu - \log y!)$$

Explanation:

$\theta = \log(\mu)$

$\Phi = 1,\ a(\Phi) = \Phi$

$b(\theta) = \exp(\theta^2)$

$c(y,\Phi) = -\log y!$

Negative Binomial

$$= f(y \mid \theta, \Phi) = \binom{n}{y} \mu^{y} (1-\mu)^{n-y}$$

$$= exp[(y \log \mu + (n-y)\log(1-\mu) + \log)\binom{n}{y}]$$

$$= exp\ (y \log \tfrac{\mu}{1-\mu} + n \log(1-\mu) + \log\binom{n}{y})$$

Explanation:

$\theta = log\ \frac{\mu}{1-\mu}$

$b(\theta) = n \log(1-\mu)$

$= n \log\ (1+\exp\theta)$

$c(y,\Phi) = \log\binom{n}{y}$

Economic valuation of natural resources aims to identify important values, benefits and all forms of problems that arise in an ecosystem. So that in the future it is expected to get a standard to measure sustainable ecosystem utilization. The valuation method is distinguished by the method of total economic value, damage economic method and method concept. Here it used the travel cost method as a part of method concept of non-market approach. Step by step to count economic value explained below:

- Counting consumers' surplus

  $$WTP \approx CS = \frac{N^2}{\beta 1} \quad \text{.....(1)}$$

- Counting individual surplus

  $$\frac{WTP/\sum X}{n} \quad \text{.....(2)}$$

- Creating economic value.
  IS x K.....(3)

Explanation:
WTP: Willingness to pay ∑X = total visits frequency
N = visits frequency n = total respondent
β_1 = coefficient of VCE IS = Individual surplus
K = Tourists visit estimate in a year based on previous year

RESULTS AND DISCUSSION

Counting the variable of Vacation Cost Estimate (VCE)

It obtained by the addition of fuel, park, ticket, taxi bike, consumption, souvenirs, and documentation. There are 40 respondents who have different cost one another depending on their expenses. Therefore, scientific notation written below:

VCE= F + P + T + Tbk + C +S+ R

As a result, the independent variable was created and already to include in the predicted model.

[VF= exp(α+β_1VCE+ β_2A+ β_3I+ β_4D+ β_5M+ β_6S+ β_7Det)]

Examining the distribution data using both Kolmogorov Smirnov test and over-dispersion test to find out whether normal or Poisson indicated.

Table 1
The Result of One-sample Kolmogorov-Smirnov Test and Descriptive Statistic

Test Distribution	Asymp. Sig (2-tailed)	Mean	Variance
Normality	0.001	1.83	1.840
Poisson	0.250	1.83	1.840

Source: Primary Data Processed, 2020

Parameter:
H_0 = Sig < 0.05 H_0 = Distribution data is normal nor Poisson
H_1= Sig > 0.05 H_1 = Distribution data is normal or Poisson

There are two distribution tests above which consist of normality and Poisson. The result showed that the normality signification test is 0.001 < 0.05 (α

= level signification 5%) which is accepted H_0 and reject H_1. It means the distribution of data is not normal because the Asymp sig is 0.001 less than 0.05. Unlike Poisson distribution test is 0.250 > 0.05 which is accept H_1 and reject H_0. In other words, the data distribution is Poisson because the Asymp sig is 0.250 more than 0.05.

In addition, descriptive statistic describes specifically in which variety of two models Poisson or Negative Binomial. The stipulation model which called Poisson is equal-dispersion (variance=mean) and Negative binomial is if connote over-dispersion (variance>mean). The table showed that conditional variance is 1.840 exceeds than conditional mean 1.83 which means over-dispersion conducted. Furthermore, it should acclimatize to the negative binomial model.

