Analysis of Factors Affecting Driving Safety at PT. Cakraindo Mitra Internasional

Irpan Numang[1*]

[1]D4 Logistik Bisnis, Fakultas Vokasi, Universitas Logistik dan Bisnis Internasional, Jalan Sari Asih, Bandung, Indonesia
[*]*e-mail: irpan@ulbi.ac.id*

(Received: 13 October 2025; Reviewed: 25 October 2025; Accepted: 18 November 2025)

Abstract

This research investigates the determinants that influence driving safety among truck drivers at PT. Cakraindo Mitra Internasional. The study especially examines how safety briefings, work experience and work rest affect safety driving behaviour. The motivation for this study arises from a notable increase in traffic accidents from January to April 2025. A quantitative was adopted using cross sectionals design. The sample comprised 43 truck drivers chosen by using purposive sampling method. Following data collection via a structured questionnaire, the validity and relationships within the data were examined using the Partial Least Squares-Structural Equation Model (PLS-SEM). It was found that the three variables under study contribute significantly and positively to enhancing driver safety. These results imply that consistent safety briefings, adequate work experience, and proper rest management significantly improve safe driving practices. It is recommended that the companies continue enhancing safety briefing sessions, optimized rest scheduling, and utilize driver experiences as a practical resource in safety training programs.

Keywords: Driving Safety, PLS-SEM, Safety Briefing, Travel Behavior, Work Practices, Work Rest.

INTRODUCTION

Transportation represents a crucial element in national logistics system and mobility network, playing a significant role in sustainable development, regional integration and inter-island connectivity. Indonesia's transportation infrastructure encompasses diverse modes land, sea and air that facilitate the movement of people and goods across regions. Among these, land based transportation often receives heightened attention from both authorities and users because of its indispensable role in daily activities and logistics distribution. PT Cakraindo Mitra International operates as a major logistics company that specializes in chemical supply chain management and trucking services. The company provides domestics and international ground transportation for both hazardous materials and general cargo. However, recent company record indicate a rise in traffic incident in early year of 2025. Between January and April 2025, a total of 10 accident were recorder within this the company.

Accident investigations identified two main contributing factors: driver negligence and external interference. Driver related causes included fatigue, blind spots, sudden braking, maneuvering without assistance in confined spaces and drowsiness during operation. External causes stemmed from other vehicles' blind spots or side-swipe collisions. These incidents resulted in financial losses for PT. Cakraindo Mitra Internasional, including vehicle repairs, medical expenses, and operational downtime. Interviews revealed that majority of accidents occurred because drivers failed to fully adhere to safe driving principles. Consequently, this research seeks to examine the determinants that influence driving safety at PT Cakraindo Mitra International. The objective of this study is to:

1. Evaluate the effect of safety briefing in driving safety.
2. Assess the influence of work experience on driving safety.
3. Determine the effect of work rest on driving safety.

METHODS

A quantitative design was implemented in this research to explore the variables affecting driving safety at PT. Cakraindo Mitra Internasional. According to Sugiyono (2017), the quantitative research is grounded in the positivist paradigm, emphasizing objective analysis of measurable data to test hypotheses. The approach focuses on numerical data derived from research instruments and statistical analysis to validate theoretical assumptions.

Data collection for this study was enabled by a cross-sectional design, which sampled respondents only once. The population consisted of truck drivers employed at PT. Cakraindo Mitra Internasional. Through the purposive sampling technique, a total of 43 drivers were recruited to serve as study respondents, which involved specific inclusion criteria determined by the researcher such as having completed at least two delivery trips and active employment during the study period.

Through the distribution of a structured questionnaire, the primary data were successfully acquired from the respondents. The survey instrument included 30 indicators measuring four key variables: Safety briefing (X_1), Work experience (X_2), Work rest (X_3) and Driving safety (Y). All indicators were assessed using The responses were rated on a Likert scale where 1 indicated strong disagreement and 5 indicated strong agreement. The instrument was designed to ensure that each indicator represented its intended construct accurately and reliably.

