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COMPARATIVE ANALYSIS OF SERVICE QUALITY IN TRAVELAGENT APPLICATIONS USING E-SERVQUAL AND IPA

Amalia Rizki Febrianti*[1)], Rio Guntur Utomo[2)], Rahmat Yasirandi[3)]
1. Department of Information Technology, School of Computing, Telkom University Bandung, Indonesia
2. Department of Information Technology, School of Computing, Telkom University Bandung, Indonesia
3. Department of Information Technology, School of Computing, Telkom University Bandung, Indonesia

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* Corresponding author:
Amalia Rizki Febrianti
E-mail address:
amaliarizkif@student.telkomuniversity.ac.id

ABSTRACT

This research compares the service quality of travel agent applications, which are KAI Access and Traveloka, in booking train tickets using the E-Service Quality and Importance Performance Analysis (IPA) methods. This service quality is measured based on seven dimensions of E-Service Quality, including efficiency, fulfillment, reliability, privacy, responsiveness, compensation, and contact. Data were collected through questionnaires from 340 respondents who use the KAI Access and Traveloka applications to book train tickets. The collected data were then analyzed descriptively using the Importance Performance Analysis (IPA) technique to identify priority attributes for improvement based on user satisfaction and importance levels. Based on the Gap Analysis and evaluation of 340 respondents, both the KAI Access and Traveloka apps require improvements as they still need to meet user expectations. The service quality of KAI Access and Traveloka shows significant differences across various dimensions measured by the E-Servqual and Importance Performance Analysis (IPA) methods. The research results are expected to provide recommendations for both applications to improve service quality and user satisfaction. The comparison of service quality is also expected to provide insights into the strengths and weaknesses of each application in providing train ticket booking services.

I. INTRODUCTION

The rapid growth of technology, highlighted by the Hootsuite (VR Social) Indonesia Digital Report, shows a 12.6% increase in social media usage compared to last year. This growth provides opportunities for the use of technology in various sectors, including the business economy [1]. PT Kereta Api Indonesia (KAI) introduced the KAI Access application for passengers, which enables online ticket purchases [2]. Similarly, Traveloka has become a popular platform for travel planning [1], such as e-ticketing.

E-ticketing is a modern method for documenting the ticket sales process without using physical documents. This system improves transportation services by making payments easier for passengers and reducing the use of private vehicles. E-ticketing can reserve tickets online, replacing the traditional paper-based reservation system. The technology used continues to develop, making this system more effective and sophisticated. The advantages include minimizing the risk of losing physical tickets and facilitating transactions with various payment methods, including cash, check, credit or debit cards [3].

E-ticketing has already been implemented in many travel agent applications, including KAI Access and Traveloka. KAI Access (government-owned) and Traveloka (private) is a rival. Both reflect a unique transportation industry dynamic, particularly in train ticket booking [2]. PT Kereta Api Indonesia (Persero), as a State-Owned Enterprise, is the leading provider of rail transportation services in Indonesia [4], [5]. KAI provides passenger and goods transportation services and supporting business transportation services such as station space rental. Since the change from PJKA to Perumka, KAI has continued to innovate following technological developments to meet its customers' expectations. One of the newest innovations is the launch of the Access application, the latest version of KAI Access. This application offers new features such as Trip Planner, Live Tracking, Loyalty Points, and various other digital services to enhance the user experience [6].

KAI Access benefits from integrating with national rail infrastructure, providing reliability and alignment with government policies. Meanwhile, Traveloka, as a private company, brings entrepreneurial flexibility, responding quickly to market changes with innovative, technology-driven approaches. This rivalry offers users a broader choice, with KAI Access emphasizing reliability and direct rail service integration. At the same time, Traveloka

focuses on a faster, user-friendly, and versatile booking experience, driving overall service quality improvements in the industry [7]. Service providers must ensure the optimal quality of the train ticket booking system to create user comfort and satisfaction. User evaluations are needed to measure whether the services provided meet their needs and expectations and support a positive image of the service provider [4].

The measure used in this research is the e-service Quality and Importance Performance Analysis (IPA) method. E-Service Quality is an approach that assesses the quality of electronic services through seven dimensions: Efficiency, Fulfillment, Reliability, Privacy, Responsiveness, Compensation, and Contact [8], [9]. Importance Performance Analysis (IPA) is a customer satisfaction evaluation method that maps service attributes' levels of importance and performance on a two-dimensional graph. IPA helps identify the attributes that most influence customer satisfaction and encourage repeat purchasing behavior, as in the study of the Traveloka and KAI Access applications [10].

The E-Servqual and Importance Performance Analysis (IPA) methods are essential in-service quality research. E-Servqual, specifically for digital services, focuses on system reliability, responsiveness, and security, providing deep insight into quality in a digital context [11]. Service quality is the ability of service providers to meet customer needs through internet facilities, such as websites. Unlike traditional service quality, E-service quality focuses on easy access to information from electronic-based services and involving consumers in service responsibility. In applications such as KAI Access and Traveloka, the determining factors for service quality include Efficiency, Fulfillment, Reliability, Privacy, Responsiveness, Compensation, and Contact. These dimensions were adapted to measure user perceptions of the application and assess recovery services when problems occur, thereby creating an efficient, safe, and responsive experience for users [1]. Meanwhile, IPA offers perspective by comparing customer benefits and the actual performance of a service. By illustrating these relationships, IPA helps organizations prioritize improvements based on urgency and impact on customer satisfaction. IPA enables the development of effective improvement strategies and efficient allocation of resources, focusing on the most crucial aspects for customers [10].

Sari and Suyatno's research evaluate the quality of TikTok Shop services for recommendations for feature improvements. The results show a seven-dimensional gap between user perceptions and expectations, with a score of -0.36, indicating that the TikTok Shop service still needs to meet user expectations fully. The connection with research is the use of the E-Service Quality method, which refers to seven service scales used as research indicators (Efficiency, Fulfillment, Reliability, Privacy, Responsiveness, Compensation, and Contact), and the Importance of Performance Analysis method, which is helpful in assessing service indicators [1].