Detecting Multicollinearity Using VIF and Tolerance Value

Based on the multicollinearity test and the parameter above, it showed that all of independent variable such as VCE (1.942), age (1.708), income (1.897), distance (1.529), motivation (1.832), sex (1.423), duration (1.188) have VIF less than 10. Moreover, the tolerance value of all independent variable such as VCE (0.515), age (0.586), income (0.527), distance (0.654), motivation (0.546), sex (0.703), and duration (0.842) are more than 0.1 which means the model is free from multicollinearity. Furthermore, all of the variables fit to include the model (Table 2).

Predicting the Generalized Linier Model (GLM) Using Binomial Negative

Interpretation (Table 3):

a. Regardless of all independent variables; visit frequency might be able up to e2,084 = 8,036 or rounded to 8 times visits.
b. If there will be increasing of VCE whatever it is, probably holding visit frequency up to e-0.32= 0.73 else, decreasing it in the amount of (1-0.73) x 100% = 27%.
c. If there will be increasing of Age whatever it is, probably holding visit frequency up to e-0.20= 0.81 else, decreasing it in the amount of (1-0.81) x 100% = 19%.
d. If there will be increasing of Distance whatever it is, probably holding visit frequency up to e-0.11= 0.89 else, decreasing it in the amount of (1-0.89) x 100% = 11%.
e. If there will be increasing of Income whatever it is, probably holding visit frequency up to e-0.0018= 0.98 else, decreasing it in the amount of (1-0.98) x 100% = 2%.
f. If there will be increasing of Motivation whatever it is, probably holding visit frequency up to e-0.188= 0.89 else, decreasing it in the amount of (1-0.89) x 100% = 11%.
g. If there will be increasing of Sex whatever it is, probably supporting visit frequency up to e0.062= 1,064 else, increasing it in the amount of (1-1.1) x 100% = 10%.
h. If there will be increasing of Duration of enjoying tour whatever it is, probably supporting visit frequency up to e0.071= 1.074 else, increasing it in the amount of (1-1.1) x 100% = 10%.

Table 2
The Result of Multi-collinearity Test

Model	Tolerance	VIF
Vacation Cost Estimate (VCE)	0.515	1.942
Age (A)	0.586	1.708
Income (I)	0.527	1.897
Distance (D)	0.654	1.529
Motivation (M)	0.546	1.832
Sex (S)	0.703	1.423
Duration Enjoying tour (Det)	0.842	1.188

Source: Primary Data Processed, 2020
Parameter:
VIF < 10 = Multicollinearity undetected; Tolerance > 0.1 = Multicollinearity undetected
VIF > 10 = Multicollinearity detected; Tolerance < 0.1 = Multicollinearity detected.

Table 3
The Prediction of GLM Model Using Binomial Negative

Parameter	Estimation	Standard Error	Sig
Intercept	2.084	3.2831	0.526
VCE	-0.32	5.6152	0.995
A	-0.20	0.1331	0.880
D	-0.11	0.0284	0.045
I	-0.018	0.4436	0.968
M	-0.188	1.4924	0.900
S	0.062	0.4990	0.901
Det	0.071	0.9742	0.492

Source: Primary Data Processed, 2020
Predicted the model:
$VF= \exp(\alpha+\beta_1 VCE+ \beta_2 A+ \beta_3 I+ \beta_4 D+ \beta_5 M+ \beta_6 S+ \beta_7 Det)$
$VF= \exp(2.084-0.32VCE-0.20A-0.11I-0.018D-0.188M+0.062S+ 0.071Det)$
Definition:
VF = Visits frequency
$\beta_{1...}$ = Coefficient
α = Intercept
D = Distance
VCE = Vacation Cost Estimate
M = Motivation
A = Age
S = Sex
I = Income
Det = Duration of enjoying tour

Signification Testing the Variable Independent Affect Dependent Variables by Wald Test

Based on the table above, the only one independent variable which has Wald Test value more than chi-square X_2 (3.841) is distance (D) in the amount of 15.002. In that case, rejects H_0 and accepts H_1 which means there is a significant influence of distance on visit frequency. While other independent variables such as vacation cost estimate (0.003), age (2.258), income (0.02), motivation (0.016), sex (0.015), and duration enjoying tour (0.05) have Wald Test value less than chi-square X_2 (3.841), therefore they accept H_0 and reject H_1 which means there is no significant influence on visit frequency.

