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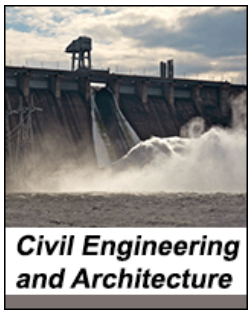


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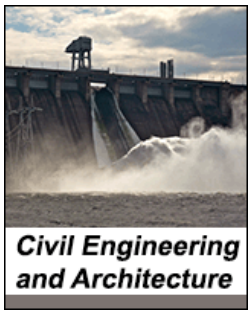


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# Local Law Enforcement Variables as Moderating Effect on the Behavior of Foreign Motorcycle Riders in Tourism Areas in Bali

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**Abstract** Foreign motorcyclists are prone to greater risks than the locals in most countries worldwide [1]. Risk parameters identified include lack of knowledge of traffic regulations, inadequate driving skills, different seasons, and general attitudes towards traffic safety reflected in driving behavior [2]. Along with tourism development, the number of foreign motorcyclists also increases. Therefore, safety measures are essential [3]. In this research, by using data collected from 71 foreign motorcyclists as respondents, we study the influence of local road and traffic conditions, human factors, and local law enforcement on the behavior of foreign motorcyclists around tourist areas in Bali. The method used is Structural Equation Modeling (SEM). The expected contribution is a model that finds how local law enforcement affects foreign motorcyclists' behavior around tourist areas in Bali, which can significantly reduce the risk of accidents for foreigners. The results are that local law enforcement can act as a moderating effect of human factors on the behavior of foreign motorcyclists with a P-value of 0.008. Foreign motorcyclists' behavior in tourist areas is also directly affected by their behavior in their origin country, with a P-value of 0.035. But local law enforcement cannot act as a moderating effect of local road and traffic conditions on the behavior of foreign motorcyclists with a P-value of 0.441. The research concluded that foreign motorcyclists' behavior in Bali tourist areas is positively influenced by the local law enforcement by authorized officials. It shows that the more stringent enforcement of the law, the better the behavior of foreign motorcyclists. And better conduct of foreign motorcyclists can reduce the number of accidents involving foreigners in the tourist areas in Bali.

**Keywords** Motorcyclist, Foreigner, Behaviour, Law Enforcement

## 1. Introduction

People who come to Indonesia come from different countries with various characteristics regarding age, purposes of arrival, education, and cultural background. These divergent characteristics lead to multiple choices of transportation modes in Indonesia. Some prefers motorcycles as a form of transportation. Therefore, this study will investigate the behavior of foreigners who ride motorcycles in Indonesia.

In most countries worldwide, foreign riders face larger

dangers than native drivers, as evidenced by various empirical results, including [1]. It is said that variances in countries' traffic cultures largely explain the differences in certain technical parameters. Foreign motorcyclists face increased accidents, severity, and hazards due to a lack of awareness of the road network, local traffic regulations, and insufficient driving abilities in new situations [2].

Agustin [4] indicates that three factors influence motorists to commit violations on the road with a median. The three factors are knowledge of the rider, the intensity of the action in the form of stopping motorists who commit traffic violations, and the intensity of the activity in the form of taking legal action. While on the roads that do not have a median, there were only two factors. The two factors are motorists' knowledge and the intensity of the action in the form of legal action.

Iamtrakul et al. [5] found the important factors influencing this risk behavior relatively in a high proportional order as follows; 1) understanding of the traffic regulations and 2) possession of adequate and valid travel insurance. Therefore, safety knowledge training, especially regarding traffic regulation for accident prevention, could play a key role in preventing motorcycle-related injuries and fatalities. This promising intervention is highly recommended in environments where road safety measures, particularly enforcement activities, are commonly limited.

Nævestad et al. [6] conclude in their research that road safety behaviors, to a large extent, can be attributed to different community Road Safety Cultures, which was found primarily to be influenced by the perceived level of police enforcement.

Cheng et al.'s [7] research results show that the speeding violation level tends to occur in high rainfall environments. The foreign license plate and autumn present a larger probability of high speeding violation levels than the local license plate and other seasons (i.e., spring, summer, and winter), respectively.