The research utilized Partial Least Squares–Structural Equation Modeling (PLS-SEM), performed via SmartPLS version 4.1.1.4, to analyze the collected data. As explained by Ghozali (2021), SEM is a multivariate analytical method that examines complex relationships among latent variables represented by measurable indicators. The PLS approach was selected because it is more flexible than covariance-based SEM It operates without the necessity of data. normality and can accommodate smaller sample sizes or potential multicollinearity among independent variables. The PLS-SEM analysis followed several sequential stages:

1. Designing the outer model, known as the measurement model.
2. Conducting validity along with assessing reliability.
3. Designing the inner model known as the structural model.
4. Assessing model fit and hypothesis testing.

RESULTS AND DISCUSSION

The research employed the Partial Least Squares–Structural Equation Modeling (PLS-SEM) technique for data analysis, specifically using SmartPLS 4.1.1.4. For this SEM analysis, the measurement model (Outer Model) was employed to describe the relationships between the indicators and the latent variables.

Outer Model

The relationship between observed indicators and their respective latent variables was tested through the outer model analysis. Consistent with Hair et al. (2014), this research adopted a reflective measurement model, where the indicators are viewed as reflections of the latent constructs. Convergent validity, discriminant validity, and composite reliability were the primary tests conducted in this study.

Validity Testing

Validity testing is conducted to ensure that each indicator in the research instrument accurately measures the intended construct (latent variable). The validity of the instruments in this research was established by examining both Convergent Validity and Discriminant Validity. Assessment of convergent validity involves the outer loading values and the Average Variance Extracted (AVE). Meanwhile, discriminant validity is determined using three metrics: the Fornell-Larcker criterion, the Heterotrait-Monotrait Ratio (HTMT), and cross-loadings. These tests aim to ensure that each indicator is not only relevant to the construct it measures but also clearly distinct from other constructs. Drawing from the 30 indicators deployed to assess the four variables included safety briefing (X1), work experience (X2), work rest (X3), and driving safety (Y) the Partial Least Squares (PLS) model used in this analysis can be illustrated as follows:

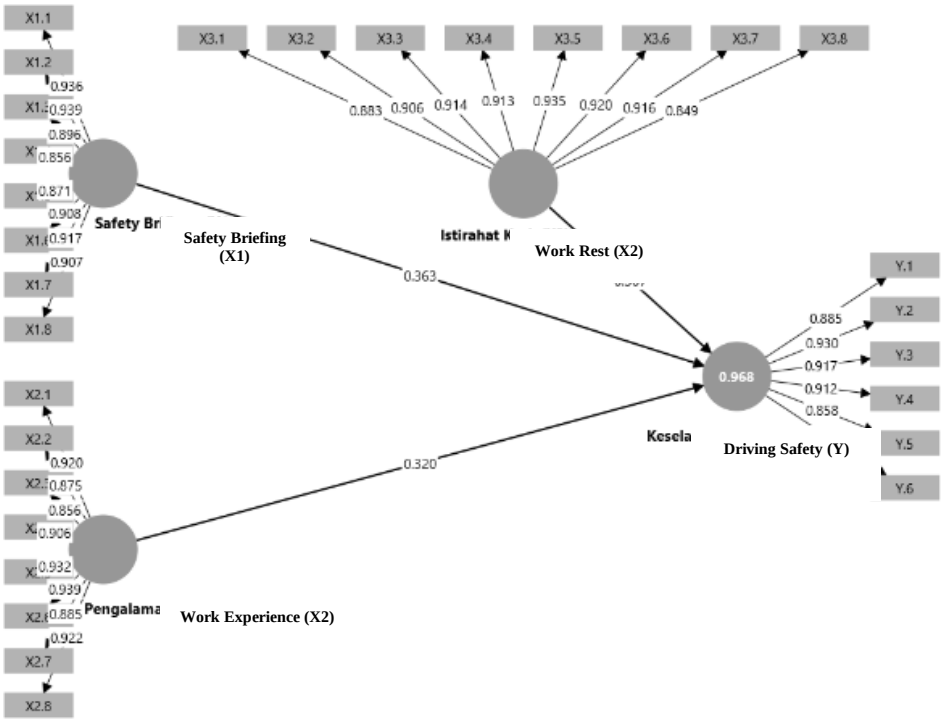

Figure 1. Form a Data Processing Model with *Smart* PLS

Testing for convergent validity in this study involved questionnaire data consisting of 30 indicators/statements obtained from 43 truck driver respondents who had completed at least two delivery trips during their employment period. These indicators represent four main variables: safety briefing (X1), work experience (X2), work rest (X3), and driving safety (Y). The outer loadings of the indicators used for the four variables are presented as follows:

Table 1. Results of Outer Loading Values

Item Indicators	Variabel				Information
	Safety Briefing	Work Experience	Work Rest	Driving Safety	
X1.1	0,752	-	-	-	Valid
X1.2	0,720	-	-	-	Valid
X1.3	0,733	-	-	-	Valid
X1.4	0,717	-	-	-	Valid
X1.5	0,721	-	-	-	Valid
X1.6	0,761	-	-	-	Valid
X1.7	0,740	-	-	-	Valid
X1.8	0,723	-	-	-	Valid
X2.1	-	0,700	-	-	Valid
X2.2	-	0,732	-	-	Valid
X2.3	-	0,765	-	-	Valid
X2.4	-	0,755	-	-	Valid
X2.5	-	0,770	-	-	Valid
X2.6	-	0,760	-	-	Valid
X2.7	-	0,722	-	-	Valid
X2.8	-	0,763	-	-	Valid
X3.1	-	-	0,731	-	Valid
X3.2	-	-	0,745	-	Valid
X3.3	-	-	0,777	-	Valid
X3.4	-	-	0,732	-	Valid
X3.5	-	-	0,717	-	Valid

X3.6	-	-	0,768	-	Valid
X3.7	-	-	0,761	-	Valid
X3.8	-	-	0,749	-	Valid
Y.1	-	-	-	0,723	Valid
Y.2	-	-	-	0,750	Valid
Y.3	-	-	-	0,726	Valid
Y.4	-	-	-	0,714	Valid
Y.5	-	-	-	0,736	Valid
Y.6	-	-	-	0,747	Valid

Predictive Relevance Test (Q^2)

The Q^2 value quantifies the model's predictive accuracy, reflecting the effectiveness of changes in the exogenous or endogenous variables in predicting the endogenous variable. The model's predictive relevance is evaluated using this measure as a validation mechanism in PLS. Specifically, Q^2 value above 0 signals the presence of predictive relevance. According The next stage in the convergent validity testing is to examine the AVE valuesFollowing Amiruddien et al. (2021), the criterion for an acceptable AVE value is ≥ 0.5. The results of the Average Variance Extracted (AVE) analysis for this study are detailed in the following section:

Table 2. Average Variance Extracted (AVE) Values

Variabels	AVE Value	Information
Safety Briefing (X1)	0,623	Valid
Work Experience (X2)	0,515	Valid
Work Rest (X3)	0,576	Valid
Driving Safety (Y)	0,540	Valid

Based on Hair et al. (2022), an AVE value that is equal to or greater than 0.5 suggests that the latent construct accounts for a minimum of 50% of the indicator variance. Hence, all constructs demonstrate adequate convergent validity in this study.

Table 3. Testing of Direct Effect Hypothesis

Hypothesis	Path Coefficient	P-Value	95% Confidence Interval Path Coefficient		F Square
			Lower Bound	Upper Bound	
H1. X1 □ Y	0,247	0,016	0,004	0,477	0,088
H2. X2 □ Y	0,320	0,004	0,176	0,565	0,090
H3. X3 □ Y	0,363	0,007	0,109	0,543	0,135

The direct effect hypothesis testing results (as shown in the table) are explicated below:

1. First Hypothesis (Safety Briefing and Driving Safety).

The statistical evidence, indicated by a path coefficient of 0.247 ($p = 0.016$), suggests that safety briefings positively and significantly influence driving safety**.** Effective pre-driving briefings that include risk identification, mitigation strategies, and operational reminders strengthen driver awareness and adherence to safety procedures. These results align with studies emphasizing the role of consistent safety communication in minimizing accidents.