Irawati and Pibriana's research compared the quality of PT.SHP and PT.TKP e-commerce services. The results show that the two e-commerce applications still need to meet user expectations, with the Reliability dimension being the most significant gap. All measurement dimensions show that user expectations are higher than user perceptions of the services provided. The research is connected to the use of servqual (service quality) analysis on five measurement dimensions: Tangibles, Reliability, Responsiveness, Assurance, and Empathy [11].

Suryawardani and his team's research used electronic service quality and the Kano Model to identify the needs of Tiket.com users. The results show six customer needs attributes, five suggest improvement, and one needs improvement. This research provides guidelines for improving online travel agent services. Related to the research is the e-service quality method, which refers to measurement dimensions, including reliability, responsiveness, fulfillment, ease of use, information, security, and efficiency. Apart from that, this research also focuses on the online travel agent Tiket.com [12].

Saputra and Savitri's research analyzed the performance of the Suroboyo Bus as a public transportation mode based on the satisfaction level of service users using the Importance Performance Analysis (IPA) method. The research results show that the quality of information delivery to passengers is in quadrant I. Use plastic bottle waste as a tool. Payment, CCTV, bench separation, driver quality, presence or absence of bus stops, and cleanliness are in quadrant II. Provision of queue numbers, departure and arrival times, whether or not seats at each bus stop, friendliness and politeness of officers, acceptance of criticism, input, complaints, responsiveness of officers, provision of waste banks, and facilities are in quadrant III. The openness of information from officers, disability friendliness, and officers' appearance are in quadrant IV. The connection with research is using IPA with service quality indicators, including reliability, assurance, empathy, responsiveness, and tangible [13].

Research by Prihartono and his team developed a conceptual model for m-commerce-based applications, especially mobile travel agent applications. The results of this research show that the concept of customer loyalty is explained differently by two groups with different levels of opinion. Customer satisfaction, trust, commitment, and commitment are factors that have a significant impact on customer loyalty. Service providers must also measure service quality to build customer satisfaction and trust. Another result is that variations in income levels can influence the relationships between variables in the research model. The connection with research is that it refers

to service quality indicators: efficiency, reliability or fulfillment, contact, responsiveness, privacy, satisfaction, trust, commitment, customer engagement, monetary experience, utilitarian experience, and customer loyalty [14].

Hamdani and his team's research analyzed the scientific method of determining satisfaction with higher education services in the Purwakarta and Subang areas. The results of this research show that the variables tangible, reliability, responsiveness, and empathy are in quadrant A, which shows that the performance of these variables is lower than the wishes of private university students in the cities of Subang and Purwakarta. The assurance variable is in quadrant D, which shows that performance is high, but student desires are low. The connection with research is that the determining variables of higher education service satisfaction include tangible, reliability, responsiveness, assurance, and empathy [15].

E-Service Quality and Importance Performance Analysis (IPA) complement each other by providing a complete conceptual basis and analysis tool [1]. Both support service development and improvement, especially in digital applications such as KAI Access and Traveloka, to ensure optimal quality and user satisfaction. Through the application of the E-Service Quality method, this research provides a deep understanding of the extent to which the two applications meet customer expectations and identifies areas that require improvement. This understanding is critical to the competitive dynamics between public and private service providers in the transportation industry. Using E-Service Quality and Importance-Performance Analysis (IPA) methods, this research not only evaluates the level of customer satisfaction, but also identifies specific dimensions of service quality that affect the user experience.

The results of this study will provide recommendations for app developers to improve the features and services offered. In addition, this research also makes an important contribution in understanding the impact of digital service quality on user satisfaction in the context of transportation. By analyzing the government's KAI Access application, this research provides public policy implications that can be used by policy makers to formulate more effective strategies in improving the quality of public services in the digital era. Then, this research not only expands knowledge in the field of service quality, but also offers recommendations that can be implemented in the development of digital-based transportation applications.

II. METHODS

A. Research Method and Model

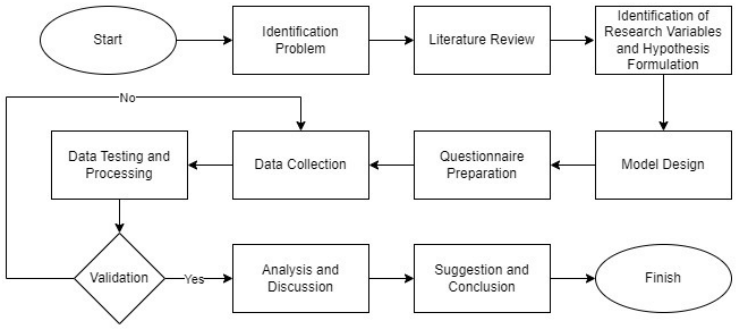

Figure 1. Flowchart of Research Method

This research includes a descriptive focus in the quantitative research category, describing factors or variables without testing the relationship or influence between variables. Data were collected through questionnaires and analyzed statistically without the author's intervention. The initial stage involves case study observations to describe the problem by providing context for the digital banking user experience. This research uses dimensions of the E-Servqual method to construct the questionnaire, allowing quantitative measurement of each dimension. The process also includes testing data's validity and reliability, and conclusions are drawn using the Importance Performance Analysis (IPA) technique, which also guides the formulation of recommendations [16], [17].

B. Sampling

The sample in this study consisted of users of the KAI Access and Traveloka applications. Researchers used a purposive sampling technique, selecting samples based on specific criteria. The Bernoulli formula was used to determine the sample size. This technique ensures that the sample taken is representative in accordance with the research objectives so that the analysis results can accurately describe the condition of the population.