The widespread use of motorbikes as a method of transportation in Bali is mainly due to its reliability in heavy traffic and on narrow roads and the ability of motorbikes to reach remote places in urban and rural areas that are generally not accessible by optional transportation methods. Moreover, this mode of transportation is increasingly becoming the hallmark of foreign arrivals in Bali because of the different components related to transportation, such as the ease and affordability of motorbike rental and the unreliability of existing public transportation. Similarly, motorbikes in other parts of Asia are the preferred method of transportation for foreign visitors due to shorter travel periods and lower costs associated with fuel use and rent [8].

Rabbani et al.'s [9] research revealed that most accidents occur in the daytime and with those who do not have enough traffic education. Due to side frictions, a decrease in road capacity (pcu/hour) was found between 14.37% and 26.60%, while a speed reduction was between 13.79% and 76.19%. These show a significant side friction problem on arterial roads in tourism areas. The road control policy, particularly on roadside access, is needed for these arterial roads [10].

Variations in general attitudes towards road safety reflected in riding behavior can contribute to a higher accident risk for foreign motorcyclists than locals. Research in this field, especially on local law enforcement's influence on foreign motorcyclists' behavior, has not been specifically addressed. In this research, we want to study the result of local road and traffic conditions, human factors, and local law enforcement's impact on foreign motorcyclists' behavior around tourist areas in Bali using Structural Equation Modeling (SEM). The expected contribution of this research is a model that finds how local law enforcement affects foreign motorcyclists' behavior around tourist areas in Bali, which eventually can significantly reduce the risk of accidents involving foreigners.

The problems to be researched are:

- How do the local road and traffic conditions influence foreign motorcyclists' behavior in Bali's tourism areas?
- How do the human factors influence foreign motorcyclists' behavior in Bali's tourist areas?
- How does local law enforcement affect the foreign motorcyclists' behavior in tourism areas in Bali?

This research is expected to help develop corrective measures in foreign motorcyclists' behavior to reduce the rate of motorcycle accidents involving foreign motorcyclists. Expectantly, the solution to reduce accidents against foreign motorcyclists will not only be in terms of infrastructure development but will also be more directed at improving local law enforcement to modify the motorcyclists' behavior.

The contribution of this study is a model that can explain how local law enforcement affects the behavior of foreign motorcycle riders in tourist areas in Bali, which can then play a major role in reducing the risk of accidents involving foreign motorcyclists.

## Theory of Planned Behaviour (TPB)

The Theory of Planned Behaviour (TPB) mentions three types of considerations guiding human behavior: beliefs about possible consequences of behavior (*behavioral beliefs*); beliefs about the normative expectations of others (*normative beliefs*); and beliefs about the existence of factors that can facilitate or hinder behavioral performance (*control beliefs*). In their respective proportions, beliefs result in favorable or unfavorable conduct to that behavior.

The intention is said to be the catalyst for action. However, because many behaviors present problems that may limit willpower, it's important to consider the feeling in control of behavior than intention itself. If the perception of control over behavior is genuine, it might act as an indirect control and help predict the under- investigation behavior [11].

The socio-cultural context should characterize and frame the risk factors connected with motor vehicle-related injuries. To establish targeted and efficient measurements and interventions, a detailed study of socio-cultural aspects associated with motorcycles is required [12].

Road infrastructures, damages, and maintenance conditions are partly responsible for motorcyclists paying less attention to traffic regulations. According to global statistics, traffic fatalities and injuries have increased by about 65% between 2000 and 2020 [13, 14]. The outlook is devastating in low and middle-income countries, where traffic fatalities are estimated to increase by 80% [15]. Road accidents have become a big problem in many countries, especially in urban areas [15, 16], and Indonesia did not escape this trend.

The characteristics and consequences of road accidents that result in death and injury in developing countries are different from those of high-income countries. In low-income countries, most victims are pedestrians, cyclists, motorcyclists, and even passengers on public transportation systems [15]. In the United States, 80% of the victims who die from road collisions are motorcyclists and passengers of four-wheeled motor vehicles [17].

Human behavior is important when designing strategies to reduce traffic accidents and fatalities. What tourists do or do not do results in many accidents. As a result, human behavior research is critical for road safety research [10, 11].