Table 4
The Signification Test Using Wald

Parameters	*Wald* Test	X^2 *df* 1	Result	Decision
VCE	0.003	3.841	*Wald*<X^2	Accept H_0; reject H_1
A	2.258	3.841	*Wald*<X^2	Accept H_0; reject H_1
D	15.002	3.841	*Wald*>X^2	Reject H_0; Accept H_1
I	0.02	3.841	*Wald*<X^2	Accept H_0; reject H_1
M	0.016	3.841	*Wald*<X^2	Accept H_0; reject H_1
S	0.015	3.841	*Wald*<X^2	Accept H_0; reject H_1
Det	0.005	3.841	*Wald*<X^2	Accept H_0; reject H_1

Source: Primary Data Processed, 2020
Parameter:
If W*ald Test* <X^2 = accept H_0; reject H_1
If Wald Test > X^2; Reject H_0; accept H_1
Hypothesis:
H_0= there is no signification influence between independent affect dependent variable
H_1= there is signification influence between independent affect dependent variable

Table 5
The Result of Economic Valuation

	Formulas	Result
WTP	WTP ≈ CS =N^2/ β_1	IDR 50,000
IS	$\frac{WTP/\Sigma X}{n}$	IDR 27,397.26
EV	IS x K	IDR 328,767,120

Source: Primary Data Processed, 2020

Discussion
Vacation cost estimating how much in rupiahs' tourist spend their money to access the destination start the first point of departure until back as before. Its components such as fuel price, park retribution, ticket price, taxi-bike rent, consumptions cost, souvenirs, and documentation-tools rent which has different spend one another. Besides, it also need the complete trip information like mode, purpose and itinerary use automatic approach using GPS (Yazdizadeh, et al., 2018). In addition, the detail information of attraction, accommodation, transportation, amenities, climate, currency, language, and also local people's lives is needed (Camilleri, 2018).

Tazkia & Hayati (2012) argued that vacation cost is significantly against demand tourism. In addition, Cininta, et al. (2016) said that visit frequency significantly affects education and income. Then, Priambodo & Suhartini (2016) also argued that tourism demand also affects by vacation cost, education, income, and group. In contrast to this, the vacation cost of the tourists Tretes waterfalls of Wonosalam-Jombang insignificantly to demand/visit frequency because Wald-test 0.003 less than chi-square 3.841. But it has been predicted to be possible to hold visit frequency up to 0.73 times or might be able to decrease by 27% from the beginning.

The fuels in Indonesia are consist of gasoline and diesel which the variety of prices and quality levels. There are three levels of gasoline such Premium as lower (IDR 7,000), Pertalite (IDR 7,650) as middle up, and the best level are Pertamax (IDR 9,850), Pertamax-Turbo (IDR 11,200), Pertamax-Dex (IDR 11,700).

Likewise, diesel also divided into Dexlite (IDR 10,200) and Bio-solar (IDR 9,800). The tourists spend for the fuel depend on their vehicle and distance.

So imperative to organise retribution that should have physical structures-infrastructures such wide parking area for the all variety of vehicle and also a traditional cafeteria, and souvenir shop centre (MH, 2014). Park retribution has charged for each vehicle. All of the tourists parked their vehicle and walk is a must because of the precipitous track. It has been managed by village-owned enterprises or BUMDES, an institution below village government focuses on increasing and developing village resources. Its prospective to enhance income like seems on regional income department with average growth both two-wheeled and four-wheeled are 13.14% and 9.7% (Hasan & Suratman, 2013). The parking charges is different between motorcycle in the amount of IDR 5,000 and car IDR 10,000. The parking area located 1.5 kilometres before ticket box, and 2 kilometres again to reach the waterfall, so the tourists must prefer to walk or rent the taxi-bike which is only stop until ticket box.