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$$N = \frac{[Z\frac{\alpha}{2}]^2 p.q}{e^2}$$

N = the total of samples
$Z\frac{\alpha}{2}$ = Normal distribution value
p = Proportion of Successful Estimates
q = Proportion of Failed Estimates
q = Fault tolerance

Therefore, to determine the number of respondents can be done as follows:

$$N = \frac{1{,}96^2 x 0{,}5 x 0{,}5}{0{,}05^2}$$
$$N = \frac{0{,}9604}{0{,}0025}$$
$$N = 384.16 \approx 400$$

The sample size is approximately 400 respondents. Thus, researchers used 400 respondents who had used at least one train ticket order via the KAI Access and Traveloka applications and were at least 17 years old.

C. Research Instrument

This research uses primary and secondary data. Primary data was obtained from an online questionnaire by Google Form that was distributed to 400 respondents aged at least 17 who use the KAI Access and Traveloka applications. Secondary data comes from other sources that do not provide data directly to data collectors. The questionnaires have a five-point Likert rating scale to answer questions, ranging from "very unsatisfactory" to "very satisfactory".

D. Data Analysis

Descriptive analysis describes data clearly, forming conclusions that are easy to understand. Researchers use seven dimensions to assess applications, with four core dimensions, include Efficiency, Fulfillment, Reliability, and Privacy, and three dimensions of recovery: Responsiveness, Compensation, and Contact [17]. Using a 1-5 scale questionnaire, we will analyze a minimum of 400 respondents to identify the smallest and largest cumulative values.

The biggest cumulative value = 400 x 5 = 2000
Smallest cumulative value = 400 x 1 = 400

E-Service Quality

After collecting data regarding service quality using the E-Service Quality method through a questionnaire, a CSI assessment was carried out. This assessment includes calculating Mean Importance Scores (MIS), Mean Satisfaction Scores (MSS), Weighted Factor (WF), Weighted Score (WS), Weighted Total (WT), and Customer Satisfaction Index (CSI) [8]. Service Quality Score, or gap analysis, is calculated using a certain formula.

$$Q = P - E$$

Q = Service quality
P = Perception or reality of the service
E = Service expectations

The E-Servqual method was chosen in this study due to its superiority in measuring e-service quality, focusing on the user experience when interacting with digital services. In the context of applications such as KAI Access and Traveloka, both of which are technology-based digital platforms, E-Servqual provides a reliable framework to identify the gap between users' expectations and their perceptions of the quality of service provided [8]. E-Servqual is specifically designed to deal with electronically delivered services, so it fits perfectly with the characteristics of KAI Access and Traveloka. This method allows the research to precisely assess various aspects of the service such as efficiency, reliability, and security-factors that are very important in e-service. One of the main advantages of E-Servqual is its ability to identify gaps between user expectations and perceptions, which is a direct indicator of areas that require improvement. In the transportation app industry, identifying and fixing these gaps is critical to

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improving customer satisfaction and app competitiveness. Some modifications have been made to the E-Servqual dimensions when applied to KAI Access and Traveloka to suit the specific features and services offered by the two apps.

The Q value measures service quality; Positive numbers ($Q \geq 0$) indicate the service meets expectations, while negative numbers indicate the opposite. The Customer Satisfaction Index (CSI) assesses user satisfaction by calculating the Mean Satisfaction Factor (MSS) and Mean Importance Factor (MIS) and then calculating CSI after obtaining the MIS, MSS, WF, and WS values.

$$\text{CSI} = \frac{\text{Total WS}}{\text{Max value of Likert scale}} \times 100\%$$

WS = Weighted Score

The Customer Satisfaction Index (CSI) is used to measure the overall level of user satisfaction, providing a clear index value as a key indicator of customer satisfaction. CSI focuses on the user's perception of the service as a whole and can be used to monitor changes in satisfaction over time. When used in conjunction with IPA, CSI completes the analysis by confirming findings and providing an overview of how improvements will affect overall satisfaction [8]. The combination of IPA and CSI provides a holistic approach in service quality analysis, ensuring effective improvement strategies in increasing application user satisfaction.

Importance Performance Analysis (IPA)

The Importance Performance Analysis method has two stages of data processing: suitability level analysis and quadrant analysis. Conformity level analysis compares service quality with users' level of importance. In contrast, quadrant analysis maps indicators in a Cartesian diagram to identify priorities for improving service quality based on four quadrants.

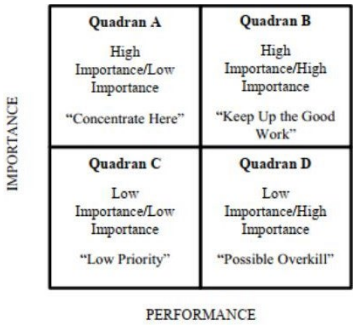

Figure 2. Importance Performance Analysis' Quadrants

By mapping the position of service quality attributes in each quadrant, organizations can determine improvement priorities in an effective and structured manner. Each quadrant provides specific guidance for actions to take. Quadrant I (Concentrate Here) show weak attributes that require immediate improvement. Quadrant II (Keep Up the Good Work) reflects vital attributes that are important to maintain. Quadrant III (Low Priority) contains attributes with low priority, where users are unsatisfied, but the influence is insignificant. Quadrant IV (Possible Overkill) includes attributes that perform well but do not have a significant impact [10].

Importance Performance Analysis (IPA) was chosen for its ability to provide a clear analysis of service performance based on user perceptions and the level of importance they place on certain aspects. IPA facilitates the identification of areas requiring improvement by providing a visualization in the form of a map showing service elements in a performance and importance matrix. This allows researchers to set effective improvement priorities and identify critical areas that require attention [10]. This method is highly adaptive and relevant for various service contexts, including digital services such as KAI Access and Traveloka.

III. RESULT AND DISCUSSION

A. Respondent's Demographic Profile

The questionnaire results obtained with the sample description in this study are as follows.

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TABLE 1.
CHARACTERISTICS OF RESPONDENTS BASED ON GENDER

Variable	Frequency	Percentage (%)
Male	202	59,4
Female	138	40,6
Total	340	100

According to Table 1, the total number of respondents was 340. The majority of respondents were male, 59.4%, or 202 people, while female respondents were 40.6%, or 138 people.