They also claimed that the perceptions of motorcyclists of the road and traffic environment were linked to their age, driving experience, weariness, stress, and emotions. While there has been a lot of research into traffic infractions committed by motorcycle riders in developed countries, there has been little research into traffic violations committed by motorcyclists in developing countries, where the usage of motorcycles has been rapidly increasing recently. Motorcycles hold a large share of the mode of transportation choice in several Southeast Asian countries, such as Indonesia, Malaysia, Vietnam, and Thailand [18]. Meanwhile, according to the study, motorcycles are the leading cause of traffic accidents. For example, in Indonesia, there were 105.1 million motorcycles from 129.3 million units of motor vehicles in 2016 [19]. In Vietnam, 80-90% of Ho Chi Minh City households have access to motorcycles [20].

Motorcycles significantly impact road performance and accident rates [21, 22]. It is widely believed that motorcyclists have relatively poor safety records compared to other groups of road users [23]. Motorcyclists are frequently viewed as dangerous road users who cause numerous collisions. Furthermore, they are more risk-taking and speedy than car drivers [24]. In Indonesia, motorcyclists have the highest share of recorded accidents [25].

Most traffic accidents are related to human factors. Riders regularly deviate from safe driving conditions [26]. Many researchers point out that disobedience, driving errors, and road traffic violations are the main reasons for traffic accidents [26–30]. O'Connel [31] has stated that many undesirable aspects of rider behavior happen due to intentional or unintentional actions, which means that the mistakes are committed by themselves and not being forced by others to make mistakes. A study by Watson, et al. [32] in Australia showed that the urge for thrills drives a motorcyclist's decision to engage in high-risk activities. On the other hand, the purpose of safety is founded on behavioral control in the form of personal discipline.

Many studies have shown that road users' attitudes can be explored by studying noncompliance and violations. A detailed discussion related to this topic is provided by Rothengatter [33]. The inclination to commit driving errors and traffic offenses, attitudes toward their own and other road users' driving styles, attitudes toward the cars they control, and personal qualities are claimed to influence driver performance [34]. In other words, infractions might occur due to the driver's attitude toward the behavior, social norms regarding the action, behavior control, and moral standards [35].

## 2. Hypothesis

The hypotheses of this study are:

H1: The behavior of foreign motorcyclists is influenced by local conditions, which are the road environment and local traffic conditions.

H2: The behavior of foreign motorcyclists is also influenced by human factors.

H3: The local law enforcement moderate local condition factors concerning the behavior of foreign motorcyclists

H4: The local law enforcement moderate human factors concerning the behavior of foreign motorcyclists

## 3. Methodology

Figure 1 shows the research design for this study. Initial observations were made by observing foreign motorcyclists' behavior in Bali's tourist areas. Many foreign motorcyclists were found to be breaking traffic laws during this observation. This phenomenon will be investigated by first identifying the causal variables. The variables were then measured using a questionnaire. The SEM approach was used to examine reliability, validity, and how these variables affect foreign motorcyclists' behavior in Bali's tourist regions after the questionnaire was disseminated and re-collected. The analysis technique using SEM is applied in this study because it is a combination of two methodological disciplines, namely the econometric perspective, which focuses on predictions, and psychometrics which can describe the concept of a model with latent variables (variables that cannot be measured directly) but is measured through the indicators. (manifest variables). SEM essentially offers the ability to

perform path analysis with latent variables [36]. This study used SEM PLS as a tool because SEM PLS was developed to test a theory with a small sample size [37].

