Analysis of Passenger Online Transportation Demand in Ende City

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Ende City, as one of the activity centers on Flores Island, has a fairly high level of community mobility. Activities going to schools, markets, offices, airports, and tourism areas cause the need for transportation to increase. The purpose of this study is to determine how big the role of transportation and the influence of online-based transportation on the online-based transportation system in Ende City. The collected data will be measured and analyzed statistically to identify patterns of relationships between existing variables, such as the relationship between usage factors (time, fare, comfort, security, and accessibility) and public perception of online transportation services. The number of samples, using the Slovin formula with the number of samples needed is ± 100 respondents. The data collection methods used are observation, interviews, questionnaires and literature studies. Based on the results of data processing and analysis, the time variable, fare variable, comfort variable, security variable and accessibility variable are obtained. Of these several factor variables, the fare variable is a superior factor variable of several other studied variables, which indicates that these variable factors are the priority of respondents in choosing the need for Online Passenger Transportation in Ende City, especially in the use of the Maxim application. It is hoped that further research will change the methods and analysis tools to increase insight into the Analysis of Passenger Online Transportation Needs.

Keywords: Time, Fare, Convenience, Security, Accessibility and Online Transportation

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1. Introduction

Transportation is an essential need that not only facilitates physical mobility but also drives economic growth, social integration, and sustainable regional development. Alongside advancements in information technology, this sector has experienced disruptive innovation through the emergence of app-based online transportation. Azizah and Adawia [1] assert that this disruptive innovation in the transportation industry was initially driven by the urgency to address traffic congestion and high mobility demands in major urban areas. These digital services have proven to offer a more practical, rapid, and comfortable mobility alternative compared to conventional transportation, although their existence introduces new dynamics regarding public acceptance, business competition, and regulatory challenges.

According to the Central Statistics Agency (BPS), Indonesia will become the world's first country to use online transportation, reaching 66.7%, or 88.3 million people. Therefore, online transportation is extremely beneficial for the community, especially in Ende, East Nusa Tenggara province. Various previous studies have examined the phenomenon of online transportation from diverse perspectives to understand the shifts in user behavior. Putriani and Fauzi [2] discovered that service practicality and feature variety are the primary reasons individuals—particularly students and younger demographics—transition from conventional or private vehicles to online transportation. This aligns with Belay's [3] perspective, which emphasizes that online transportation has fundamentally transformed the mobility behavior patterns of the tech-savvy generation. Furthermore, Pratama and Farida [4] confirmed that this mode of transportation

possesses the potential to reduce congestion levels and dependency on private vehicles if optimally managed and integrated with existing systems.

Although previous literature has extensively highlighted the success and dynamics of online transportation in metropolitan areas, studies concerning its existence, acceptance, and impact in medium- or small-scale cities remain substantially limited (*research gap*). Ende City, serving as a hub for economic, educational, and tourism activities on Flores Island, confronts unique mobility challenges. The continuously increasing community activities are disproportionate to the availability of conventional public transportation, which remains limited in terms of fleet capacity, route coverage, and operational hours. This condition creates a niche for online transportation as an alternative solution. However, its implementation necessitates an in-depth investigation because the rate of smartphone ownership, internet infrastructure, and the socio-economic conditions of Ende City's population present adaptation challenges and potential friction with traditional transportation that differ fundamentally from those in metropolitan cities.

Considering the literature gap and the urgency of these issues, this study aims to analyze the extent to which passenger online transportation fulfills community mobility needs and to evaluate its influence on the conventional transportation system in Ende City. This analysis is delimited to evaluating user needs based on time, fare, comfort, safety, and accessibility factors, excluding the technical aspects of application development. The findings of this research are anticipated to provide a theoretical contribution to the transportation planning literature for developing cities, while simultaneously offering a practical contribution—serving as strategic recommendations for local governments in formulating licensing policies, fleet quotas, and regulations for the harmonious coexistence of online and conventional transportation.