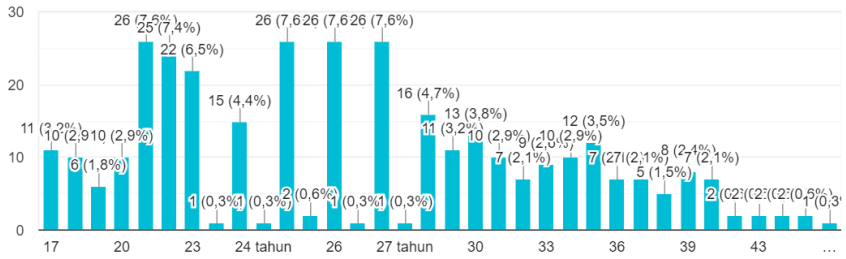

Figure 3. Age of Respondent

According to Figure 3, from a total of 340 respondents, the most dominant ages were 21, 25, 26, and 27 years, with 26 respondents each or the equivalent of 7.6%. Then, 7.4% of respondents were 22 years old. Meanwhile, respondents aged 23 were 6.5%; 4.7% were 28 years old, 4.4% were 24 years old, 3.8% were 30 years old, and 35 years as much as 3.5%. Ages 17 and 29 years each with 3.2%. Ages 18, 20, 31, and 34 years each have a percentage of 2.9%.

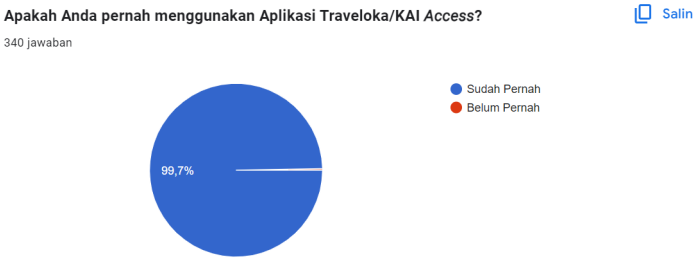

Figure 4. Total active users of KAI Access and Traveloka apps

Figure 4 shows that 99.7% of 340 respondents have used the Traveloka and KAI Access applications

B. Validity and Reliability

Validity testing ensures that a measuring instrument, such as a questionnaire, actually measures what it is intended to measure. The validity of the questionnaire is declared valid if each question effectively explores the variable in question. Correlation coefficients were calculated to assess the level of validity of each item. In addition, reliability testing determines the consistency of the questionnaire in measurement. A Cronbach's Alpha value of more than 0.6 indicates that the questionnaire is reliable. Validity and reliability tests were carried out using SPSS to ensure the reliability of the research data. Validity and reliability test calculation tables are provided for further analysis [18], [19].

TABLE II.
VALIDITY OF KAI ACCESS'S ITEMS

Item	Reality		Result	Expectation		Result
	r-count	r-table		r-count	r-table	
E1	0,485	0.106	Valid	0,442	0.106	Valid
E2	0,401	0.106	Valid	0,418	0.106	Valid
E3	0,494	0.106	Valid	0,456	0.106	Valid
E4	0,356	0.106	Valid	0,520	0.106	Valid
E5	0,469	0.106	Valid	0,460	0.106	Valid
F1	0,558	0.106	Valid	0,563	0.106	Valid
F2	0,572	0.106	Valid	0,419	0.106	Valid
F3	0,547	0.106	Valid	0,401	0.106	Valid
F4	0,625	0.106	Valid	0,563	0.106	Valid

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Item	Reality		Result	Expectation		Result
	r-count	r-table		r-count	r-table	
F5	0,585	0.106	Valid	0,422	0.106	Valid
RE1	0,466	0.106	Valid	0,577	0.106	Valid
RE2	0,552	0.106	Valid	0,435	0.106	Valid
RE3	0,393	0.106	Valid	0,519	0.106	Valid
P1	0,575	0.106	Valid	0,486	0.106	Valid
P2	0,584	0.106	Valid	0,524	0.106	Valid
P3	0,486	0.106	Valid	0,480	0.106	Valid
R1	0,553	0.106	Valid	0,422	0.106	Valid
R2	0,525	0.106	Valid	0,374	0.106	Valid
C1	0,696	0.106	Valid	0,583	0.106	Valid
C2	0,575	0.106	Valid	0,428	0.106	Valid
C3	0,428	0.106	Valid	0,506	0.106	Valid
K1	0,509	0.106	Valid	0,545	0.106	Valid
K2	0,600	0.106	Valid	0,373	0.106	Valid

Table 2 shows the validity test results on the KAI Access variable items. An item is said to be valid if r-count > r-table. All KAI Access variable items are said to have a satisfactory level of validity, with reality items in the range of 0.356 to 0.696 and expectation items in the range of 0.373 to 0.583.

TABLE III.
VALIDITY OF TRAVELOKA'S ITEMS

Item	Reality		Result	Expectation		Result
	r-count	r-table		r-count	r-table	
E1	0,873	0.106	Valid	0,914	0.106	Valid
E2	0,919	0.106	Valid	0,921	0.106	Valid
E3	0,893	0.106	Valid	0,903	0.106	Valid
E4	0,900	0.106	Valid	0,843	0.106	Valid
E5	0,920	0.106	Valid	0,913	0.106	Valid
F1	0,907	0.106	Valid	0,897	0.106	Valid
F2	0,911	0.106	Valid	0,841	0.106	Valid
F3	0,883	0.106	Valid	0,867	0.106	Valid
F4	0,902	0.106	Valid	0,917	0.106	Valid
F5	0,901	0.106	Valid	0,862	0.106	Valid
RE1	0,828	0.106	Valid	0,778	0.106	Valid
RE2	0,857	0.106	Valid	0,869	0.106	Valid
RE3	0,866	0.106	Valid	0,889	0.106	Valid
P1	0,904	0.106	Valid	0,914	0.106	Valid
P2	0,859	0.106	Valid	0,926	0.106	Valid
P3	0,775	0.106	Valid	0,816	0.106	Valid
R1	0,833	0.106	Valid	0,849	0.106	Valid
R2	0,892	0.106	Valid	0,910	0.106	Valid
C1	0,869	0.106	Valid	0,906	0.106	Valid
C2	0,873	0.106	Valid	0,837	0.106	Valid
C3	0,910	0.106	Valid	0,860	0.106	Valid
K1	0,909	0.106	Valid	0,865	0.106	Valid
K2	0,893	0.106	Valid	0,900	0.106	Valid

Table 3 shows the validity test results on the Traveloka variable items. An item is said to be valid if r-count>r-table. So, all Traveloka variable items are said to have a satisfactory level of validity, with reality items in the range of 0.775 to 0.920 and expectation items in the range of 0.778 to 0.926.