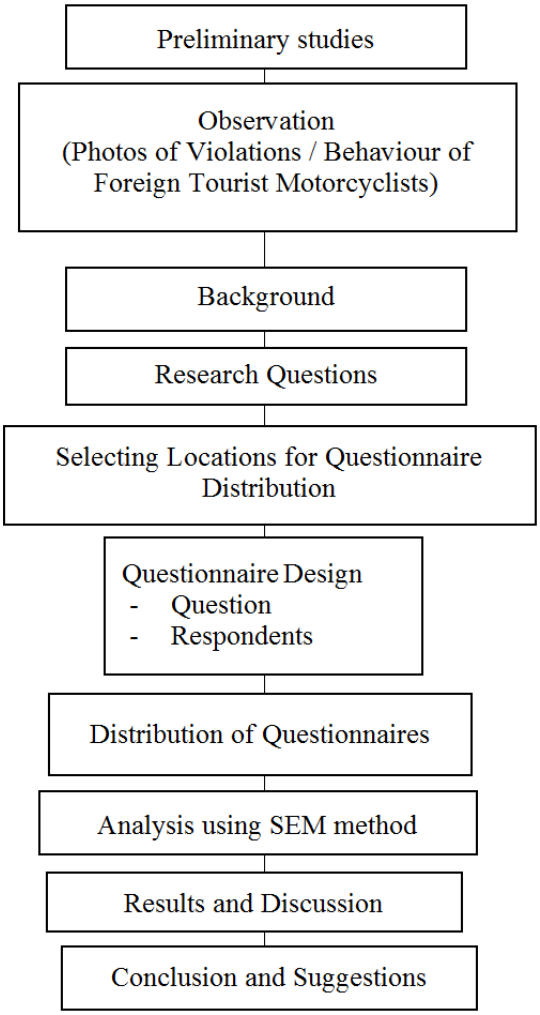


**Figure 1.** Research Design

The research will be carried out in Bali tourist destinations, Kuta, Ubud, Sanur, and Canggu. The study was conducted from September 2021 to December 2021.

## 4. Determination of Data Sources

Table 1 shows the research questions and sources to obtain the data needed for this study. Data are collected from field observations or by recording foreign motorcyclists' behavior. Then a survey was conducted on selected respondents as samples. The questionnaire was structured and developed to collect motorcyclists' information, motorcycle riding behavior, and attitudes in tourism areas.

This questionnaire examined three types of accidents: minor accidents, serious injury accidents, and fatal accidents. The target number of respondents is based on [38], who recommend a sample size of at least ten times the number of research variables for research using multivariate analysis. This study has four variables, so the sample required is at least 40 respondents. However, 71 respondents in this study counted more than the sample size recommended by Roscoe [38]. If the respondent does not want to write, the surveyor will ask the question in person. As a result, the sample selection procedure may not be fully random, as respondents are contacted based on availability. The questionnaire was given only to respondents who claimed to be motorcyclists. The data sources in this study were as follows:

1. Primary data is data obtained directly from primary data sources. The primary data source in this study is the result of direct field observations of foreign motorcyclists' behavior (field observation). Results of questionnaires for foreign motorcyclists are also the primary data source.
2. Secondary data is obtained from secondary sources which is not directly received by researchers, namely through related journals, books, and archives related to the discussions. This study can use it as guidelines or references, including data on Bali's foreign visits.

**Table 1.** Research Variable

| Data | Type of Data | Data Source | |
|---|---|---|---|
| | | Primary | Secondary |
| Photos of foreign motorcyclists | Qualitative | Observation | - |
| Theory and conceptual basis<br>• *Theory of Planned Behaviour*<br>• *Structural Equation Modelling* (SEM) | <br>Qualitative<br>Quantitative | <br>-<br>- | <br>Literature<br>Literature |
| **Research Question 1**<br>The influence of local road and traffic factors | Quantitative | Questionnaire | Literature |
| **Research Question 2**<br>The influence of human factors | Quantitative | Questionnaire | Literature |
| **Research Question 3**<br>The influence of local law enforcement on local road and traffic conditions | Quantitative | Questionnaire | Literature |
| **Research Question 4**<br>The influence of local law enforcement on human factors | Quantitative | Questionnaire | Literature |