2. Second Hypothesis (Work Experience and Driving Safety).

Work experience was found to have a significant and positive influence on driving safety, evidenced by the path coefficient ($\beta = 0.320$, $p = 0.004$).Drivers with longer tenure and greater exposure to various road conditions typically develop stronger situational awareness and hazard anticipation skills. This finding supports the notion that accumulated experience enhances decision-making and adaptability in dynamic traffic environments.

3. Third Hypothesis (Work Rest and Driving Safety)
Work rest was found to have the strongest influence on driving safety ($\beta = 0.363$, $p = 0.007$). Drivers who maintain regular rest periods exhibit better concentration, reaction times, and alertness, thereby reducing fatigue-related risks. This outcome reinforces previous research highlighting the critical role of rest management in preventing road accidents among professional drivers.

Coefficient of Determination Test (R^2)
The R^2 value within the structural model serves to measure the influence that the independent variables have on the dependent variable**.** Based on Chin (1998), an R^2 result falls into the strong category if ≥ 0.67, the moderate category if between 0.33 and 0.67, and the weak category if < 0.33. The following are the R-squared values for each dependent variable in this study:

Table 4. Results of the Coefficient of Determination (R^2)

Variabels	R Square	Adjusted R Square
Driving Safety (Y)	0,240	0,277

With an Adjusted R^2 of 0.051, the Safety Briefing (X1) variable accounts for only 5.1% of the variance in Driving Safety (Y). The majority, 94.9%, is influenced by other variables not included in the model. Meanwhile, the corrected R^2 value for Driving Safety (Y) of 0.257 shows that Driving Safety is influenced by 25.7% of the variables Safety Briefing (X1), Work Experience (X2), and Work Rest (X3), The majority, 74.3%, is explained by factors outside the scope of the research model. Based on these values, the strength of the model is categorized as weak. Following to Hair et al. (2022), the qualitative interpretation of Q-square values is as follows: 0 (low influence), 0.25 (moderate influence), and 0.50 (high influence). Hair et al. (2022) provide a qualitative interpretation where a Q^2 value of 0.50 is considered high influence, 0.25 is considered moderate influence, and 0 is considered low influence. The Q^2 statistic evaluates the model's predictive accuracy. Q^2 value greater than zero indicates that the model has predictive relevance A Q^2 value exceeding zero confirms the model's predictive relevance. Due to the Q^2 value of 0.172, the structural model's predictive relevance is considered low but satisfactory, confirming the exogenous variables' capacity to predict the dependent variable to some degree.

Model Fit Test (SRMR)
The model fit analysis evaluates whether the proposed research model demonstrates goodness-of-fit. SRMR (Standardized Root Mean Square Residual) is a measure of model fit that represents the difference between the correlation matrix of the observed data and the correlation matrix estimated by the model (Hair et al., 2022). According to Karin Schermelleh et al. (2003), an SRMR value between 0.08–0.10 indicates an acceptable fit model.
Model fit was assessed using the Standardized Root Mean Square Residual (SRMR). Both the saturated and estimated models yielded SRMR values of 0.096, which fall within the acceptable range of 0.08–0.10 (Henseler et al., 2016). This indicates that the proposed structural model adequately represents the observed data.

PLS Predict
As a validation tool, PLS Predict is used to ascertain the predictive capacity of the built Partial Least Squares (PLS) model. According to Hair et al. (2021), this validation is conducted by comparing the predictive performance of the PLS model with that of a benchmark model, such as linear regression. The basis for this assessment is the prediction error figures, specifically the Root Mean Square Error (RMSE) and the Mean Absolute Error (MAE). The evaluation of the model's predictive strength is carried out through the indicators of the endogenous variable the variable being predicted in the model. When the PLS model yields lower RMSE and MAE values compared to the linear regression model, it is concluded that the PLS model has superior predictive power. In comparing the model to the benchmark, the predictive power is rated as high if all endogenous indicators show better performance (lower error), medium if most indicators perform better, and low if only a minority perform better.

