

**SATISFACTION MODEL OF COMMUTERS ON TRAFFIC SCENARIOS
IN DAVAO CITY****Jesryl T. Canillas****Peter Paul C. Condinato****April Joy A. Dela Torre****Lizlie Joy U. Gomez****Joan A. Payo**Graduate School Students, College of Development Management,
University of Southeastern Philippines**Dr. Gaudencio G. Abellanosa**Graduate School Faculty, College of Development Management,
University of Southeastern Philippines,

ABSTRACT

Traffic congestion remains one of the most persistent challenges in rapidly urbanizing Philippine cities, particularly in Davao City, where increasing mobility demands continue to shape commuter experiences. Understanding the key determinants of commuter satisfaction is essential for strengthening evidence-based traffic governance. Existing research highlights the influence of safety, reliability, and efficiency on commuter satisfaction; however, few studies integrate these factors with explicit assessments of law enforcement, traffic management, and the responsiveness of governing authorities within a unified analytical framework in the Philippine setting. This study addresses this gap by examining the extent to which law enforcement and regulations, traffic management and control, and coordination and responsiveness of authorities affect commuter satisfaction in Davao City. An Exploratory Factor Analysis (EFA) was conducted using the data collected from 150 commuters in Davao City through a survey. Also, the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett's test of Sphericity were used in factor analysis to assess the suitability of the data for factor analysis, and a Scree Plot was used to graphically identify the optimal number of factors that can be extracted from the survey. Based on the findings, four factors were identified that influence commuter satisfaction in traffic scenarios when using EFA. These include law enforcement and regulations, road infrastructure and safety, traffic management and control, and the coordination and responsiveness of authorities, which are the areas where commuters are most satisfied. Together, these factors shape the satisfaction of commuters in traffic scenarios in Davao City, based on their personal experiences. Furthermore, Confirmatory Factor Analysis (CFA) was conducted with an additional 150 commuters. Among the four factors, only three remained: law enforcement and regulations, road infrastructure and safety, and the coordination and responsiveness of authorities.

Keywords:

Traffic scenarios, Commuters, Exploratory Factor Analysis, Confirmatory Factor Analysis

INTRODUCTION

Traffic congestion has been a long-standing and persistent challenge in the Philippines affecting the overall quality of urban life. In recent years, it has become especially problematic in many cities in the Philippines especially, the focus of this study, Davao City. For commuters, these traffic scenarios shape the quality of their travel experience, influencing comfort, safety, convenience, and overall satisfaction. As Philippine cities expand, particularly rapidly growing urban centers such as Davao City, understanding what factors most affect commuter satisfaction becomes essential for developing responsive and evidence-based traffic governance. Commuter satisfaction is influenced by multiple dimensions of the traffic experience, including the quality of law enforcement, the effectiveness of traffic management, and the responsiveness of governing authorities. However, despite the increasing attention given to urban transport issues, existing studies tend to examine these

factors indirectly. For instance, safety and assurance, concepts closely tied to proper enforcement of regulations, have been consistently identified as significant predictors of commuter satisfaction. In the Philippines, Jou et al. (2023) found that the assurance dimension, encompassing safety and regulatory compliance, significantly influences the satisfaction of public utility vehicle (PUV) passengers. Similar findings emerge internationally: studies in Malaysia and other developing contexts using PLS-SEM and SEM approaches consistently show that safety and security strongly shape passenger satisfaction. These safety-related constructs indicate that law enforcement and regulatory compliance are central to the commuter experience, even if not always directly labeled as such.

Traffic management and operational control also play a key role in shaping commuter satisfaction. Evidence from China, Tanzania, and other developing countries demonstrates that reliability, frequency, and efficiency, core features of traffic management, are strong determinants of commuter satisfaction (Zhu, Li, & Li, 2019; Msumanje, 2021; Ngatia & Nakamura, 2010).

Across multiple studies, traffic-related factors such as safety, reliability, and efficiency have been shown to exhibit significant relationships with overall commuter satisfaction, as demonstrated in studies from Quezon City, Tanzania, and Abuja (Galvez, Katon, & Valdez, 2025; Nwachukwu, 2014). Yet, few investigations integrate these factors alongside explicit assessment of law enforcement, traffic management, and authority coordination within a single model, particularly in a Philippine context. This research aims to address that gap by determining which of these factors significantly influence commuter satisfaction and identifying the strongest predictors among them.

Given the evolving traffic conditions and growing commuter population in Davao City, the need for evidence-based insights on how commuters perceive local traffic scenarios has become increasingly important. By examining the roles of law enforcement and regulations, traffic management and control, and the coordination and responsiveness of authorities, this study aims to provide a comprehensive and context-specific understanding of the factors that influence commuter satisfaction. The findings will not only fill a local research gap but will also offer practical implications for improving traffic governance, enhancing commuter experience, and guiding policy and operational reforms toward more efficient and commuter-centered urban transportation systems.