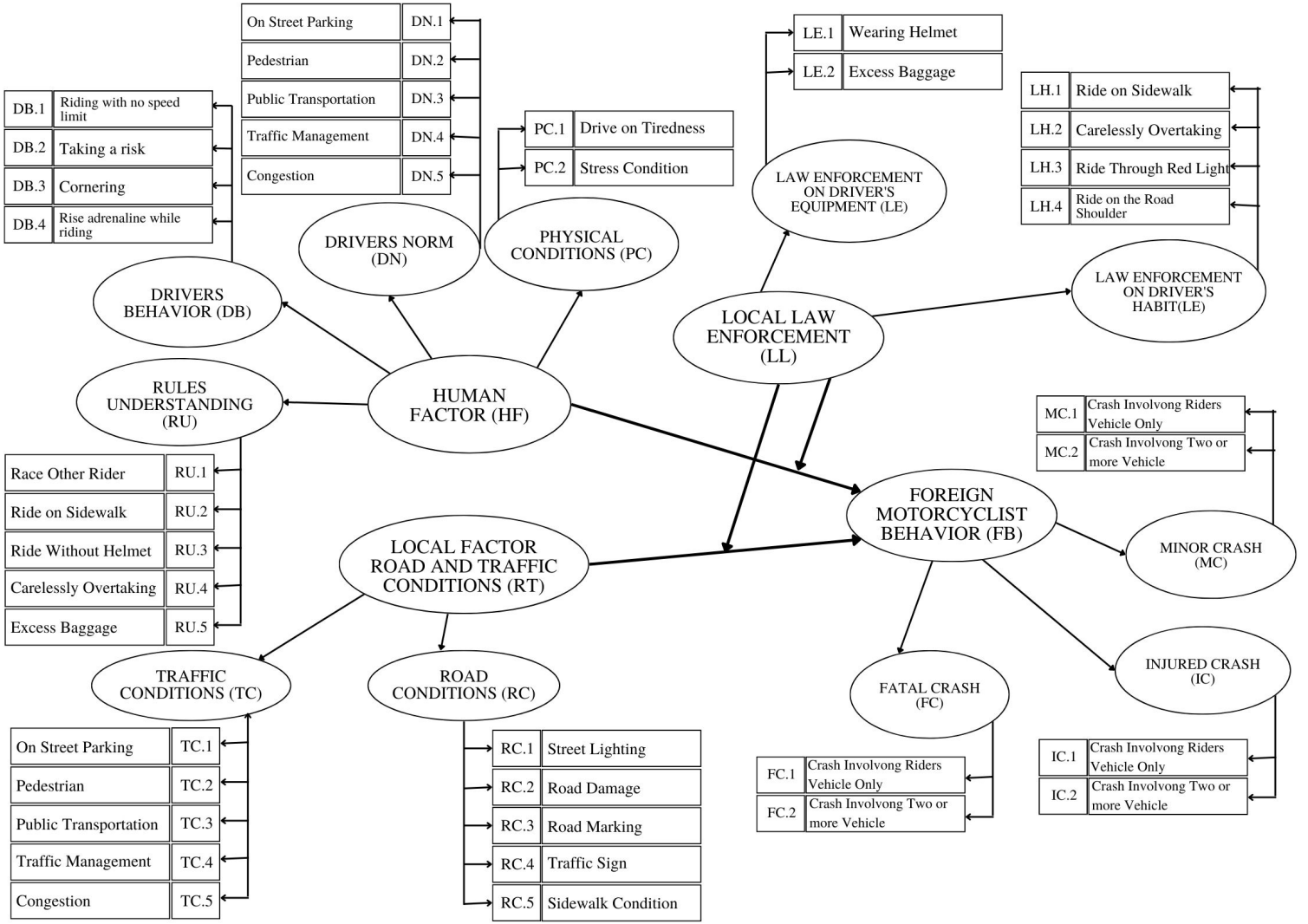


**Figure 2.** Research Variable

# 5. Research Variables

Figure 2 shows the research variables used in this study. Those variables were obtained from previous studies related to this research. The hypothesis is added to the factors of Local Law Enforcement (LL) that local law enforcement influences the behavior of international motorcyclists.

The explanation of the research variables is:

1. Local Law Enforcement (LL)

The Local Law Enforcement variable is a variable of the influence of law enforcement which consists of 2 indicators, namely:

a. Law on Rider's Equipment (LE) is a condition for law enforcement against the use of riding equipment and cargo carried by motorcycle riders.
b. Law on Rider's Habit (LH) is a condition of law enforcement against the driving habits of local motorcycle riders.

2. Road and Traffic Conditions (RT)

Road and Traffic Conditions are road conditions and traffic conditions experienced by motorcycle riders. The Road and Traffic Conditions indicators consist of:

a. Road Conditions (RC), are the condition of the road traversed as measured by the condition of street lighting, road damage, road markings, condition of signs, and pavement conditions.
b. Traffic Conditions (TC), are traffic conditions experienced by motorists.

