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A Local-level App vs A National-level App: Evaluation of M-Grocery Apps From The UX and The Service Performance Perspective

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Abstract

In Indonesia, the increase in internet users, reaching 215.63 million in 2022-2023, has facilitated the growth of mobile shopping applications like Sayurbox and Beceran, which cater to daily needs such as groceries and fresh food items. Despite receiving high user ratings, these applications face technical issues that could impact user satisfaction and company revenue. This study aims to evaluate the service quality and user experience of the Sayurbox and Beceran applications using the M-S-QUAL and UX Benchmarking methods. The M-S-QUAL method assesses service quality across nine dimensions, while UX Benchmarking evaluates user satisfaction, ease of use, error counts, success rates, and task completion times. The results of UX Benchmarking reveal that Sayurbox has fewer errors and higher user satisfaction compared to Beceran, which has faster loading times but more errors. The M-S-QUAL analysis indicates that both applications have negative gap values in most service attributes, with Sayurbox performing slightly better than Beceran. Sayurbox received a score of -0.25 for the value gap on the M-S-QUAL scale, while Beceran received a score of -0.41 for the value gap.

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INTRODUCTION

The basic needs of food, clothing, and shelter are essential for human life, typically fulfilled through shopping activities [1]. Nowadays, shopping can be done online due to technological advancements in the current industrial era [2]. This advancement is evident with the increase in internet users in Indonesia, reaching 215.63 million in 2022-2023, according to the Indonesian Internet Service Providers Association (APJII). The proximity of the Internet to daily life, including online shopping, known as M-commerce, is a result of these technological advancements [3].

M-commerce refers to business activities conducted via mobile devices and the Internet, encompassing various shopping applications that assist in meeting daily needs [4]. Examples include Beceran and Sayurbox, applications used for purchasing kitchen supplies, vegetables, and other fresh food items. Sayurbox has been downloaded over a million times on Google Playstore, with a rating of 4.8/5 from 34,000 reviewers, while Beceran has over 5,000 downloads, mainly by local residents around Purbalingga, also with a rating of 4.8/5.

Despite their high ratings, both applications face technical issues reported by users. These issues need to be addressed promptly, as they can impact the company's revenue [5]. Reviews on Google Playstore reveal complaints about Sayurbox, such as delayed deliveries, unresponsive customer service, incorrect items delivered, long buffering times, unclear information display, and payment errors. Beceran faces issues like limited payment methods, restricted delivery times, unsatisfactory item

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freshness, bugs, and long buffering times. Users have also directly complained about login/signup errors and higher product prices compared to physical markets. To maintain user loyalty, Sayurbox and Beceran need to be managed and regularly evaluated [6]. Failure to address these issues may lead to a decline in users and financial problems, similar to the case of the Tumbasin app, which shut down in 2023 due to persistent service quality issues [7]. Wise companies regularly evaluate their service quality to ensure customer satisfaction, as it is crucial for business sustainability [8]. Electronic service quality evaluation can be conducted using Electronic Service Quality (E-ServQual) and Mobile Service Quality (M-S-QUAL) methods. E-ServQual measures the quality of web-based electronic services [9], while M-S-QUAL assesses the quality of mobile applications specifically [10]. Given its comprehensive dimensions, this study will use M-S-QUAL to measure the service quality of the Sayurbox and Beceran applications.

Furthermore, user experience (UX) must be assessed since user discomfort can result from UX designs that do not take user perspectives into account [11]. UX measurement methods include the Think Aloud Protocol and User Experience (UX) Benchmarking. The Think Aloud Protocol involves users verbally expressing their thoughts while using the system [12]. UX Benchmarking measures task success rates, user satisfaction, error rates, and user feedback, comparing these metrics with other applications [13]. Therefore, this study will use the UX Benchmarking method to evaluate the user experience of the Sayurbox and Beceran applications. The aim of this research is to determine the results of user experience measurements on Beceran and Sayurbox using the UX Benchmarking method, as well as to assess the service quality of these applications using the M-S-QUAL method. The benefit of this research is to identify appropriate improvement recommendations to enhance service quality and user experience using M-S-QUAL and User Experience Benchmarking for the Beceran and Sayurbox applications. The research was conducted using qualitative methods, with the results obtained through interviews with local residents of Purbalingga who served as respondents.