2. Literature Review

Transportation is fundamentally a *derived demand* that facilitates the movement of individuals and commodities to fulfill various essential socio-economic needs [3], [5]. Concurrently with the rapid penetration of digital technology, the sector has undergone a massive transformation with the advent of online transportation, which integrates real-time mobility services via smartphone applications. This innovation has engendered a variety of alternative modes, ranging from two-wheeled transport (e.g., Maxim)—considered highly effective in navigating urban congestion [6], to online taxi services that offer route flexibility and premium comfort [7]. This transformation not only disrupts conventional systems but also cultivates a new mobility ecosystem that prioritizes cost transparency, user accessibility, and the integration of driver identity to bolster operational safety [8].

The public's decision to transition to and adopt online transportation is heavily influenced by the convergence of consumers' personal characteristics and the functional advantages of the service. Theoretically, these preferences are dictated by cultural dimensions, social reference stimuli, as well as individual demographic and economic conditions (Kotler, as cited in [7]). This decision is further reinforced by the *perceived ease of use* of the technology, aggressive fare promotions (such as e-wallet integration), and its practicality compared to the utility of private vehicles or conventional public transport [9], [10]. Despite offering high efficiency, the operation of online transportation continues to grapple with several residual structural issues. These include incomplete operational legality regulations, the absence of standardized vehicle roadworthiness testing (KIR), technical network constraints, and indirect implications on the surge of traffic volume on roadways [11].

The difference between this research and previous research is that this research discusses or analyzes directly related variables such as travel time, accessibility, comfort, security and fares that influence the

performance of online transportation and are analyzed according to the existing conditions of the research location.

3. Methods

This study employs a quantitative descriptive approach, which conceptualizes social phenomena as objective entities that can be classified, measured, and analyzed statistically. This approach was selected in alignment with the research objective: to analyze the demand for passenger online transportation in Ende City, Ende Regency, East Nusa Tenggara Province. This encompasses the identification of factors influencing its usage—namely time, fare, comfort, safety, and accessibility—as well as the public's perception of the service. Data collection was conducted over a one-month period, encompassing both weekdays and weekends, to ensure a representative variance of respondents.

The data utilized consisted of both primary and secondary sources. Primary data were obtained through questionnaires distributed to respondents, structured around the factors identified in the literature review. This was supplemented by field observations and in-depth interviews with users, conventional transport drivers, and local government officials as complementary sources of information. Secondary data were sourced from scientific literature, academic journals, official reports, and relevant prior studies.

The study population comprised the entire demographic of Ende City who use or are prospective users of online transportation services (N = 87,541 individuals). The sample size was determined utilizing Slovin's formula with a margin of error of 10% (e = 0.10), yielding a total of 100 respondents. Sampling was conducted randomly from 100 online transportation users to ensure a more accurate description of the contribution of online transportation users.

The collected data will be analyzed using statistical methods. The data analysis stages include: Descriptive Analysis: Describing the respondent profile and general characteristics of online transportation users. Validity and Reliability Test: Measuring the validity and reliability of the research instrument (questionnaire). The validity test will use Product Moment correlation, while the reliability test will use Cronbach's Alpha. The analysis will then use Factor Analysis to identify latent variables influencing online transportation use. This stage will be supported by the Kaiser Meyer Olkin (KMO) test and Bartlett's Test of Sphericity to ensure data validity.

The collected data were subsequently analyzed systematically using SPSS version 24 software, encompassing three primary stages. First, descriptive analysis was employed to delineate the respondent profiles and the distribution of online transportation usage characteristics. Second, instrument testing was conducted via validity testing utilizing the Pearson Product-Moment correlation (deemed valid if $r_{calculated} > r_{table}$; $\alpha = 0.05$) and reliability testing using Cronbach's Alpha (deemed reliable if $\alpha > 0.70$). Third, factor analysis was applied to identify the latent variables influencing the usage of online transportation. This required the prerequisite Kaiser-Meyer-Olkin (KMO > 0.50) and Bartlett's Test of Sphericity (Sig. < 0.05) to confirm data adequacy prior to proceeding with the analysis.