3. Human Factors (HF)

Variable Human Factors are a variation of the driver's physical condition and general attitude toward road safety, reflected in driving behavior. The indicators of Human Factors are:

a. Physical Conditions (PC), are a measurement to determine the driver's driving condition.
b. Driver's Norms (DN) are a measurement to determine the rider's norms in riding a motorcycle.
c. Driver's Behavior (DB) is related to the behavior habits of motorcycle riders in the country of origin.
d. Rules Understanding (RU), namely the driver's understanding of traffic rules.

4. Foreign Rider's Behavior Variable (FB)

a The Foreign Rider's Behavior variable is a behavioral variable for foreign motorcyclists using an indicator of the level of accidents experienced by motorists. These indicators are:

a. Minor Crash (MC), is a minor accident, which is an accident where there is no need for medical attention (treated by a doctor or nurse). Still, there is serious damage to the driver's vehicle or other vehicles (only property damage).
b. Injury Crash (IC), is an accident that results in injury to the driver or other person requiring medical treatment (treated by a doctor or nurse).
c. Fatal Crash (FC), is a fatal accident that is an accident that results in the death of another person involved in the accident

# 6. Findings

### Outer Model Evaluation

The outer model assessment is carried out to determine the validity and reliability of the indicators and research latent variables. Validity is known by using the values of *convergent validity* and *discriminant validity*. Meanwhile, reliability is known using the indicator reliability value and value of *internal consistency reliability*.

### 7.1. Validity Test

The validity test can be seen from convergent validity and discriminant validity results.

7.1.1. Convergent Validity Test

The convergent validity of the model is known from the loading factor value and the AVE (average variance extracted) value. Table 2 below shows that the loading factor value is between 0.659 and 0.996, which means that it exceeds 0.5 according to the recommendations of Fornell and Larcker [39]. This figure indicates that all measurement indicators meet the convergent validity requirements and that each indicator accurately measures the variable in question.

Table 2 also shows the AVE construct values between 0.617 and 0.849. This value is greater than 0.5 [39], which means that the construct in this study can measure the corresponding latent variable.

**Table 2.** Convergent Validity Test

| | Outer Loading | Variable | AVE |
|---|---|---|---|
| LE | 0.879 | LL | 0.721 |
| LH | 0.808 | | |
| RC | 0.951 | RT | 0.742 |
| TC | 0.760 | | |
| PC | 0.659 | HF | 0.617 |
| DN | 0.791 | | |
| DB | 0.890 | | |
| RU | 0.784 | | |
| MC | 0.981 | FB | 0.849 |
| IC | 0.996 | | |
| FC | 0.994 | | |

7.1.2. Discriminant Validity

Data validity was calculated using discriminant validity using the values of cross-loadings stated in table 3. Compared to other latent variables, this indicator has a high correlation. As a result, all valid indications and discriminant validity have been met.

**Table 3.** Cross Loading

| | FB | HF | LL | RT |
|---|---|---|---|---|
| **DB** | 0.541 | 0.890 | 0.279 | 0.252 |
| **DN** | 0.402 | 0.791 | 0.233 | 0.285 |
| **FC** | 0.855 | 0.510 | 0.493 | 0.022 |
| **IC** | 0.949 | 0.522 | 0.372 | 0.050 |
| **LE** | 0.414 | 0.323 | 0.879 | -0.146 |
| **LH** | 0.335 | 0.158 | 0.808 | -0.157 |
| **MC** | 0.956 | 0.522 | 0.360 | 0.023 |
| **PC** | 0.363 | 0.659 | -0.037 | 0.237 |
| **RC** | 0.037 | 0.200 | -0.143 | 0.951 |
| **RU** | 0.443 | 0.784 | 0.399 | 0.104 |
| **TC** | 0.017 | 0.344 | -0.192 | 0.760 |

### 7.2. Reliability Test

The reliability value shows the consistency of the results even though the measurements are repeated. Therefore, reliability can be interpreted as a free calculation from random errors [40]. Testing reliability is calculated using PLS through internal consistency reliability. The composite reliability and Cronbach's alpha value must be greater than or equal to 0.6 for internal consistency reliability. The composite reliability and Cronbach's alpha are both similar to or greater than 0.6 in Table 4, indicating that these latent variables produce consistent and reliable findings