METHODS

The methods used in this research are qualitative descriptive methods. The purpose of this descriptive study is to make the description and picture factual and accurate regarding the facts, properties, and relationships between the phenomena investigated. According to [14], qualitative research is characterized by reporting results through detailed descriptions, direct quotes from interviews, and interpretative commentary. Moreover, researchers should carefully record what happens in the setting by writing field notes and interview notes, as well as by collecting other kinds of documentary evidence.

Mobile Service Quality (M-S-QUAL)

Mobile Service Quality (M-S-QUAL) is a measurement tool used to assess the service quality of information systems or the performance of mobile applications specifically for their users [10]. According to [15], M-S-QUAL is an extension of E-S-QUAL, requiring its measurement dimensions to be adjusted to aspects inherent in mobile devices. This evolution from E-S-QUAL to M-S-QUAL has been driven by the increasing use of mobile devices over the years and the applications that help users achieve specific goals [16]. By adjusting these dimensions, service quality measurement on mobile devices can be conducted accurately and appropriately. The dimensions of M-S-QUAL are efficiency, system availability, content, privacy, fulfilment, responsiveness, compensation, contact, and billing [17]. Here is a table containing the M-S-QUAL dimensions and the statement attributes used in this research.

Table 1. Instrument of M-S-QUAL

Dimension	Questions
Efficiency	The application is well-organized (EF1) The application loads pages quickly (EF2) The application is easy to use (EF3) The application makes it easy for me to find the food items I need (EF4)
System Availability	This application always runs smoothly when used (SA1) This application can be opened easily (SA2) The pages in this application continue to run smoothly when I input information (SA3)
Content	This application provides content that matches the actual product (C1) This application provides product information that is easy for me to understand (C2) This application provides comprehensive content (C3)
Privacy	This application protects information related to important data that I use for payments (P1) This application does not disclose my shopping history (P2) I am confident that this application does not disclose my personal information to others (P3)
Fulfillment	This application delivers the products according to my order (F1) This application delivers my order as per the informed schedule (F2) This application provides product offers without causing me any loss (F3) The product delivery is conducted promptly (F4) The delivery status information is provided timely (F5)
Responsiveness	This application provides customer service contact (R1) This application can handle product complaint issues well (R2) This application has online customer service available (R3)
Compensation	The application provides compensation if the delivered products do not match my order (CP1) The application provides a service for reporting if the sold products are illegal (CP2)
Contact	This application provides contact numbers to communicate with the application's representatives (CT1) This application offers online/offline customer service (CT2) This application responds to customer inquiries/complaints in a friendly manner (CT3)
Billing	This application provides easy payment procedures and payment confirmation (B1) This application provides information related to purchase details (B2) This application offers various payment methods (B3) The prices of products available on this application are still affordable (B4) The payment process can be done easily and quickly (B5)

User Experience Benchmarking

User Experience (UX) is the combination of all behaviors and attitudes exhibited by individuals when interacting with a product [18]. A benchmark is a standard or reference point used to compare or evaluate an object [18]. Benchmarking becomes an essential aspect in achieving continuous improvement through ongoing processes such as measurement, comparison, and continuous improvement to attain sustainable competitive advantage [19]. User Experience Benchmarking is one of the usability measurement methods that is conducted by evaluating users' experiences with a product or service using metrics to gauge its relative performance against predetermined standards [20]. In UX Benchmarking, there is an approach called the heart framework, which is used to measure the quality of a product's success. Within the heart framework, five variables are utilized: happiness, engagement, adoption, retention, and task success [21]. From the five variables, 2-4 variables can be selected to be used as measurement metrics in UX Benchmarking [22].