OBJECTIVES

This study aims to achieve the following:

- 1) To determine factors of commuter's satisfaction on the traffic scenarios in Davao City;
- 2) To develop a framework of commuter's satisfaction on the traffic scenarios; and
- 3) To develop a model of commuter's satisfaction on the traffic scenarios.

METHODOLOGY

This study utilized a quantitative research design, allowing the researcher to measure variables numerically and analyze patterns statistically. A structured survey served as the primary data-collection tool, consistent with quantitative studies that require standardized and measurable responses (Singh, 2006). Data were collected using a structured questionnaire consisting of several statements rated on a five-point Likert scale, where 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree. Likert-type scales are widely used in quantitative studies because they allow respondents to express their level of agreement across measurable dimensions (Singh, 2006). Each item in the instrument represented an indicator contributing to a broader construct, allowing the study to uncover latent factors underlying respondents' perceptions and levels of satisfaction.

The participants were drawn from commuters in Davao City. A quantitative sampling procedure was implemented to ensure representativeness within the target group. Only fully accomplished questionnaires were included in the analysis. Participation was voluntary, and confidentiality of responses was strictly maintained. Prior to data collection, permission was secured from the relevant institutional authorities. Surveys were distributed either personally or digitally, depending on respondents' accessibility. Clear instructions were provided to ensure uniform understanding of the items. All returned questionnaires were reviewed, encoded, and checked for completeness. To identify the latent dimensions underlying the survey responses, the study employed Exploratory Factor Analysis (EFA). EFA is appropriate for revealing hidden variable structures and grouping related items based on shared variance (Fabrigar et al., 1999).

Before conducting EFA, the dataset's suitability was assessed using:

a. Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy, which evaluates whether the dataset is appropriate for factor analysis by comparing partial correlations with total correlations (Kaiser & Rice, 1974), and

b. Bartlett's Test of Sphericity, which determines whether the correlation matrix is sufficiently patterned for factor extraction (Tobias & Carlson, 1969).

A scree plot was examined to help identify the number of factors to retain based on the point where the eigenvalues begin to level off. After establishing the initial factor structure, a Confirmatory Factor Analysis (CFA) was conducted to validate and confirm the model generated from the EFA results. CFA is essential for assessing the robustness and reliability of measurement models, especially when traditional methods offer limited insight (Brown, 2015). All statistical analyses including descriptive statistics, EFA, and CFA were conducted using SPSS and AMOS.

RESULTS AND DISCUSSION

This chapter presents the findings of the study: "Satisfaction Model of Commuters on Traffic Scenarios in Davao City". The results of the Exploratory Factor Analysis (EFA) are presented, as well as the interpretation and analysis of the respective results. All findings were illustrated through tables. The discussion and interpretation of tabular and graphical data were also provided to ensure clarity and ease of understanding.

Sampling Adequacy Requirement. The collected data used Exploratory Factor Analysis (EFA), using the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy, and Bartlett's test of Sphericity was evaluated first, and its suitability was evaluated. To produce reliable factors, with values ranging from 0 to 1 (Kaiser, 1974), the patterns of correlations are compact enough to determine the KMO index. The interpretation standard of KMO is classified as follows: above 0.90 as "Marvelous", 0.80-0.89 as "Meritorious", 0.70-0.79 as "Middling", 0.60-0.69 as "Mediocre", 0.50-0.59 as "Miserable", and below 0.50 as "Unacceptable"

As shown in Table 1 below, the KMO value is 0.918, which falls within the category of "Marvelous", meaning that with its strong correlations among variables, the dataset for factor analysis is highly appropriate.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.918
Bartlett's Test of Sphericity	Approx. Chi-Square	2707.552
	df	435
	Sig.	0.000

Table 1. KMO and Bartlett's Test

The Chi-Square value of 2707.552 with degrees of freedom at 435 and a significance level of $p < 0.000$, below the 0.5 threshold, yielded in the Bartlett's Test of Sphericity. This shows that variables are interrelated and are suitable for EFA.

Total Variance Explained. The Exploratory Factor Analysis (EFA) measured the total variance explained to show how much data is represented by the extracted factors. Table 2 presents the initial eigenvalues, extraction sums of Squared loadings, and rotation sums of squared loadings. Using the criterion, five components were obtained.

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	13.772	45.906	45.906	13.772	45.906	45.906	6.579	21.930	21.930
2	2.490	8.299	54.205	2.490	8.299	54.205	4.680	15.598	37.528
3	1.54	5.142	59.347	1.542	5.142	59.347	3.7	12.418	49.946

	2		7				25		
4	1.135	3.784	63.131	1.135	3.784	63.131	3.346	11.153	61.100

Extraction Method: Principal Component Analysis.