**Table 4.** Reliability Test

| | Cronbach's Alpha | Composite Reliability |
|---|---|---|
| **LL** | 0.600 | 0.832 |
| **RT** | 0.687 | 0.850 |
| **HF** | 0.789 | 0.864 |
| **FB** | 0.909 | 0.944 |

### 7.3. Evaluation of the Inner Model (Structural Model)

This evaluation step is conducted to confirm the theoretical model outlined in the structural research model [41]. Here, the structural evaluation model uses indicators: $R^2$

7.3.1. $R^2$ value

The $R^2$ value in this PLS calculation represents the variance in the model [41]. The $R^2$ value in this study is listed in Table 5 and Figure 3 below:

**Table 5.** R Square

| Variable | R Square |
|---|---|
| FB | 0.539 |

From table 5 above, it is known that the FB variable (Foreign Behavior) can be explained by the LL variable (Local Law Enforcement), RT (Local Roads and Traffic Conditions), and HF variable (Human Factor) by 53.90%. The remaining 46.10% contributes to other variables not included in this model.

7.3.2. Goodness of Fit (GoF)

The Goodness of Fit (GoF) is used to validate the overall model because it is a single measure of the measurement model (outer model) and structural model measurement (inner model). The Goodness of Fit (GoF) value has a range of values between 0 (zero) to 1 (one). The formula for determining the value of Goodness of Fit is as below:

$$\begin{aligned} GoF &= \sqrt{(\overline{AVE} \times \overline{R^2})} \\ &= \sqrt{(0.730 \times 0.539)} \\ &= \sqrt{0.393} \\ &= 0.627 \end{aligned} \quad (1)$$

The results of the Goodness of Fit (GoF) calculation show a value of 0.627 so that based on the criteria regarding the GoF value namely: 0.10 (GoF small), 0.25 (moderate GoF), and 0.36 (Gof large), then it can be said that the model is categorized as large

### 7.4. Summary of the Outer Model and Structural Model Evaluation

The results of the external model evaluation in this study show that the constructs utilized in this study are valid and reliable, allowing the structural model to be evaluated further. Based on the structural model evaluation results, the proposed research model is also appropriate, and hypothesis testing can be performed.

## 7. Hypothesis Testing

Hypothesis testing determines whether a relationship between latent variables is significant. Hypothesis testing can be calculated from the path coefficient results and the model's significance based on the P-Value. The path coefficient value is significant if the P-Value is less than 0.05. Table 6 and Figure 3 show the P-value of relationship between latent variables in this study.

According to the findings, RT has no significant relationship with FB (P-value of 0.937). It means that international motorcyclists' behavior in tourist zones will

not be affected regardless of road and traffic conditions. Hypothesis 1 is not supported by these findings.

This study also found that HF strongly positively related to FB (P-value of 0.035). This major finding implies that the greater the human factors, the better the behaviour of international motorcyclists in tourist locations. Hypothesis 2 is supported by these findings.

The findings also show that LL cannot be a moderating variable in the RT to FB relation (P-value of 0.441). As a result, regardless of the state of local law enforcement, it is unable to mitigate the impact of local road and traffic circumstances on the behaviour of international motorcyclists. Hypothesis 3 is therefore unevident.

In contrast to the relation of RT and LL as moderating variables, the results of this study indicate that the LL variable can moderate the HF variable (P-value of 0.008). It means that the local law enforcement (LL) does play a role in improving the factors (HF) on their effect on FB (behaviour of foreign motorbike riders). Thus hypothesis 4 is proven.