Data Collection and Sample Data

Data collection begins by identifying respondents who use the Beceran and Sayurbox applications and meet the respondent criteria. The respondents are then given instructions to perform predetermined tasks. Data collection is carried out using the user experience benchmarking method, which involves selected metrics from the HEART Framework, including satisfaction rating, ease of use, average time on task, error count, success rate, and time on task. Subsequently, respondents will be given a questionnaire containing questions aligned with the M-S-QUAL dimensions, where they will provide

answers based on their perspectives of the two applications. Once the M-S-QUAL data is collected, validity and reliability tests will be conducted to determine the accuracy and consistency of the measurement tool used. The criteria for the validity test are if r_calculated≥r_table (two-tailed test, significance level 0.05), the collected data can be considered valid. Conversely, if r_calculated<r_table, it is considered invalid [23]. The reliability test criterion is that if Cronbach's alpha value is greater than 0.6, the data can be considered reliable [23]. The sample selection technique used in this research is purposive sampling because it analyzes data from respondents in a population that meets specific criteria defined by the researcher [24]. Using this technique, the researchers obtained 30 respondents for the data analysis.

RESULT AND DISCUSSION

Validity Test

The questionnaire that was distributed to 30 respondents who are the users of Beceran and Sayurbox tested the validity by performing a comparison between the r calculate and r table where the r table value obtained from the r product moment table with the significance level of 5% with n = 30, that can be seen on Table 1 and Table 2. The r table value for Df = 28 (Df = n-2) is 0.361. If r_calculated ≥ r_table, then the question item of the questionnaire is valid. On the contrary, if r_calculated < r_tablethen the question items of the questionnaire are not valid. Therefore, each item in question of the service attribute assessed should have a value above 0.361 in order to be valid. The validity test conducted revealed that all M-S-QUAL attributes used have values above 0.361, thereby confirming the validity of all attributes.

Reliability Test

The reliability test in Table 4 of this research utilized Cronbach's Alpha coefficient. Based on the values obtained for each service attribute regarding the actual and expected levels, where all items have a Cronbach's Alpha value above 0.6, each disseminated question item can be considered reliable for the researcher to proceed to the next step. The reliability test conducted revealed that all the M-S-QUAL attributes used have values above 0.6, indicating that all the attributes can be considered reliable.

Calculation of User Experience Benchmarking

The data analysis using the UX Benchmarking method is conducted on the known average values of the total duration of application usage for each task scenario, the number of errors in each application, user satisfaction scores, and user-friendliness scores of both applications. The average values are shown in Table 2.

Table 2. Calculation of User Experience Benchmarking

Criteria	Beceran	Sayurbox
Average Time T1 (second)	19	32
Average Time T2 (second)	90	122
Average Time T3 (second)	42	61
Average Time T4 (second)	15	22
Average Time Total (second)	166	238
Success Rate	100%	100%
Error Count	23	9
Average User Satisfaction	3	4
Average Ease of Use	4	4

Moreover, interviews with respondents about their experiences using both applications were conducted. For the Beceran application, respondents highlighted advantages such as fast task time, ease of understanding, and a simple interface. On the other hand, the Sayurbox application was praised for having more comprehensive features, a wider range of products, a more attractive interface, various payment methods, and a dedicated discount section. Respondents also pointed out several drawbacks of

the Beceran application. These include incomplete features, an unappealing design, a limited range of products, a lack of location selection features, limited payment methods, restricted service areas, and limited delivery times. On the other hand, the Sayurbox application was noted for its slow loading times, high shipping costs, limited delivery times, and restricted delivery areas. These explanations can be seen in Figure 1.