If the correlation value is positive and high (above 0.5) between the items in the questionnaire and the total score indicates a strong and unidirectional relationship, indicating that the items consistently measure the same dimension and are valid for service quality assessment. Negative correlations may signal an item's incompatibility with other constructs or measurement of different aspects, which may require revision or deletion of the item. Meanwhile, correlations close to zero signify a lack of significant relationship, suggesting the need for improvement or deletion of the item. Overall, high and positive correlations in the validity test indicate a good measurement instrument, making the analysis reliable and in line with the research objectives [18].

TABLE IV.
RELIABILITY

Variable	Dimension	*Cronbach's Alpha*				Nilai Standar
		Reality	Result	Expectation	Result	
KAI *Access*	*Efficiency*	0,666	Reliable	0,701	Reliable	≥0,6
	Fulfillment	0,682	Reliable	0,730	Reliable	≥0,6
	Reliability	0,636	Reliable	0,742	Reliable	≥0,6
	Privacy	0,633	Reliable	0,697	Reliable	≥0,6
	Responsiveness	0,618	Reliable	0,751	Reliable	≥0,6
	Compensation	0,710	Reliable	0,637	Reliable	≥0,6
	Contact/Kontak	0,629	Reliable	0,704	Reliable	≥0,6

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Variable	Dimension	*Cronbach's Alpha*				Nilai Standar
		Reality	Result	Expectation	Result	
Traveloka	*Efficiency*	0,742	Reliable	0,796	Reliable	≥0,6
	Fulfillment	0,769	Reliable	0,837	Reliable	≥0,6
	Reliability	0,681	Reliable	0,627	Reliable	≥0,6
	Privacy	0,740	Reliable	0,786	Reliable	≥0,6
	Responsiveness	0,661	Reliable	0,669	Reliable	≥0,6
	Compensation	0,756	Reliable	0,762	Reliable	≥0,6
	Contact/Kontak	0,610	Reliable	0,734	Reliable	≥0,6

Table 4 shows the results of the reliability test. An item is said to be reliable if Cronbach's Alpha is 0.6 to 1. All KAI Access reality dimensions show reliable results with a Cronbach's Alpha of 0.618 to 0.710. All dimensions of KAI Access expectations show reliable results with Cronbach's Alpha of 0.637 to 0.751. All Traveloka reality dimensions show reliable results with Cronbach's Alpha of 0.610 to 0.769. All dimensions of Traveloka's expectations show reliable results with Cronbach's Alpha of 0.669 to 0.837.

C. *Service Quality Analysis*

Service Quality analysis uses Gap Analysis to measure the difference between user expectations and reality regarding the KAI Access and Traveloka applications. This analysis aims to assess user satisfaction with service quality. Quality is considered good if the ratio of reality to expectations (Q) ≥ 1 [20].

TABLE V.
SERVICE QUALITY ANALYSIS OF KAI ACCESS

Item	Reality	Expectation	Gap	Q=R/H
E1	4,362	4,650	-0,288	0,938
E2	4,288	4,597	-0,309	0,933
E3	4,400	4,326	0,074	1,017
E4	4,524	4,506	0,018	1,004
E5	4,300	4,229	0,071	1,017
Mean	**4,375**	**4,462**	**-0,087**	**0,981**
F1	4,674	4,671	0,003	1,001
F2	4,156	4,691	-0,535	0,886
F3	4,468	4,174	0,294	1,070
F4	4,682	4,582	0,100	1,022
F5	4,250	4,547	-0,297	0,935
Mean	**4,446**	**4,533**	**-0,087**	**0,980**
RE1	4,515	4,306	0,209	1,049
RE2	4,579	4,474	0,105	1,023
RE3	4,224	4,744	-0,520	0,890
Mean	**4,439**	**4,508**	**-0,069**	**0,985**
P1	4,568	4,235	0,333	1,079
P2	4,597	4,429	0,168	1,038
P3	4,421	4,650	-0,229	0,950
Mean	**4,528**	**4,438**	**0,090**	**1,020**
R1	4,562	4,356	0,206	1,047
R2	4,565	4,285	0,280	1,065
Mean	**4,563**	**4,321**	**0,242**	**1,056**
C1	4,303	4,706	-0,403	0,914
C2	4,335	4,282	0,053	1,012
C3	4,621	4,526	0,095	1,021
Mean	**4,419**	**4,505**	**-0,086**	**0,981**
K1	4,162	4,603	-0,441	0,904
K2	4,438	4,338	0,100	1,023
Mean	**4,300**	**4,471**	**-0,171**	**0,962**

Based on the average reality score, the average of each indicator is in the range of 4.156 to 4.682, which shows that the respondents' reality regarding service quality is in the satisfactory category. Meanwhile, based on the average expectation score, the average of each indicator is in the range of 4.174 to 4.744, which means that respondents' expectations regarding service quality are in a meaningful category. The gap between the average reality and expectations for each item ranges from -0.535 to 0.333. Meanwhile, the Q value or service quality based on the average value of reality and expectations shows 0.886 to 1.079 with a score dominated by 1, where a Q value ≥=1 is said to be good service quality, so the KAI Access quality value can be good.