**Table 6.** P-Value Table

| | P-Value |
|---|---|
| HF -> FB | 0.035 |
| LL -> FB | 0.004 |
| LL*HF -> FB | 0.008 |
| LL*RT -> FB | 0.441 |
| RT -> FB | 0.937 |

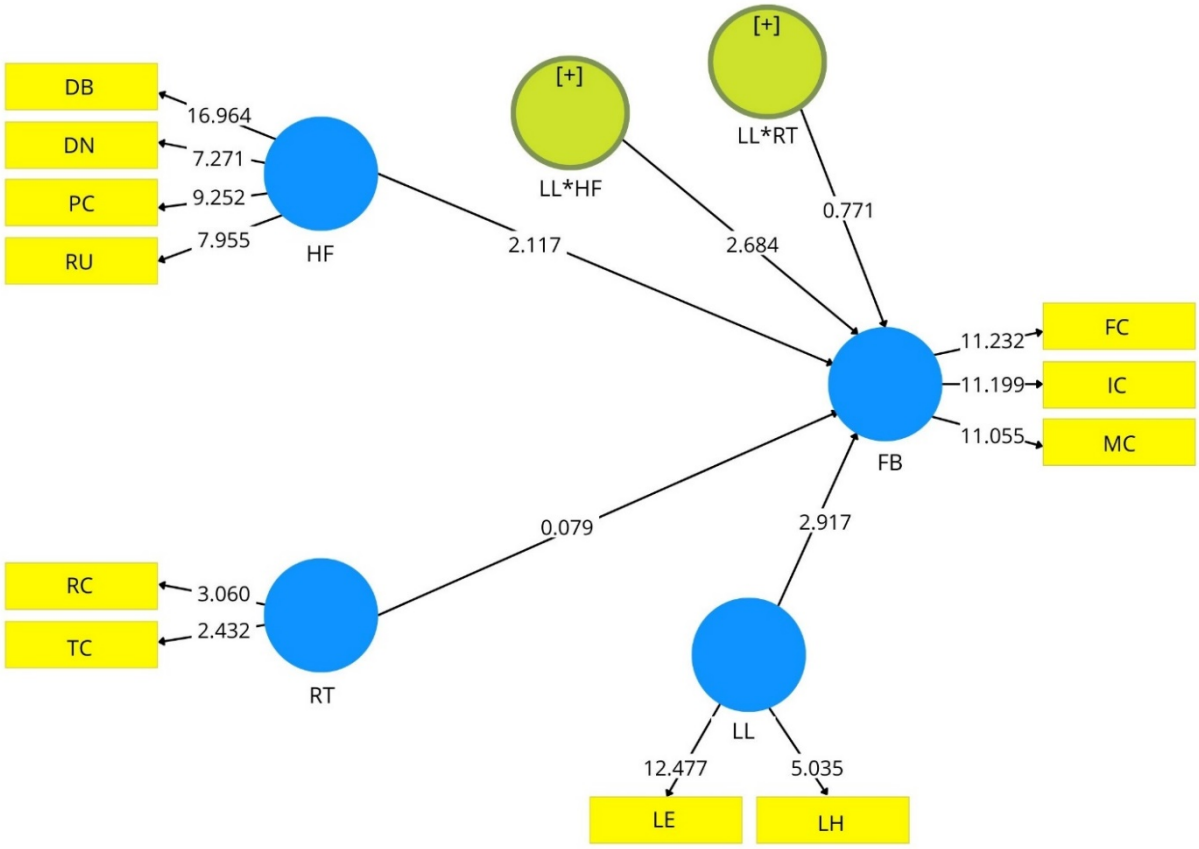


**Figure 3.** Bootstrapping

## 8. Conclusions

From the study results above, it can be concluded that the human factors influence the behavior of foreign motorcyclists with a P-value of 0.035. Local law enforcement also acts as a moderating variable to the human factors related to the foreign motorcyclists' behavior, with a P-value of 0.008. In conclusion, foreign motorcyclists' behavior in Bali tourist areas is very much influenced by the local law enforcement by authorized officials. Additionally, law enforcement against traffic violations also influences the behavior—wherein the more stringent enforcement of the law, the better the behavior of foreign motorcyclists. Finally, better foreign motorcyclists' behavior will reduce the risk of accidents for foreign motorcyclists, passengers, and other traffic users. Therefore, more stringent law enforcement by local authorities is strongly recommended to reduce the accident rate experienced by foreign motorcyclists. The proposed corrective measures that can be taken to strengthen local traffic law enforcement are, among others, stricter traffic ticketing, not accepting bribes, tightening the rules for granting traffic permits, use of electronic traffic tickets, and providing information both at airports and embassies about traffic conditions in Indonesia in general and Bali in particular.

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