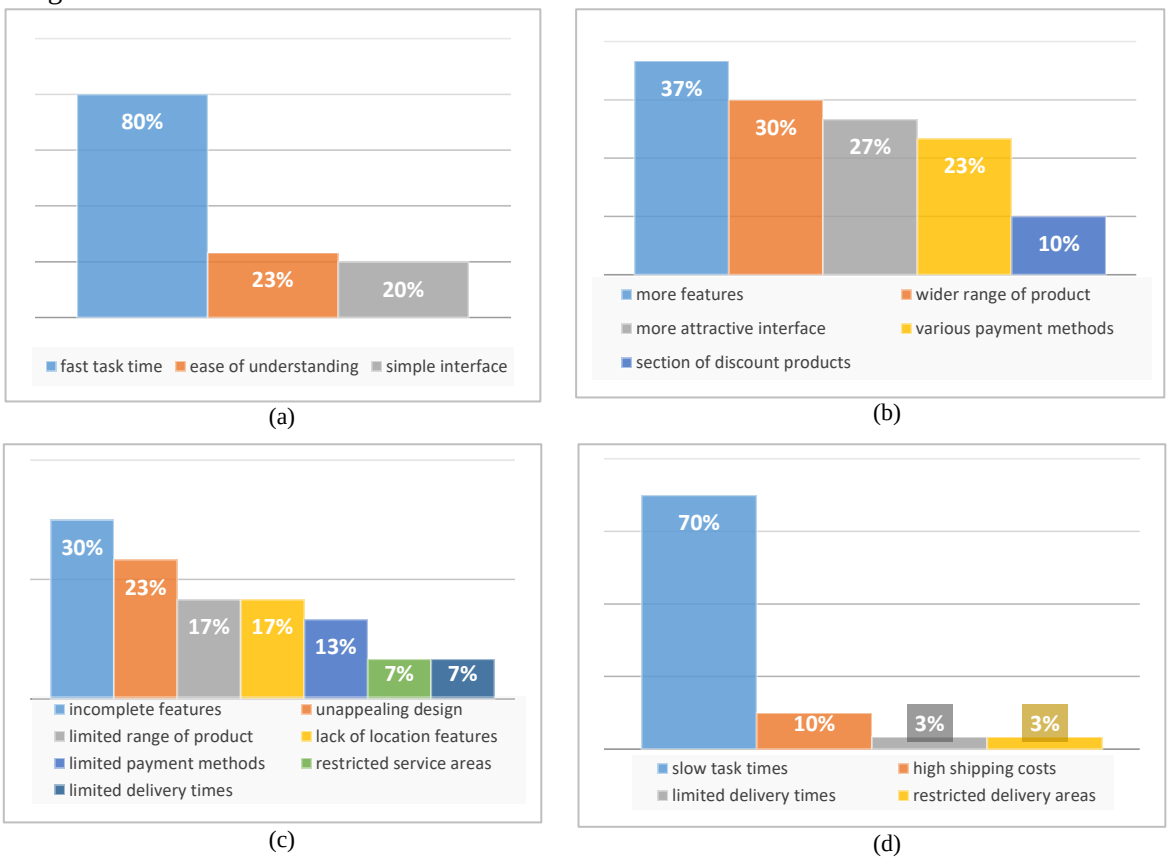

Figure 1. Result of respondents' interview on (a) Advantages of Beceran; (b) Advantages of Sayurbox; (c) Deficiencies of Beceran; (d) Deficiencies of Sayurbox

The results of the UX Benchmarking measurements for both applications are shown in Figure 2. Based on Figure 2, the user experience results for the Beceran and Sayurbox applications vary significantly. The Beceran application has a faster task time compared to Sayurbox, but it also has a higher number of errors than Sayurbox. The average user satisfaction score for the Beceran application is lower than that of Sayurbox. However, the average scores for ease of use and success rate are the same for both applications.