4. Results And Discussion

Descriptive Statistics of User Perceptions and Needs-Expectations

Table 1 presents the average respondent scores for the ten indicators of the Perception of Maxim Services variable (X) and the seven indicators of the Needs and Expectations of Maxim Services variable (Y). These were measured using a 4-point Likert scale (1 = Strongly Disagree, 4 = Strongly Agree).

Table 1. Descriptive Statistics of Research Indicators

Variable	No	Indicator	Mean
Perception of Maxim Services (X)	1	The Maxim application is easy to use for booking services	3,17
	2	Maxim service fares are affordable for the people of Ende City	3,24
	3	The waiting time for a Maxim vehicle is relatively fast	3,21
	4	Maxim drivers are friendly and polite	3,30
	5	Maxim vehicles are in clean and roadworthy condition	3,26
	6	I feel safe using the Maxim service	3,32
	7	The Maxim service helps save travel time	3,30
	8	The coverage of Maxim services adequately serves the Ende City area	3,04
	9	The Maxim payment system (cash/cashless) is easy to use	3,26
	10	Travel cost information on the application is clear and transparent	3,18
Needs and Expectations of Maxim Services (Y)	1	I need Maxim services for daily activities	3,15
	2	The number of Maxim fleets in Ende City still needs to be increased	3,17
	3	I need a variety of services (motorcycles, cars, delivery, etc.)	3,32
	4	I hope Maxim provides promos/discounts more frequently	3,62
	5	I hope Maxim improves the quality of driver training	3,13
	6	I want Maxim services to be available 24 hours	3,55
	7	I will continue to use Maxim if the service quality improves	3,61

In general, the mean scores for all indicators of the Perception variable ranged from 3.04 to 3.32, indicating that the majority of respondents agreed or strongly agreed with the quality of Maxim services. The indicator with the highest mean was "I feel safe using the Maxim service" (3.32; 60% of respondents agreed and 40% strongly agreed, with zero disagreements). Conversely, the indicator with the lowest mean was "The coverage of Maxim services adequately serves the Ende City area" (3.04; 71% agreed, 20% strongly agreed, but 8% disagreed and 1% strongly disagreed). This indicates that the geographical coverage of the service is the most questioned aspect relative to the other indicators.

For the Needs and Expectations variable, the mean scores ranged from 3.13 to 3.62. The indicator with the highest mean was "I hope Maxim provides promos/discounts more frequently" (3.62; 62% strongly agreed, 38% agreed). Meanwhile, the indicator with the lowest mean was "I hope Maxim improves the quality of driver training" (3.13; 38% strongly agreed, 38% agreed, 23% disagreed, and 1% strongly disagreed), reflecting a relatively wider variance in opinion compared to other indicators within this variable.

Instrument Validity and Reliability Test Results

Validity testing was performed using Pearson Product-Moment correlation with a sample size of n = 100 (df = n-2= 98, at a two-tailed significance level of 5%), yielding a critical r_{table} value of 0.1966. Reliability

testing was conducted using the Cronbach's Alpha coefficient. A summary of both test results is presented in Table 2.