Table 2. Total Variance Explained

As shown in the table above, the first component accounts for 21.930% of the total variance, indicating that it represents a significant share of variability within the dataset. The second component contributes 15.598% of the variance, followed by 12.418% for the third component, and 11.153% for the fourth component. These results demonstrate that the first factor has the most influence, whereas the fourth factor has the smallest impact on explaining the total variance.

When considering the four identified components or factors collectively, they account for 61.099% of the total variance. This indicates that these four factors capture the majority of the underlying variation in the dataset and provide a meaningful representation of the data's overall structure. To support the results of the previous table, Figure 1 presents the scree plot illustrating the relationship between the number of components and their corresponding Eigenvalues. The scree plot graphically indicates that the first four factors account for most of the total variability in the data, as indicated by the Eigenvalues. The Eigenvalues for the first four factors are all greater than 1, as presented

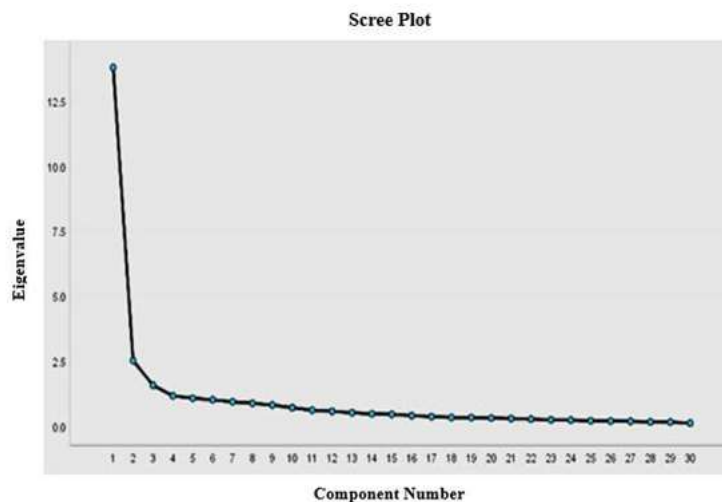


Figure 1. Graphical Explanation of Total Variance

Rotated Component Matrix. This study aims to develop a framework based on the key factors influencing the satisfaction of commuters on traffic scenarios in Davao City. In line with this, the first objective is to identify the underlying components or factors. Using Exploratory Factor Analysis (EFA) on a 30-item survey questionnaire, four key factors were identified from the gathered data.

The first factor reflects law enforcement and regulation, consisting of eleven (11) items, which highlight traffic rules, driver behavior, and professionalism of public transport operators and authorities. The second factor pertains to road infrastructure and safety, consisting of eight (8) items that capture the adequacy and visibility of traffic signals, road markings, lighting, and presence and conduct of traffic enforcers. The third factor represents traffic management and control, with four (4) items that focus on traffic flow, management of obstruction, organized loading/unloading zones, and predictability of travel time. Finally, the fourth factor relates to coordination and responsiveness of authorities, encompassing three (3) items that represent timely dissemination of traffic information, advance announcement, and functional infrastructure supporting traffic movement. Altogether, 26 items from the original 30-item questionnaire were retained, while four (4) items were excluded from the factor structure. These excluded items exhibited weak connections with the rest of the dataset, characterized by low commonalities and potential validity issues, rendering them unsuitable for inclusion in the final model. This approach is supported by Hair et. al. (2014), who state that items lacking clarity or relevance to the identified components may be excluded from the analysis to improve the model's validity.

Rotated Component Matrix with Grouped Attributes

Law Enforcement and Regulations. Table 3 presents the rotated matrix with group attributes under the theme Law Enforcement and Regulations with 11 items. These factors are associated with the following items, such as *Drivers refrain from illegal parking that blocks traffic flows* with the factor loading of (0.806); *Drivers observe proper speed limits in both highways and city roads* with the factor loading of (0.763); *Drivers show courtesy and patience in congested traffic situations* with the factor loading of (0.745); *Drivers avoid counterflowing during heavy traffic* with the factor loading of (0.704); *Driver use proper signals like turning indicators, hazard lights, etc. when needed* with the factor loading of (0.658); *Public transport drivers follow their routes without unnecessary stops* with the factor loading of (0.653); *Public transportation drivers act professionally towards commuters* with the factor loading of (0.635); *Emergency or accident response from authorities is timely* with the factor loading of (0.615); *Drivers (private or public) respect pedestrian lanes and unloading areas* with the factor loading of (0.612); *Drivers comply with designated loading and unloading areas* with the factor loading of (0.558); and *Drivers(private or public) follow traffic policies and rules consistently* with the factor loading of (0.521).