In contrast to this, the taxi-bike rent has been managed by villagers individually. they use the modification motorcycle which has resistant against the precipitous track. Youths villagers dominantly grab it out than adults especially on the weekend. The price is IDR 20,000 for once trip only and IDR 40,000 for round trip. These are depending on the tourists to prefer rent it or walk. The drivers sometimes have double role when he did his job because the foreign tourists ask about something using English. (Prachanant, 2012) said that three main purposes ability speak English are giving information, services and offering help. On the other hand, tourism managers also need the concept of humour by raising practical issues in its application so that tourists are not bored (Pabel & Pearce, 2018)Tour guide services has significantly influence to the satisfactory of tourists and re-visiting intensity (Oter & Çetinkaya, 2016).

The natural attraction is managed by Integrated Service Unit of R Soerjo Forest Park or local named UPT TAHURA R Soerjo which the entrance fee on two categories; the first one is local tourist in the amount of IDR 10,200 and the second one foreign tourist IDR 25,000 or US$ 1.72. Limaei, et al. (2014) said that the entrance fee has increased, willingness to pay indicated to decrease. Conversely, Wang & Jia (2012) added that the entrance fee possibly to increase gradually to measure realistic impacts. Yet, it can't be applied on Tretes waterfall because of development step which is need to increase promotion but still preserve nature continuously.

Every tourist need foods and drinks certainly during the trip because the main destination (Tretes waterfall) is too far and sheer. So, they must spend some of money to grab food or bring by self. The variety price of food in range IDR 5,000-IDR 25,000 based on individual chooses and tastes. The decision to prefer foods in the tourism destination could be a cleverish approach of investigation to know how their satisfaction (Mak, et al., 2012).

Before the tourists back home, sometimes need to bring something peculiar souvenirs of Wonosalam like durian and snakefruit. Both of them will be found on the roadside along the trip before the parking area. The durian's price IDR 50,000-IDR 200,000 per piece depend on size, varieties, and tastes. Else, the snakefruit of Gelengdowo sell in the amount IDR 7,000 per kilograms. Its garden located beside the parking area which is to become agritourism snakefruit-house

in the future. Kim et al., (2019) argued that agritourism significantly impacts consumer spending patterns with the fruits. Hopefully, the tourists might be picking the snakefruit up satisfactory.

Documentation-tools rent needed to them who want to get more quality pictures, using digital single lens reflex (DSLR). The price rent start IDR 50,000 – IDR 150,000 per day depend on lens equipment and type. They had to prefer rent than buy because of overpriced. The tourist has so many poses in front of the camera. Commonly, they used a part of all like bland, bland variant, composed, composed variant, model, model variant, dynamic, dynamic variant, projecting and projecting variant. Nevertheless, it could be better evaporate rarely in photograph (Pearce & Wang, 2019).

There oldest one tourist is 48 years old and the youngest is 15 years old while the children include their parent. There is no signification influence on visit frequency because the tastes of travelling are different one another age. Both the youths and the olds either to visit or not, based on their want. Instead, the age might be probably to decrease the taste to travelling because of health in 19%.

There is information which crucial to be compelling destination while the distance may not be obstacle (Sun, et al., 2018). In addition, how far the tourists came from are the main reason that's why it has significant influence on visit frequency. It seems on how many times they repeat to visit in other chance on the next day. Consequently, in the amount of 11% each addition of distance probably to decrease visit frequency. It is related to the law of distance decay who said "farther away you are from goods or services, the less likely you are to make use of it". Besides, the distance is affected by the decision to prefer vehicle type significantly (Angueira, et al., 2017).

Income is also proportional to travel taste. While people will increase their income, travel taste does change immediately. Here is a bearing of tourism frequency against income from which insurance sources (Chen & Chen, 2018). In contrast, seems on the tourist's income which does not influence significantly on visit frequency (repeat) which exactly has probably 2% to change their destination that never visits previously.