Table 2. Instrument Validity and Reliability Test Results

Variable	Item	$r_{calculated}$	r_{table}	Validity Status	Alpha if Item Deleted	Reliability Status
Perception of Maxim Services (X)	x1.1	0,373	0,1966	Valid	0,629	Reliabel
	x1.2	0,209	0,1966	Valid	0,649	Reliabel
	x1.3	0,322	0,1966	Valid	0,635	Reliabel
	x1.4	0,460	0,1966	Valid	0,617	Reliabel
	x1.5	0,425	0,1966	Valid	0,622	Reliabel
	x1.6	0,245	0,1966	Valid	0,646	Reliabel
	x1.7	0,426	0,1966	Valid	0,622	Reliabel
	x1.8	0,449	0,1966	Valid	0,619	Reliabel
	x1.9	0,502	0,1966	Valid	0,611	Reliabel
	x1.10	0,471	0,1966	Valid	0,616	Reliabel
Needs and Expectations of Maxim Services (Y)	y1	0,433	0,1966	Valid	0,723	Reliabel
	y2	0,592	0,1966	Valid	0,703	Reliabel
	y3	0,602	0,1966	Valid	0,701	Reliabel
	y4	0,444	0,1966	Valid	0,722	Reliabel
	y5	0,631	0,1966	Valid	0,691	Reliabel
	y6	0,637	0,1966	Valid	0,699	Reliabel
	y7	0,642	0,1966	Valid	0,697	Reliabel

Overall Cronbach's Alpha coefficient: Perception variable (X) = 0.642; Needs and Expectations variable (Y) = 0.731. Source: Processed from research data.

All items across both variables demonstrated an r_{table} value greater than the r_{table} (0.1966); thus, all items were declared valid. The Cronbach's Alpha values for both variables fell within the 0.61–0.80 interval, which is classified as high according to Ghozali's [12] criteria, confirming that all items are reliable and suitable for use as measurement instruments.

Factor Analysis Results

Factor analysis was conducted on five variables that shape user perceptions and needs: Time, Fare, Comfort, Safety, and Accessibility.

Feasibility Test of Factor Analysis

Table 3. Kaiser-Meyer-Olkin (KMO) and Bartlett's Test Results

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.540
Bartlett's Test of Sphericity	Approx. Chi-Square	47.569
	df	10
	Sig.	.000

The KMO value of 0.540 (> 0.50) and a Significance (Sig.) value of 0.000 (< 0.05) on Bartlett's Test indicate that the data met the assumptions required to proceed with factor analysis.

Table 4.: Output Anti-image Matrices

		Time	Fare	Comfort	Safety	Accessibility
Anti-image Covariance	Time	.897	-.025	-.243	.001	-.084
	Fare	-.025	.738	.105	-.304	-.257

		Time	Fare	Comfort	Safety	Accessibility
Anti-image Correlation	Comfort	-.243	.105	.858	-.168	-.113
	Safety	.001	-.304	-.168	.797	.017
	Accessibility	-.084	-.257	-.113	.017	.846
	Time	.592[a]	-.031	-.277	.001	-.097
	Fare	-.031	.509[a]	.132	-.397	-.326
	Comfort	-.277	.132	.501[a]	-.204	-.133
	Safety	.001	-.397	-.204	.542[a]	.020
	Accessibility	-.097	-.326	-.133	.020	.594[a]

a. Measures of Sampling Adequacy(MSA)

The Measure of Sampling Adequacy (MSA) values for each individual variable were also above 0.50, namely Time (0.592), Fare (0.509), Comfort (0.501), Safety (0.542), and Accessibility (0.594), confirming that all variables were eligible for inclusion in the factor analysis.

Communalities

Tabel 5. Output Communalities

Variable	Initial	Extraction
Time	1.000	.618
Fare	1.000	.746
Comfort	1.000	.653
Safety	1.000	.515
Accessibility	1.000	.419

Extraction Method: Principal Component Analysis.

Four of the five variables (Time, Fare, Comfort, and Safety) exhibited extraction values above 0.50, meaning these four variables can be adequately explained by the extracted factors. The Accessibility variable showed an extraction value of 0.419, which is slightly below the conventional threshold of 0.50.

Total Variance Explained

Table 6. Total Variance Explained

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	1.771	35.415	35.415	1.771	35.415	35.415	1.619	32.386	32.386
2	1.181	23.622	59.037	1.181	23.622	59.037	1.333	26.651	59.037
3	.860	17.207	76.244						
4	.709	14.180	90.424						
5	.479	9.576	100.000						

Extraction Method: Principal Component Analysis.