Dimension	Item	Attributes	Factor Score
Law Enforcement and Regulations	25	Drivers refrain from illegal parking that blocks traffic flows.	0.806
	27	Drivers observe proper speed limits in both highways and city roads.	0.763
	30	Drivers show courtesy and patience in congested traffic situations.	0.745
	24	Drivers avoid counterflowing during heavy traffic.	0.704
	28	Drivers use proper signals like turning indicators, hazard lights, etc. when needed.	0.658
	26	Public transport drivers follow their routes without unnecessary stops.	0.653
	29	Public transportation drivers act professionally towards commuters.	0.635
	08	Emergency or accident response from authorities is timely.	0.615
	22	Drivers (private or public) respect pedestrian lanes and unloading areas.	0.612
	23	Drivers comply with designated loading and unloading areas.	0.558
	21	Drivers (public or private) follow traffic policies and rules consistently.	0.521

Table 3. Rotated Matrix with Group Attributes under Law Enforcement and Regulations

The researchers found out that drivers should refrain from illegal parking that blocks traffic flows, observe proper speed limits in both highways and city roads, show courtesy and patience in congested traffic situations, avoid counterflowing during heavy traffic, use proper signals like turning indicators, hazard lights, etc. when needed Public transport drivers follow their routes without unnecessary stops, public transportation drivers act professionally towards commuters, emergency or accident response from authorities is timely, respect pedestrian lanes and unloading areas, comply with designated loading and unloading areas, and traffic policies and rules consistently

These findings support Al-Adawy et al. (2021), who suggest that avoiding illegal parking, using signals, adhering to speed limits, and maintaining traffic courtesy have a significant impact on driver behavior. It further aligns with Chen & Fan (2022) to reduce accidents and congestion, one must comply with the rules and in improving safe driving, proper signaling is a must.

Road Infrastructure and Safety.

Table 4 presents the rotated matrix with group attributes under the theme, Road Infrastructure and Safety, comprising 8 items. These factors are associated with the following items, such as : *Traffic lights are functional and visible in all necessary areas* with the factor loading of (0.753); *Night-time visibility and lighting improve overall road safety* with the factor loading of (0.735); *Signal timing is appropriate for both vehicles and pedestrians* with the factor loading of (0.648); *Traffic enforcers are visible in all critical intersections and busy*

roads with the factor loading of (0.640); The imposition of apprehensions and penalties help discourage repeat traffic violations with the factor loading of (0.617); Road markings such as pedestrian lines among others are clear and maintained with the factor loading of (0.544); Traffic enforcers act professionally and respectfully towards commuters with the factor loading of (0.534); and Traffic signages are adequate and available in all necessary areas with the factor loading of (0.509)

Dimension	Item	Attributes	Factor Score
Road Infrastructure and Safety	14	Traffic lights are functional and visible in all necessary areas.	0.753
	13	Night-time visibility and lighting improve overall road safety.	0.735
	15	Signal timing is appropriate for both vehicles and pedestrians.	0.648
	05	Traffic enforcers are visible in all critical intersections and busy roads.	0.640
	09	The imposition of apprehensions and penalties help discourage repeat traffic violations.	0.617
	16	Road markings such as pedestrian lines among others are clear and maintained.	0.544
	07	Traffic enforcers act professionally and respectfully towards commuters.	0.534
	12	Traffic signages are adequate and available in all necessary areas.	0.509

Table 4. Rotated Matrix with Group Attributes under Road Infrastructure and Safety

The researchers found out that traffic lights are functional and visible in all necessary areas, nighttime visibility and lighting improve overall road safety, signal timing is appropriate for both vehicles and pedestrians, traffic enforcers are visible in all critical intersections and busy roads, imposition of apprehensions and penalties helps discourage repeat traffic violations, road markings such as pedestrian lines, among others, are clear and maintained, traffic enforcers act professionally and respectfully towards commuters, and traffic signages are adequate and available in all necessary areas.

These findings support the study of Zhang et al. (2021) that traffic control systems reduce crashes and also improve mobility in the urban area. To enhance the decision-making of the driver, functional traffic signals must be visible. Hussein & Karim (2022) discovered that nighttime safety is associated with proper road lighting, which is necessary for guiding drivers and pedestrians while also reducing violations. Moreover, aligning the research with the loading factors shows that in order to promote road safety, quality in infrastructure must be done effectively.

Traffic Management and Control.

Table 5 presents the rotated matrix with group attributes under the theme Traffic Management and Control, comprising 4 items. These factors are associated with the following items: *Road obstructions, such as illegal parking is managed and cleared quickly* with the factor loading of (0.810); *Traffic moves smoothly along my usual routes* with the factor loading of (0.740); *Loading and unloading zones are organized and does not excessively delay traffic flow* with the factor loading of (0.722); and *Travel time is consistent and predictable in days wherein I can arrive at my destination at my expected time* with the factor loading of (0.722).