There is a human condition in which alienation is a part of it. In fact, disquiet cannot separate in the daily life that influences a tourist to try new things as one of the related results of motivation (Vidon & Rickly, 2018). The forth motivation why tourists choose Tretes waterfall as their destination include picnic, refreshing, date, and education/research. A picnic can be used to meet together up with family which has correlated (Kluin & Lehto, 2012). Unfortunately, it is not influence significantly on visit frequency Even if motivation probably to decrease visit frequency up to 11% because of too enough or bored. Terzidou, et al. (2018) added that spiritual belief and also the meaningful location which means their faith significantly to be travel motivation.

Often one of us said that gender and sex have the same meaning. The reality is different thing both of them; gender is about social involved in their households like double role, subordination, marginalisation, and stereotype (Purbowo & Widodo, 2018); where sex is about biological aspect such pregnancy and physiologist. Women and men both of the sex have the same chance to obtain happiness by traveling as their human rights. Otherwise, no matter how much spends the time and money during did it whenever and wherever. In fact,

the spirit to travel both of them is not affect visit frequency maybe cause of substitution destination. But she or he on the future might be able to increase 10% visit frequency another way like invited other people by mass communication, social media, blog, and others. According to this, some the Asian women which have a double role in a gender perspective, resisting its norm because of transformation silently (Yang, et al., 2017).

The duration of enjoying tour reflects how the length of stay shortly in a day in the Tretes waterfall. Alén, et al. (2014) said that age, motivation, climate, attribute, substitution tent, and outdoor activities significantly impact to length of stay during vacation. So many tourists left their activity to enjoy life and prefer Tretes waterfall as the best destination. How many time that they while away the time is such a valuable experience for them. Predictably, it will have positive impact to jack up 10% visit frequency, whereas not significantly up to now.

Fauzi (2010) argued that economic value is the total maximum disposed to spend their goods to get other goods. This concept called willingness to pay. Denant-boemont & Hammiche (2018) said that economic value is total maximum income which is spent by individual to access the availability things or services. In this case, the tourists disposed to spend the amount of IDR 50,000 to get the satisfaction of the Tretes waterfall of Wonosalam-Jombang which its beauty like in paradise. In compare, Willingness to pay the national of Gading mount in the amount of RM 1.64 or IDR 55,260 (Kamri, 2013) and the visitors of Emas waterfall in brazil only disposed in the amount of US$ 2,75 or IDR 38.878 (Peixer, et al., 2011).

The value of natural resource also estimated by a willingness to pay, individual surplus and total economic value The tourists have surplus consumers in the amount of IDR 27,397.26 because getting cheaper than the satisfaction of tourism. The value of forest conservation brings benefit and value in regional, national and international. It seems on the benefit of the forest by ecosystem services and regional value-added which are economic, social and ecological (Loomis, et al., 2019). The amount of total economic value of Tretes waterfall of Jombang is IDR 328,767,120 per year in the assumption that would be visited by 15000 tourists in a year.

CONCLUSIONS

There are variables such as total travel expense, age, income, motivation, sex, and duration of enjoying tour partially does not significantly affect the frequency of visits. The only one independent variable which significantly toward visit frequency is distance. Regardless of the independent variables, the visit frequency would be enhancing up to 8 times. Whereas, sex and duration of enjoying tour probably to support visit frequency as much as 10% each other. In contrast, other independent variable such VCE (27%), age (19%), distance (11%), income (2%), and motivation (11%) probably to decrease. There are total economic value IDR 328,767,120 per year, individual surplus IDR 27,397.26, and consumers surplus IDR 50,000. This tour is very beneficial for tourism sustainability and the welfare of the local community. Additional services and increased tourism would be increasing the number of visits each year. In its development, coordination across government is needed in the development and development of Tretes Wonosalam waterfall tourism so that it can run in

accordance with the strategic development plan that provides facilities, accommodation and souvenir centres that are not yet available.

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