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TABLE VI. SERVICE QUALITY ANALYSIS OF TRAVELOKA

Item	Reality	Expectation	Gap	Q=R/H
E1	2,994	3,344	-0,350	0,895
E2	2,947	3,297	-0,350	0,894
E3	3,109	3,153	-0,044	0,986
E4	3,085	3,038	0,047	1,015
E5	3,262	3,159	0,103	1,033
Mean	**3,079**	**3,198**	**-0,119**	**0,963**
F1	3,068	3,206	-0,138	0,957
F2	2,988	3,038	-0,050	0,984
F3	3,303	2,991	0,312	1,104
F4	3,179	3,265	-0,086	0,974
F5	3,082	3,126	-0,044	0,986
Mean	**3,124**	**3,125**	**-0,001**	**0,999**
RE1	3,409	3,535	-0,126	0,964
RE2	3,432	3,803	-0,371	0,902
RE3	3,294	3,721	-0,427	0,885
Mean	**3,378**	**3,686**	**-0,308**	**0,916**
P1	3,703	3,541	0,162	1,046
P2	3,391	3,188	0,203	1,064
P3	3,312	3,726	-0,414	0,889
Mean	**3,469**	**3,485**	**-0,016**	**0,995**
R1	3,462	3,494	-0,032	0,991
R2	3,750	3,553	0,197	1,055
Mean	**3,606**	**3,524**	**0,082**	**1,023**
C1	3,541	3,685	-0,144	0,961
C2	3,550	3,459	0,091	1,026
C3	3,721	3,526	0,195	1,055
Mean	**3,604**	**3,557**	**0,047**	**1,013**
K1	3,312	3,585	-0,273	0,924
K2	3,294	2,979	0,315	1,106
Mean	**3,303**	**3,282**	**0,021**	**1,006**

Based on the average reality value score, each indicator has an average range of 2.947 to 3.750, which shows that the respondents' reality regarding service quality is in the unsatisfactory and neutral categories. Meanwhile, based on the average expectation score, each indicator's average is 2.979 to 3.803, which means that respondents' expectations regarding service quality are in the unimportant and neutral categories. The gap between the average reality and expectations for each item ranges from -0.427 to 0.315. Meanwhile, the Q value or service quality based on the average value of reality and expectations shows 0.885 to 1.106 with a score dominated by 0, where a Q value ≥=1 is said to be good service quality, so Traveloka's quality value can be less good.

The gap values in E-Servqual provide important insights into the service performance of the application. A positive gap, where user perceptions exceed expectations, indicates high satisfaction and becomes a competitive advantage. Conversely, a negative gap, where perceptions are lower than expectations, indicates dissatisfaction and areas for improvement. In the efficiency dimension, a positive gap indicates an application that is easy to use, while a negative gap indicates complexity. In reliability, positive gaps reflect reliable information, while negative gaps indicate uncertainty. In privacy, a positive gap means that data security is guaranteed, while a negative gap reflects user concerns. In responsiveness, a positive gap indicates fast service, while a negative gap indicates lack of support. Interpretation of gap values helps identify the strengths and weaknesses of application services, enabling effective quality improvement strategies.

D. Importance Performance Analysis (IPA)

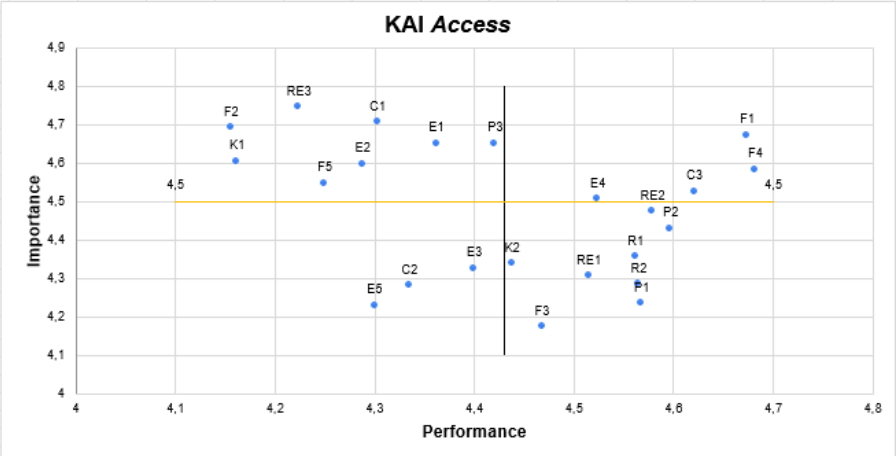

Figure 5. The Cartesian Diagram of KAI Access's Importance Performance Analysis

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According to Figure 5, the indicators have been grouped into four different quadrants, each depicting the specific characteristics of each indicator. The following is an explanation for each quadrant:

- Quadrant I (*high importance and low performance*)
  Indicators E1, E2, F2, F5, RE3, P3, C1, and K1 provide an overview of the quality and responsiveness of an application in dealing with user needs and problems. The efficiency variable has two indicators, namely E1 and E2. Then, the fulfillment variable has two indicators, namely F2 and F5. The reliability variable only has one indicator, namely RE3. Then, there is one indicator for the privacy variable, namely P3. In the compensation variable, there is one indicator, namely C1. Meanwhile, in the contact variable, only one indicator, namely K1. Those indicators show that the importance of user needs is high while the performance of the KAI Access application is low or does not meet user expectations.
- Quadrant II (*high importance and high performance*)
  Indicators E4, F1, F4, and C3 provide a comprehensive picture of various aspects of quality and user experience using the KAI Access application. First, the E4 indicator assesses that the KAI Access application features are well organized and easy for users to use. The fulfillment variable has two indicators, namely F1 and F4. Then, the compensation variable only has one indicator, namely C3. These indicators explain that the needs and performance of KAI Access application users align with user expectations. Therefore, the indicators in quadrant II are factors whose performance must be maintained.
- Quadrant III (*low importance and low performance*)
  Indicators in quadrant III show low user satisfaction and are considered less critical, even though they are essential for increasing overall user satisfaction. One is the C2 indicator, which highlights the importance of procedures or transaction instructions in avoiding errors when making transactions in the KAI Access application. However, this procedure's performance could be better because many users still experience errors, so improvements are needed to make it easier for users to understand. In addition, the E5 indicator provides notifications to users entirely and quickly.
- Quadrant IV (*low importance and high performance*)
  Quadrant IV indicators for the KAI Access application include completeness of transaction evidence (F3), ease of finding information (R2), responsiveness to problems (R1), and transaction and data protection (P1). Even though this application is safe, users may need to use more security features because they are used to safe online payment methods and rarely use the application. Developers need to improve security features to maintain user trust continuously. Apart from that, K2 explained the ease of information and refund features and the 'Help Center' feature for application explanations.