Table 5. Result Of PLS Predict

Measurement Items	PLS		LM	
	RMSE	MAE	RMSE	MAE
Y.1	0,775	0,699	0,759	0,625
Y.2	0,711	0,578	0,706	0,546
Y.3	0,701	0,606	0,657	0,559
Y.4	0,753	0,629	0,713	0,617
Y.5	0,719	0,671	0,704	0,626
Y.6	0,721	0,680	0,719	0,564

The PLS Predict procedure assessed the difference in prediction errors between the PLS model and the linear regression benchmark by comparing their Root Mean Square Error (RMSE) and Mean Absolute Error (MAE). Due to the lower RMSE and MAE values observed for most Driving Safety indicators (Y.2, Y.3, Y.5, Y.6) under the PLS model, the analysis confirms that the model has moderate predictive strength.. This suggests that the model is capable of accurately forecasting driving safety outcomes.

Goodness of Fit (GoF)

The Goodness of Fit (GoF) and hypothesis testing are used to evaluate both the structural and measurement models, as well as to provide a simple overall measure of the model's predictive performance (Wetzels et al., 2009). The GoF value ranges from 0 to 1, with thresholds indicating large (0.36), moderate (0.25), and small (0.10) levels of fit (Wetzels et al., 2009). The results of the Goodness of Fit (GoF) assessment for the model utilized in this research are as follows:

$GoF = \sqrt{AVE} \times R2$
$GoF = \sqrt{0{,}559} \times 0{,}0115$
$GoF = 0{,}294$

Substituting the obtained values (AVE = 0.559; R^2 = 0.115) results in GoF = 0.294. This value falls within the moderate fit category, indicating that the model demonstrates a satisfactory alignment between empirical data and theoretical expectations (Wetzels et al., 2009).

CONCLUSION

The outcomes of the analysis and hypothesis testing lead to several conclusions.:

1. Safety briefing exerts a strong positive association with driving safety. Structured and consistent safety briefings covering pre-driving instructions, potential hazard identification, and risk mitigation strategies to help improve drivers' alertness and compliance with safety standards, ultimately minimizing the likelihood of accidents.
2. Work experience also significantly influences driving safety. Drivers with longer working experience demonstrate better skills in anticipating risks, managing vehicle control, and responding effectively to unexpected conditions on the road.
3. Work rest shows the strongest positive relationship with driving safety. Adequate rest priors to and between driving sessions allows drivers to maintain focus, alertness, and decision-making capacity, thereby reducing the probability of fatigue-related incidents.

In summary, the study confirms that safety briefing, work experience, and work rest collectively contribute to enhancing safe driving behavior. The results suggest that these three factors must be embedded within the company's safety management framework due to their importance. For future implementation, PT. Cakraindo Mitra Internasional is encouraged to continue reinforcing safety culture through scheduled briefings, optimized rest cycles, and experience-based driver mentoring programs.

ACKNOWLEDGMENTS

The author expresses sincere appreciation to all individuals and institutions who supported this research.

REFERENCES

Afifatul, Y., Darmawati, D., & Suwandari, L. (2021). The influence of logistics service quality on shipping services (Study on consumers of J&T Express, JNE Express, SiCepat, Pos Indonesia and Ninja Express). *Proceeding of International Conference on Sustainable Competitive Advantage, 2*(1).

Ali, D., Alam, M., & Bilal, H. (2021). The influence of service quality, price, and environment on customer loyalty in the restaurant's industry: The mediating role of customer satisfaction. *Journal of Accounting and Finance in Emerging Economies, 7*(1), 143–154.

Amak, B., Malonda, N. S. H., & Kawatu, P. A. (2020). Hubungan Perilaku Safety Riding Pengendara Ojek Online Dengan Kejadian Kecelakaan Lalulintas Di Kota Manado. *Jurnal of Public Health and Community Medicine*, *1*(1), 45–51.