Dimension	Item	Attributes	Factor Score
Traffic Management and Control	03	Road obstruction such as illegal parking is managed and cleared quickly.	0.810
	01	Traffic moves smoothly along my usual routes.	0.740
	04	Loading and unloading zones are organized and do not excessively delay traffic flow.	0.722
	02	Travel time is consistent and predictable in days wherein I can arrive at my destination at my expected time.	0.722

Table 5. Rotated Matrix with Group Attributes under Traffic Management and Control

The researchers found out that road obstructions, such as illegal parking, are managed and cleared quickly, traffic moves smoothly along my usual routes, loading and unloading zones are organized and does not excessively delay traffic flow, and travel time is consistent and predictable in days wherein I can arrive at my destination at my expected time.

These findings support the study of Tan & Rivera (2022), which shows that traffic management and control play a huge role and benefit both the driver and commuter. To enhance efficiency in the roadway and also to prevent bottlenecks, an organized loading zone must be established. Singh & Patel (2020) also cited that commuters' satisfaction and traffic performance in relation to its system are associated with having predictable travel times. Overall, the literature supports that in order to strengthen road efficiency and reduce delays, there should be good control measures and proactive traffic.

Coordination and Responsiveness of Authorities. Table 6 presents the rotated matrix with group attributes under the theme Coordination Responsiveness of Authorities, comprising 3 items. These factors are associated with the following items, such as: *Information about traffic updates is accessible through all media platforms* with the factor loading of (0.711); *Announcements for road closures or rerouting are given in advance to avoid inconvenience* with the factor loading of (0.649); and *Drainage and road conditions is functioning well that support smooth traffic flow* with the factor loading of (0.570).

Dimension	Item	Attributes	Factor Score
Coordination and Responsiveness of Authorities	19	Information about traffic updates is accessible through all media platforms.	0.711
	20	Announcements for road closures or rerouting are given in advance to avoid inconvenience.	0.649
	18	Drainage and road conditions are functioning well, which supports smooth traffic flow.	0.570

Table 6. Rotated Matrix with Group Attributes under Coordination and Responsiveness of Authorities

The researchers found out that information about traffic updates is accessible through all media platforms with the factor loading of announcements for road closures or rerouting are given in advance to avoid inconvenience, and drainage and road conditions are functioning well that support smooth traffic flow.

The findings support these results, as noted by Lee & Santos (2021) information on real time traffic reduces delays and improves the decision-making of the commuters. Likewise, as cited by Morales & Chen (2022) advance advisories on the schedule of rerouting allows the travellers and commuters to adjust their time with the new routes. According to Garcia and Liu (2020) to ensure smooth flow and avoid disruptions during bad weather, proper drainage and road maintenance should be essential at this point. Overall, the study affirms that communication and readiness in infrastructure strengthen the traffic system efficiency.

The overall summary across all items supports the internal consistency and construct validity of this dimension. Factor loading above the 0.50 are considered significant and have strong indicators they are intended to measure of the variable. Hair et al, (2014). Results suggest that the 4 factors namely, law enforcement and regulations, road infrastructure and safety, traffic management and control, and coordination and responsiveness of the authorities do have a meaningful element of overall satisfaction model of commuters in traffic scenarios.

Framework Developed Based on Findings

The findings of the Exploratory Factor Analysis (EFA) suggest a framework that illustrates how key factors influence the satisfaction of commuters in traffic scenarios in Davao City. As shown in Figure 2, four key factors or dimensions emerged from the responses of commuters; this includes Law Enforcement and Regulations, Road Infrastructure and Regulations, Traffic Management and Control, and Coordination and Responsiveness of Authorities.

Law Enforcement and Regulations.

This factor emerged as a critical determinant of satisfaction of commuters on traffic scenarios in Davao City, it indicates that effective enforcement of traffic rules improve road behavior and reduce traffic violations. This supports previous studies emphasizing that strict and consistent enforcement of traffic regulations significantly

reduces traffic congestion and enhances commuters' satisfaction (Noland, 2021; Aini, Yusoff, & Mohamad, 2020).

Road Infrastructure and Safety.

This factor emerges with the previous studies about highlighting the importance of road quality like having well-designed roads, adequate lighting, safe pedestrian spaces contribute and clear signage in improving the and reducing congestion in traffic. Hassan and Lee (2022), found that well-maintained roads and having facilities for pedestrians that are safe can increase the overall public confidence and satisfaction with the transport system in the urban areas. Similarly, Bai et al. (2020), in enhancing the efficiency in travel and reducing roadway conflicts, road infrastructure that is high in quality is essential and significant.