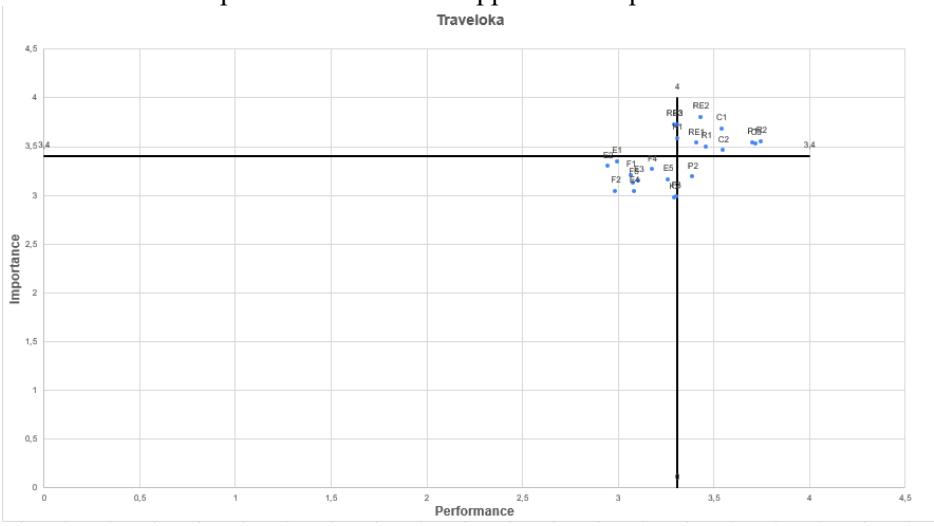

Figure 6. The Cartesian Diagram of Traveloka's Importance Performance Analysis

According to Figure 6, the indicators have been grouped into four different quadrants, each depicting the specific characteristics of each indicator. The following is an explanation for each quadrant:

- Quadrant I (*high importance and low performance*)
  The RE3, P3, and K1 indicators describe the quality and responsiveness of the application to user needs. The RE3 indicator in the reliability variable emphasizes the consistency of payment system transaction procedures. P3 on the privacy variable highlights the need for continuous monitoring and improvement of application security and quality. Meanwhile, K1 in the contact variable emphasizes the importance of

adequate contact options. These three indicators show that user needs are high, while the Traveloka application performance is still low or inadequate.

- Quadrant II (*high importance and high performance*)
  The indicators RE1, RE2, P1, R1, R2, C1, C2, and C3 provide a comprehensive of the quality and user experience of the Traveloka application. R2 assesses the ease of finding problem information, while R1 emphasizes responses to problems and solutions. RE1 and RE2 focus on satisfaction regarding refund and schedule change features. P1 protects personal information, and C1 to C3 covers compensation related to offers, refunds, and transaction errors. This quadrant shows that the application's needs and performance meet user expectations.
- Quadrant III (*low importance and low performance*)
  Quadrant III indicators, such as E1 to E5, F1 to F5, and K2, show low user satisfaction and are less critical, although essential for overall improvement. E4 highlights the need for organized features, but performance is low due to user error. K2 highlights the importance of 'Help Centres', which are also less effective in providing solutions. Indicators F1-F5 focus on meeting information needs such as seat availability and discounts, which need to be improved for a better user experience.
- Quadrant IV (*low importance and high performance*)
  Quadrant IV has only one indicator, P2, in the privacy variable. This indicator focuses on the security and accessibility of user accounts to prevent misuse. This indicator ensures users can access accounts on the Traveloka application safely and efficiently and meets user security expectations. Quadrant IV shows that user needs are low, and application performance is adequate, so this indicator does not need to be improved.

In Importance Performance Analysis (IPA), results from applications such as KAI Access and Traveloka are mapped into four quadrants based on importance and performance. Quadrant I (Concentrate Here) signify aspects that are very important but low in performance. If KAI Access or Traveloka is here, improvements in this area should be a priority. Quadrant II (Keep Up the Good Work) indicates that the app has met or exceeded user expectations in important aspects, where the two apps may be in close competition. Quadrant III (Low Priority) indicates less important aspects with low performance, so improvements are not a priority. While quadrant IV (Possible Overkill) shows good performance on aspects that are not very important, so they can be allocated to other aspects. Similarity of position in the quadrants indicates that both applications have similar strengths and weaknesses, competing in the same areas. Differences in position indicate that one app may be superior or weaker in meeting user expectations on certain aspects, which can be a competitive advantage if the application manages to excel in important areas. The Strategic Implications of the Application Position on the IPA Quadrant are as follows:

- Quadrant I (*high importance and low performance*): Applications that are in this quadrant must immediately improve their performance on this dimension, as this is an area that is very important to users but has not met expectations. Improving performance in this area should be a top priority to avoid losing users.
- Quadrant II (*high importance and high performance*): Applications that are in this quadrant should maintain high performance in these aspects. Ensuring that services remain consistent and high quality will help in maintaining customer loyalty and strengthening the competitive position.
- Quadrant III (*low importance and low performance*): While improvements in these areas may not be very urgent, the application may consider allocating them to other more critical areas. However, these aspects should still be monitored to ensure that performance does not drop too far, which could have a negative impact if user conditions or priorities change.
- Quadrant IV (*low importance and high performance*): Applications in this quadrant may need to revisit their user expectations. Excellent performance on less important aspects may not add significant value to users, so excessive expectations can be redirected to areas that need more improvement or development.