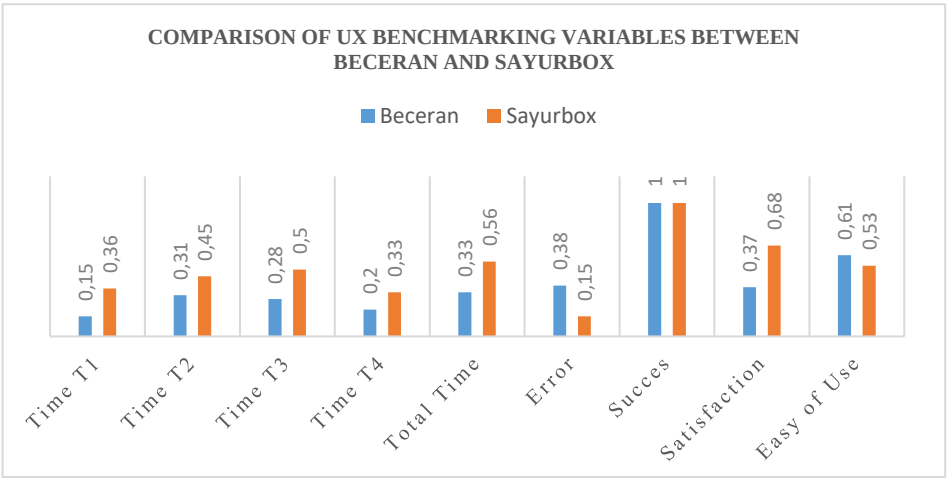

Figure 2. Comparison of UX Benchmarking Variables Between Beceran and Sayurbox

Calculation of M-S-QUAL

Data analysis in the M-S-QUAL method is conducted to determine the performance and importance values of the service quality statement attributes in the Beceran and Sayurbox applications. The performance and importance values are obtained from respondents' perceptions regarding the service quality of both applications. The collected data is then processed by summing all Likert scale points for each statement attribute from each respondent to obtain the final summation results of those attribute values. From the total points, calculations are made for performance and importance values by dividing the sum by the number of respondents in the study, which is 30 respondents. The assessment results for performance and importance in the Beceran and Sayurbox applications are shown in Table 3.

Table 3. Calculation of M-S-QUAL for Beceran and Sayurbox

Attribute	Beceran			Sayurbox		
	Actual	Expectation	Gap	Actual	Expectation	Gap
E1	4.37	4.47	-0.10	4.40	4.47	-0.07
E2	4.40	4.50	-0.10	4.00	4.40	-0.40
E3	4.37	4.73	-0.37	3.97	4.50	-0.53
E4	4.47	4.47	0.00	4.10	4.47	-0.37
SA1	3.83	4.50	-0.67	4.13	4.60	-0.47
SA2	4.43	4.53	-0.10	4.20	4.53	-0.33
SA3	3.90	4.53	-0.63	4.13	4.50	-0.37
C1	4.23	4.57	-0.33	4.13	4.43	-0.30
C2	4.20	4.50	-0.30	4.23	4.50	-0.27
C3	4.40	4.40	0.00	3.97	4.23	-0.27
P1	4.23	4.40	-0.17	4.10	4.40	-0.30
P2	4.37	4.47	-0.10	4.13	4.50	-0.37
P3	4.23	4.40	-0.17	4.17	4.40	-0.23
F1	4.17	4.47	-0.30	4.40	4.47	-0.07
F2	3.90	4.33	-0.43	4.13	4.40	-0.27
F3	4.50	4.37	0.13	3.93	4.37	-0.43
F4	3.63	4.43	-0.80	3.97	4.43	-0.47
F5	3.80	4.50	-0.70	4.60	4.50	0.10
R1	4.50	4.57	-0.07	4.37	4.57	-0.20
R2	3.60	4.17	-0.57	4.07	4.17	-0.10
R3	4.10	4.40	-0.30	4.00	4.43	-0.43
CP1	3.90	4.40	-0.50	4.40	4.40	0.00
CP2	3.83	4.23	-0.40	4.40	4.23	0.17
CT1	4.40	4.43	-0.03	4.40	4.50	-0.10
CT2	4.23	4.50	-0.27	4.23	4.50	-0.27
CT3	3.67	4.43	-0.77	4.23	4.43	-0.20
B1	2.33	4.33	-2.00	4.00	4.33	-0.33
B2	4.57	4.70	-0.13	4.53	4.70	-0.17
B3	2.13	4.40	-2.27	4.40	4.40	0.00
B4	4.33	4.47	-0.13	4.03	4.37	-0.33
B5	4.43	4.60	-0.17	4.17	453	-0.37
mean		-0.41			-0.25	