Traffic Management and Control.

This factor emerges with the previous studies indicating that in order to improve movements in urban environments and to reduce congestion, an effective traffic management and control system are needed as for the reason also that when traffic is properly managed and controlled, there is a well implemented flow system and efficiency is visible. According to Zhang and Li (2020), to have a higher satisfaction of the commuter and to make the traffic flow smoother, there should be measures in the proactive control in traffic management. Meanwhile, Rahman and Adnan (2021), to reduce the time in travelling and to improve the experience of the road user, an effective coordination must be done in optimizing the traffic signal.

Coordination and Responsiveness of Authorities.

This factor emerges with the previous studies determining that in improving transportation efficiency, there should be a strong institutional coordination such as timely response to incidents on the road. Wang & Park (2021), stated that in order to have a more positive experience in travelling, the authorities should build commuters' trust by being active in responding. Likewise, Cristea et al. (2022) highlight in times of having a quicker response time and reduced congestion, the cooperation of the inter-agency is essential in enhancing the traffic incident management.

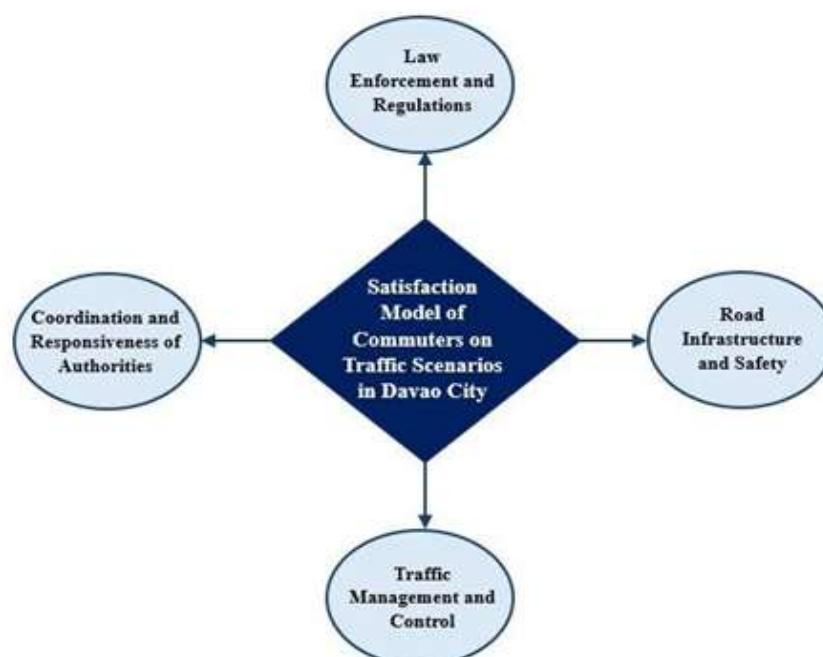


Figure 2. Satisfaction Model of Commuters on Traffic Scenarios in Davao City revealing the Four Factors or Dimensions

Model of Commuters Satisfaction on the Traffic Scenarios in Davao City Based on the Findings

The Best Fit Model illustrates the relationship between the key dimensions of the commuters on traffic scenarios in Davao City. Among the four initially extracted factors, only three remained in the final model: law enforcement and regulation, road infrastructure and safety, and coordination and responsiveness of authorities. The refinement of the data was based on the results using AMOS software during the model-fitting process.

The AMOS software identified that the remaining factor, Traffic management and control, did not meet the required model fit criteria, including acceptable levels for goodness-of-fit indices, CFI, TLI, and RMSEA. Figure 3 presents the final best fit model, which only includes the three most statistically significant and meaningful factors, supported by a model fit known as AMOS.

The first factor (F1), Law Enforcement and Regulations, retained five (5) items out of eleven (11). These items include, item 25 'Drivers refrain from illegal parking that blocks traffic flows.', item 30 'Drivers show courtesy and patience in congested traffic situations.', item 28 'Drivers use proper signals like turning indicators, hazard lights, etc. when needed.', item 23 'Drivers comply with designated loading and unloading areas.', and item 21 'Drivers (public or private) follow traffic policies and rules consistently.'. These items showed strong consistency and did not cross-loadings with the second factor.

The second factor (F2), Road Infrastructure and Safety, retained two (2) items out of eight (8). These items include, item 15 'Signal timing is appropriate for both vehicles and pedestrians.' and, item 12 'Traffic signages are adequate and available in all necessary areas. These two items only demonstrated no overlapping correlation in the final model.