Based on the criterion of an eigenvalue > 1, only two components were extracted as factors: Component 1 (eigenvalue 1.771), explaining 35.415% of the variance, and Component 2 (eigenvalue 1.181), explaining 23.622% of the variance. These two factors cumulatively explain 59.037% of the data variation, whereas the remaining three components were not extracted due to their eigenvalues being less than 1.

Factor Grouping

Table 7. Rotated Component Matrix

Variable	Before Rotation		After Rotation	
	1	2	1	2
Time	0,455	0,641	0,067	0,783
Fare	0,689	-0,521	0,858	-0,100
Comfort	0,488	0,644	0,094	0,803
Safety	0,666	-0,267	0,710	0,108
Accessibility	0,638	-0,109	0,605	0,229

Extraction Method: Principal Component Analysis; Rotation Method: Varimax with Kaiser Normalization (converged in 3 iterations.

Based on the highest correlation (loading) values for each variable, two factor groups were formed: Factor 1 consists of the Fare, Safety, and Accessibility variables; whereas Factor 2 consists of the Time and Comfort variables. The Component Transformation Matrix results showed an inter-component correlation value of 0.862 (> 0.50) for both components, indicating that the performed factor rotation was sufficient to summarize the five analyzed variables.

Discussion

Public Needs and Opinions Regarding the Presence of the Maxim Service in Ende City

The presence of the Maxim online transportation service in Ende City has garnered a highly positive public response. This is reflected in the questionnaire results, which indicate that the majority of respondents agreed or strongly agreed with various statements concerning the quality of Maxim's services. This condition suggests that the Maxim service is not only well-received by the public but is also considered capable of addressing the increasingly dynamic and growing mobility needs within the urban area of Ende City.

For the people of Ende City, Maxim functions as more than merely a means of transportation; it has emerged as a practical solution for supporting daily activities. This service is particularly indispensable for individuals without private vehicles, those with time constraints, and those requiring a flexible, rapid, and easily accessible mode of transport. Through its app-based booking system, Maxim is perceived as capable of providing convenience and efficiency in fulfilling the community's travel needs.

Public opinion regarding the presence of Maxim indicates that this service delivers tangible benefits in daily life. The high rate of usage and public acceptance signifies that online transportation has become a vital component of the urban transportation system in Ende City. The community evaluates Maxim as an effective alternative to conventional transportation modes, particularly concerning accessibility and service reliability.

Based on the research findings, public needs and opinions regarding the Maxim service can be analyzed through five primary variables: time, fare, comfort, safety, and accessibility. These five variables play a crucial role in shaping user satisfaction levels and reinforcing the public's positive perception of the service. Consequently, the presence of Maxim not only fulfills the transportation needs of the Ende City community but also contributes significantly to the overall enhancement of transportation service quality.

Time Variable

The time variable is one of the most critical factors in selecting a transportation mode. The research findings indicate that the majority of respondents consider the waiting time for Maxim vehicles to be relatively fast

and that the service effectively saves travel time. A mean score exceeding 3.0 demonstrates that respondents are satisfied with the time efficiency offered by the Maxim service.

The swift response of drivers and the seamless in-app booking process serve as primary factors supporting this time efficiency. Compared to conventional transportation, which often operates on irregular schedules and limited routes, Maxim provides time certainty for its users. Therefore, the Maxim service is assessed as capable of enhancing the effectiveness of community mobility in Ende City, particularly for routine activities such as commuting to work or school, as well as for urgent needs.

Fare Variable

Regarding fares, the questionnaire results reveal that Maxim's service rates are deemed affordable by the people of Ende City. All respondents expressed agreement or strong agreement, indicating an absence of significant opposition to the implemented fare structure.

Fares that are relatively low, transparent, and disclosed prior to the commencement of the trip constitute the primary competitive advantage of the Maxim service. This cost transparency instills a sense of security and trust among users, as there are no hidden charges beyond what is displayed on the application. Furthermore, the public's expectation for promotions and discounts indicates that pricing remains a sensitive factor; however, overall, Maxim has successfully met community expectations regarding the affordability of transportation costs. This is also as stated by previous research regarding the certainty of service costs being listed directly, the existence of moneyless features, one-click ordering, direct evaluation (ratings and complaints), and the availability of free ride promos [2].