Enggarsasi, U., & Sa'diyah, N. K. (2017). Kajian Terhadap Faktor-Faktor Penyebab Kecelakaan Lalu Lintas Dalam Upaya Perbaikan Pencegahan Kecelakaan Lalu Lintas. *Perspektif*, *22*(3), 228–237.

Hair, J. F., Hult, T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2022). *Partial least squares structural equation modeling (PLS-SEM) using R.* Cham: Springer International Publishing.

Hati, S. W., & Juliati, A. (2019). Analisis pengaruh logistics service quality terhadap kepuasan dan loyalitas pelanggan pada perusahaan logistik Jalur Nugraha Ekakurir (JNE). *Jurnal Akuntansi, Ekonomi dan Manajemen Bisnis, 7*(2), 240–249.

Japarianto, E. (2018). Pengaruh logistics service quality terhadap customer retention dengan customer satisfaction sebagai variabel intervening pada industri ekspedisi laut di Surabaya. *Jurnal Manajemen Pemasaran, 12*(1), 25–32.

Joddy, S. A., Wahyuni, I., & Kurniawan, B. (2022). Hubungan Antara Perilaku Safety Riding Dan Stres Kerja Terhadap Kecelakaan Kerja Pada Pengendara Ojek Online Komunitas X Tembalang. *Jurnal Kesehatan Masyarakat (Undip)*, *10*(2), 213– 218.

Manurung, J., Sitorus, M. E., & Rinaldi. (2019). Faktor-Faktor yang Berhubungan dengan Perilaku Safety Riding Pengemudi Ojek Online (Go-Jek) di Kota Medan Sumatera Utara. *Journal of Health Science and Physiotherapy*, *1*(2), 91–99.

Putra, K. G., & Bahrun, K. (2023). Pengaruh kualitas pelayanan, ketepatan waktu pengiriman dan fasilitas terhadap kepuasan pelanggan (Studi Kasus Pada Pelanggan PT. Pos Indonesia). *Jurnal Manajemen Modal Insani dan Bisnia (JMMIB)*, *4*(1), 44–51.

Nurani, K., Widianita, R., & Anisah, A. (2022). The effect of service quality and price on customer satisfaction and its impact on the loyalty of Siantar Express Train customers. *Jurnal Ilmiah Manajemen, Ekonomi, & Akuntansi (MEA), 6*(3), 2220–2237.

Rahmi, U. (2024). Analisis perbandingan biaya operasional kendaraan antara sewa dengan milik sendiri di Kantor Pos Padang pada trayek Padang–Pekanbaru. *Pro Mark, 14*(2), 1–8.

Rofi'i, A., & Tejamaya, M. (2022). Analisis Faktor Risiko Kelelahan Tidak Terkait Pekerjaan pada Pengemudi Dump Truck PT X Tahun 2022: Perbandingan Tiga Kuesioner Pengukuran Kelelahan Secara Subjektif. *Promotif : Jurnal Kesehatan Masyarakat*, *12*(1), 56–65.

Salim, G., Suoth LF, Nancy, M. (2019). Hubungan Antara Kelelahan Kerja Dengan Stres Kerja Pada Sopir Angkutan Umum Trayek Karombasan Malalayang Kota Manado. *Jurnal Kesehatan Masyarakat*, 8(7), 336-343.

Sumarna, D. L., & Siregar, I. H. (2022). Pengaruh Logistics Service Quality Terhadap Customer Loyalty Dengan Customer Satisfaction Sebagai Variabel Intervening Pada Produk Pos Kilat Khusus Pt Pos Indonesia (Persero). *Jurnal Logistik Bisnis*, *12*(2), 64–75.

Totti, A & Anindhyta, B. (2023). Pengaruh kualitas pelayanan, harga, dan promosi terhadap loyalitas pelanggan pada pelanggan Anteraja cabang Sawangan Surabaya. *Jurnal Ilmu Dan Riset Manajemen (JIRM)*, *12*(8).

Wetzels, M., Odekerken-Schröder, G., & Van Oppen, C. (2009). Using PLS-SEM for assessing hierarchical formative constructs: Guidelines and empirical illustration. *MIS Quarterly*, *33*(1), 177–195.