The fourth factor (F4), Coordination and Responsiveness of Authorities, retained two (2) items out of three (3). These items include item 20, 'Announcements for road closures or rerouting are given in advance to avoid inconvenience.', and item 18, 'Drainage and road conditions are functioning well that support smooth traffic flow.'. These two items also notably showcase that there is no overlapping correlation in the final model

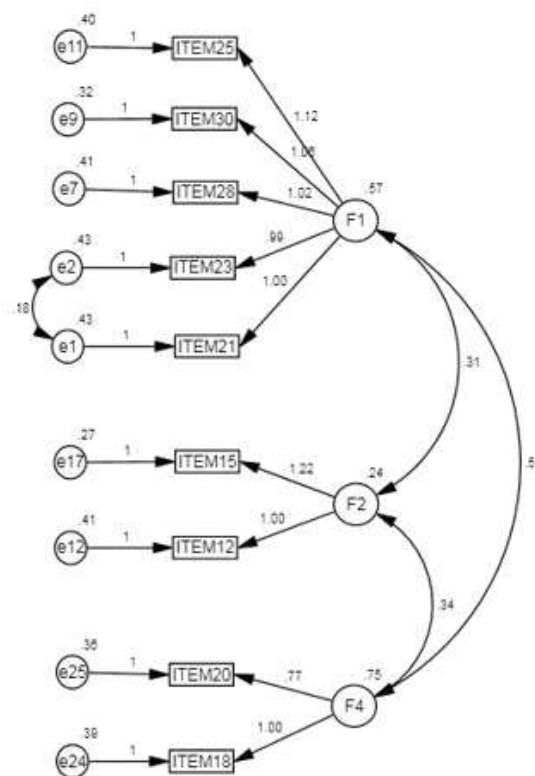


Figure 3. Best Fit Model

Table 8. Best Fit Model

Factors	Item	Attributes
Law Enforcement and Regulations	25	Drivers refrain from illegal parking that blocks traffic flows.
	30	Drivers show courtesy and patience in congested traffic situations.
	28	Drivers use proper signals like turning indicators, hazard lights, etc. when needed.
	23	Drivers comply with designated loading and unloading areas.
	21	Drivers (public or private) follow traffic policies and rules consistently.
Road Infrastructure and Safety	15	Signal timing is appropriate for both vehicles and pedestrians.
	12	Traffic signage are adequate and available in all necessary areas.
Coordination and Responsiveness of Authorities	20	Announcements for road closures or rerouting are given in advance to avoid inconvenience.
	18	Drainage and road conditions are functioning well, which supports smooth traffic flow.

Brown (2025) stated that model parameters are commonly estimated using maximum probability to allow researchers to examine multiple fit indices with their respective criteria, as well as to obtain the most probable values of the parameters given in the data. In addition, Sathyanarayana & Mohanasundaram (2024) note that absolute fit indices play a crucial role in determining how well the hypothesized model fits the observed data. Among these indices, the Chi-Square Test (χ^2) is one of the widely used measures that determines the discrepancy between the model-implied covariance matrix and the observed data. In AMOS software, this is presented as the Chi-Square Minimum (CMIN), accompanied by the degrees of freedom (df) and the p-value. An acceptable CMIN/DF ratio is less than 2, indicating a good fit in the model, especially when supported by a non-significant chi-square with a p-value of less than 0.05. Using these criteria, the researcher obtained reliable evidence regarding the adequacy and validity of the structural model.

Indices of Fit		Criterion	Model
CMIN/DF	Minimum Discrepancy / Degrees of Freedom	$0 < \text{value} < 2$	1.137
p-value	Probability Value	> 0.05	0.294
NFI	Normed Fit Index	> 0.95	0.957
TLI	Tucker Lewis Index	> 0.95	0.991
CFI	Comparative Fit Index	> 0.95	0.995
GFI	Goodness of Fit Index	> 0.95	0.953
RMSEA	Root Mean Square Error for Approximation	< 0.08	0.033
Pclose	Test of Close Fit	> 0.05	0.651

Table 9. Summary of Results

Statistical checks have been conducted for Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM), which are considered for defining and measuring factors of commuter satisfaction in traffic scenarios. Definitely, the fundamental finding from all these fit indices is that the measurement model is eminently capable of demonstrating how well the observed data are represented by that model. In tandem, these Absolute Fit Indices indicate that the proposed structure is a very strong and correct fit against which the study's items could be organized into the four factors of Law Enforcement and Regulations, Road Infrastructure and Safety, Traffic Management and Control, and Coordination and Responsiveness of Authorities. Key metrics such as the CMIN/DF ratio of 1.137 and the chi-square p-value of 0.294 both confirm that the theoretical representation of the model is almost same with the real-world data and also parsimonious-highly parsimonious which explains much of the variance even with few variables. Further assurance of the GFI equals 0.953 to ensure satisfactory variance interpretation through the model, while RMSEA set at 0.033 suggests a close to "excellent" fit with strong generalization to the whole population of commuters. The Incremental Fit Indices substantiate this argument also, since it represents that the present study is superior to a simpler baseline model