The position of the two apps in the IPA quadrant provides important insights into the strategic priorities that app developers should take. Apps that can improve performance in critical areas (Quadrant I) and maintain excellence in key areas (Quadrant II) will have a greater chance of increasing user satisfaction and loyalty. Meanwhile, apps should also consider efficiency in resource allocation by not focusing too much on less important areas (Quadrant IV).

E. The Comparison of Customer Satisfaction Index

TABLE 7.
COMPARISON OF CUSTOMER SATISFACTION INDEX

Item	*Weight Score* (WS)	
	KAI *Access*	Traveloka
E1	19,71032	12,93331
E2	19,15510	12,55136
E3	18,49670	12,66299
E4	19,80929	12,10695
E5	17,67100	13,31145
F1	21,21552	12,70605
F2	18,94506	11,72627
F3	18,12261	12,76194
F4	20,84690	13,40804
F5	18,77885	12,44553
RE1	18,89239	15,56711
RE2	19,90773	16,86030
RE3	19,47259	15,83343
P1	18,79899	16,93836
P2	19,78496	13,96490
P3	19,97692	15,94134
R1	19,31071	15,62578
R2	19,00845	17,21148
C1	19,67788	16,85602
C2	18,03810	15,86246
C3	20,32383	16,94859
K1	18,61650	15,33809
K2	18,70820	12,67610

Based on the table above, compare the Weight Score (WS) for various service items between the two applications, namely KAI Access and Traveloka. KAI Access generally shows a higher Weight Score for almost all items than Traveloka, which means that KAI Access users rate the service quality of the application as higher than Traveloka. For example, in item E1, KAI Access has a WS of 19.71052, while Traveloka only has 12.95331. Apart from that, there are several items where the difference in Weight Score is very striking. For example, in item E2, KAI Access has a WS of 19.1551, while Traveloka has a much higher WS of 324.5243. It indicates a significant imbalance in perceived service quality between the two applications on certain items. This striking difference must be analyzed further to understand the factors influencing user ratings.

Although KAI Access generally shows a higher Weight Score, there are some items where Traveloka has a competitive WS. For example, in item K1, KAI Access has a WS of 18.6165, while Traveloka has almost the same value, 13.38589. This shows that users also appreciate the quality of Traveloka's services in several aspects. Although KAI Access generally excels in assessing service quality, there are certain areas where Traveloka can still compete and perhaps even excel.

Based on the Importance Performance Analysis (IPA) analysis, there were significant differences between KAI Access and Traveloka in the placement of indicators in the four main quadrants. KAI Access has more indicators in Quadrant 1, indicating that some aspects important to users still need improvement. Traveloka, on the other hand, has a better performance with most indicators in Quadrant 2, reflecting its ability to meet user expectations. Both apps share some weaknesses in Quadrant 3, while in Quadrant 4, they show strengths in less critical areas to users. Overall, Traveloka excels in meeting user expectations, while KAI Access needs to focus on improving in critical areas.

F. Discussion

The following analysis of the discussion by comparing the results of research that has been done before is as follows:

1. This research identifies the Customer Satisfaction Index (CSI) value on Traveloka, which is 20%, indicating that the level of user satisfaction is in a very bad category. When compared to research conducted by A. Angelinaa, D. Y. Hardiyanti, and D. Lestarini on the Pegipegi application [8], resulting in a Customer Satisfaction Index (CSI) value of 26%, indicating the level of user satisfaction in the same category. Both indicate that although the application tries to provide the best service, there are still significant shortcomings that must be corrected. In the context of e-commerce, these findings emphasize the importance of continuous improvement in the service aspect, especially by focusing on the core dimensions of service quality, so that the application can meet and exceed user expectations.
2. This research identifies the importance of the efficiency dimension that it is not only about service speed but also includes aspects of overall user comfort in increasing user satisfaction with travel e-commerce services. In comparison with research conducted by A. Angelinaa, D. Y. Hardiyanti, and D. Lestarini [8], it shows that efficiency is a determining factor in customer preference for e-commerce travel agents. In [8], it is also highlighted that e-commerce travel agents are chosen by customers because of their ease of use, speed of access, and provision of fast and detailed notifications.
3. This research also compares the gap analysis between KAI Access and Traveloka. In the table, Traveloka tends to have a more negative gap value compared to KAI Access, especially in items E1 (Efficiency), E2, and RE3 (Reliability), indicating that Traveloka has a greater gap in meeting user expectations than KAI Access. When compared to research conducted by A. Angelinaa, D. Y. Hardiyanti, and D. Lestarini [8], all items have a negative gap value, indicating that users' expectations of application service quality are higher than their perceptions after using the application. The dimension with the largest gap is item X6.1 (Compensation) with a gap value of -0.65079, which indicates significant dissatisfaction with the compensation provided by the application. Other dimensions, such as Responsiveness (X5.3) and Fulfillment (X3.3), also show sizable gaps with gap values of -0.38095 and -0.56349 respectively, which identify important areas that need improvement. Therefore, while the main priority of improvement may be on Traveloka, the quality of KAI Access also needs to be continuously maintained and improved.

IV. CONCLUSION

Research regarding the service quality of the KAI Access and Traveloka applications shows significant differences in various dimensions according to the E-Servqual and Importance Performance Analysis (IPA) methods. Based on a Gap Analysis with 340 respondents, both applications need improvement because they still need to meet user expectations. However, IPA analysis reveals that Traveloka has succeeded in meeting important user expectations, while KAI Access needs to improve critical areas to increase user satisfaction and meet higher expectations. This research provides valuable insights for application developers to understand user needs and indicate improvement priorities based on perceived importance and performance.

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