Comfort Variable

Comfort represents a vital variable in determining the quality of transportation services. Based on the research findings, the community perceives Maxim drivers to be friendly and polite, and the vehicles to be clean and roadworthy. The high mean score indicates that the comfort aspect has been adequately fulfilled.

The professional demeanor of the drivers and the proper condition of the vehicles provide users with a pleasant travel experience. This demonstrates that Maxim focuses not only on speed and pricing but also prioritizes overall service quality. The comfort experienced by users consequently fosters community loyalty, encouraging continued utilization of the Maxim service in the future.

Safety Variable

The safety aspect is a crucial factor in transportation services. Research findings demonstrate that the majority of respondents feel safe when using the Maxim service. The high level of respondent agreement signifies that Maxim has successfully cultivated a sense of security for its users.

This safety is bolstered by the clear integration of driver identities within the application, real-time trip tracking systems, and reasonably good driving standards. Although there remains a public expectation for continuous improvement in the quality of driver training, the Maxim service has generally provided adequate security for users in Ende City.

Accessibility Variable

The accessibility variable relates to the ease with which the public can access the Maxim service. Research findings reveal that the coverage of Maxim services in Ende City is considered commendable, although a small fraction of respondents still feel that the service has not yet fully penetrated all areas of the city.

Furthermore, the application's ease of use and flexible payment systems (both cash and cashless) further elevate the accessibility level of the Maxim service. The community's expectation for fleet expansion and

24-hour service availability indicates that the demand for Maxim still holds the potential for continuous growth. Through expanded coverage and increased service availability, Maxim is anticipated to reach all strata of the Ende City community more equitably.

Overall, public opinion regarding the presence and service of Maxim in Ende City demonstrates a highly positive response. The five analyzed variables—time, fare, comfort, safety, and accessibility—indicate that the Maxim service has successfully fulfilled the community's fundamental mobility needs.

The presence of Maxim yields a positive impact on the transportation system in Ende City by providing an efficient, affordable, and easily accessible alternative mode of transport. The results of this study reaffirm that online transportation services like Maxim play a pivotal role in supporting urban mobility and possess the potential to become an integral component of a sustainable transportation ecosystem in Ende City.

5. Conclusion

Based on the data processing and analysis detailed in the preceding sections, several conclusions can be drawn regarding the operation of the Maxim service in Ende City. The factor analysis reveals the following correlation values (loadings) for the observed variables: Time correlates with Factor 1 at 0.067 and Factor 2 at 0.783; Fare exhibits a correlation of 0.858 with Factor 1 and -0.100 with Factor 2; Comfort demonstrates a loading of 0.094 on Factor 1 and 0.803 on Factor 2; Safety shows a correlation of 0.710 with Factor 1 and 0.108 with Factor 2; and Accessibility correlates with Factor 1 at 0.605 and Factor 2 at 0.229. Among these five variables, Fare emerges as the most dominant determinant. This finding indicates that pricing is the fundamental priority for respondents when determining their need for passenger online transportation in Ende City, particularly regarding the use of the Maxim application. Beyond affordability, the service is widely adopted because it aligns seamlessly with the local socio-economic landscape; the majority of users require transportation that is not only cost-effective but also accessible, safe, and comfortable. Furthermore, Maxim offers superior spatial flexibility, successfully penetrating areas that remain inadequately served by conventional public transit networks. Consequently, the presence of the Maxim service transcends its role as a mere alternative mode of transport, establishing itself as an effective, efficient, and vital mobility solution for the community of Ende City. For the local government to pay more attention to and improve online transportation services other than Maxim such as Grab, Go-jek and others that are beneficial and improve the welfare of the people in Ende City.

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