under which all variables are independent of one another. The extremely high values for the NFI (0.957), TLI (0.991), and CFI (0.995) all significantly surpass the recommended cutoff of 0.95. This strongly validates the construct validity of the four-dimensional model, proving that the grouping of attributes under their respective factors (as seen by their high factor loadings) is statistically robust and meaningful. The study would lose empirical validity if not supported by these high fit indices and depend solely on factor loadings. The present results provide the required statistical grounds to reach the conclusion that the identified four factors are indeed the most necessary and quantifiable elements of overall commuter satisfaction in traffic by confirming that the model as a whole is an excellent statistical fit.

At best, decent fit indices- the best CFI, TLI surpass 0.90; RMSEA is somewhat lower-statistically prove that Law Enforcement & Regulations, Road Infrastructure & Safety, Traffic Management & Control, and Coordination & Responsiveness of Authorities, are really the true, most salient determinants of commuter satisfaction among this population. Strong evidence has been far-reaching to mean that the recommendations drawn from the percent attributes did not collect simple observations or descriptive statistics; instead, these derive in an empirically validated structural model. Hence, about any allocation of resources or policy changes intended to improve some specific mixed-high-loading attributes within these four dimensions, positive scores will be realized at least in terms of efficiencies predicted for the entire traffic system and satisfaction of commuters. Thus, the model remains an exception prototype for such intervention, ensuring that all such efforts are towards matters important to commuters. More so, with this level of fit, it implies that the four factors interact as a system, such that an enhancement in one may affect perception in the others. An example of enforcement against illegal parking under Law Enforcement is linked to a rapid clearance of road obstructions as Traffic Management practices. Because the model is clearly validated as a good fit-the research will provide a full-scale framework, where intervention in all four validated dimensions simultaneously will produce significantly greater results than focusing on one aspect in isolation. This statistical underpinning guarantees that any action taken by the policymakers will facilitate further advancement in urban mobility with high confidence, thereby rendering the recommendations very strategic, evidence-based, and focus-oriented.

ACKNOWLEDGEMENT

First and foremost, the researchers extend their sincere thanks to our Almighty God for the provision of strength, wisdom, and guidance that He showered upon them throughout the conduct of this study. We sincerely thank the University of Southeastern Philippines (USEP) for providing the academic framework, tools, and assistance required to successfully complete this study. The researcher expresses sincere gratitude to Dr. Gaudencio Abellanosa, the thesis supervisor, whose priceless advice, helpful criticism, and steadfast guidance significantly influenced the path and clarity of this investigation. Finally, the researcher sincerely thanks the Davao City commuters who voluntarily participated in the survey. Their candor, patience, and transparency lent significance and a solid foundation to this study, drawing on real-world experiences. Their involvement was essential to the success of this study.

CONCLUSION

The research firmly establishes that there exist four vital dimensions that contribute significantly to general satisfaction for commuters in traffic events: Law Enforcement and Regulations; Road Infrastructure and Safety; Traffic Management and Control; and Coordination and Responsiveness of Authorities. Factor analysis performed throughout the various dimensions indicated that the constructed scale possesses strong internal consistency and the discriminant validity property, such that all items retained for the analysis had significant factor loadings (more than 0.50). This means that the four PP themes are useful constructs for an overall traffic system efficiency model. Thus, it is emphasized that driver behavior, such as not parking illegally and sticking to speed limits, is most important, as are reasonably professional and timely actions from public transport drivers and traffic enforcers. These findings are further corroborated in the literature asserting that drivers who follow the rules in signaling, obey traffic laws, and take a courteous action can bring a better behavioral response, thus reducing accidents and traffic congestion.

On the contrary, such conclusions further affirm the requirement of an equally functional traffic system through infrastructure management, which must be transparently coordinated at all authority levels. The greater the loading factors concerning Road Infrastructure and Safety, the greater is the call for functional and visible traffic lights, improved visibility at night, and properly-maintained retro-reflective road markings and signages. The

extent to which arrests and penalties could affect repeat violators was also majorly rated. Traffic Management and Control showed that the speedy management and lifting of blockages from the road (including illegal parking) and the design and maintenance of organized loading and unloading zones were primary components to establishing smooth traffic flow based on scheduled plans for predictable travel times. With respect to the dimension of Coordination and Responsiveness of Authorities, evidence exists that timely, easy-to-find updates on traffic conditions and advance information on planned road closures or rerouting are fundamental in alleviating delays and enhancing commuter decision-making, which together with drainages in good-order and road surface conditions serves to bolster the overall efficiency and dependability of the traffic system.

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