The calculation results of the gap values for the service quality of the Beceran application indicate that most statement attributes have negative gap values. Only three statement attributes have positive gap values, namely EF4 and C3 attributes with a gap value of 0, and F3 attributes with a gap value of 0.13. The calculation results of the gap values for the service quality of the Sayurbox application indicate that most statement attributes have negative gap values. Only four statement attributes have positive gap values: attribute CP1 and B3 with a gap value of 0, attribute F5 with a gap value of 0.10, and attribute CP2 with a gap value of 0.17. Based on the results obtained using the M-S-QUAL method for the Beceran and Sayurbox applications, the service quality of both applications does not yet meet user expectations [17]. For the Beceran application, only three attributes have a positive gap value, while 28

attributes have a negative gap value. In the Sayurbox application, only four attributes have a positive gap value, while 27 attributes have a negative gap value. In both applications, there are ten attributes with the lowest gap values that will be prioritized for performance improvement [25]. For the Beceran application, these attributes are B3, B1, F4, CT3, F5, SA1, SA3, R2, CP1, and F2. For the Sayurbox application, the attributes are EF3, F4, SA1, R3, F3, EF2, EF4, SA3, P2, and B5.

Improvement Recommendations

In order to enhance user experience, there are several recommendations for developers of the Beceran and Sayurbox applications. For the Beceran application, suggestions include evaluating and optimizing the application code, enhancing server specifications, completing product information, adding a dedicated section for discounted products, updating the visual design for a more appealing look, introducing a user tutorial feature, and providing an application for iPhone users.

Meanwhile, for the Sayurbox application, improvement recommendations include code evaluation and optimization, periodic checks on OTP code lists that have not been sent or failed to send, and analyzing API connections. Based on the results obtained using the M-S-QUAL method for the Beceran and Sayurbox applications, the service quality of both applications does not yet meet user expectations. Here is the table containing improvement recommendations for M-S-QUAL aspects

Table 4. Improvement Recommendations for Beceran

Beceran			
Attributes Code	Attributes Name	Gap Value	Improvement Recommendations
B3	Various payment methods	-2.27	Adding more payment method options with e-wallets such as Shopeepay, Gopay, Ovo, and Dana.
B1	Easy payment procedures and payment confirmation	-2.00	Automated payment system integration and payment confirmation.
F4	The products are delivered quickly	-0.80	The addition of same-day delivery and instant delivery options.
CT3	This application responds to consumer complaints in a friendly manner	-0.77	Creating Standard Operating Procedures (SOP) for Handling Customer Complaints
F5	Delivery status information is provided promptly	-0.70	The delivery status information can be sent automatically by the driver.
SA1	The application always runs smoothly during use	-0.67	Review the lines of code in several functions of the application.
SA3	The pages in this application continue to run smoothly when I input information	-0.63	The location Selection page can be designed as a single form.
R2	This application can handle product complaints effectively	-0.57	Add a feature for product returns in the application.
CP1	The application provides compensation	-0.50	Include clear provisions regarding compensation.
F2	The application delivers my order according to the schedule that has been informed.	-0.43	Add detailed information regarding the product delivery schedule.

The service quality score for the Beceran application across nine dimensions is -0.41, while the Sayurbox application received a score of -0.25. These results indicate that the service quality of the Sayurbox application is better than that of the Beceran application. Respondents noted that there are several service features available on Sayurbox that are absent on Beceran. For example, Sayurbox offers delivery times from 05:00 to 18:00 WIB, whereas Beceran only offers delivery from 07:00 to 11:00 WIB. Additionally, Sayurbox uses sturdy cardboard packaging with bubble wrap to ensure the safety and hygiene of the delivered products, while Beceran only uses plastic bags without bubble wrap.

Sayurbox also provides a refund feature if the received products do not match the order, a feature that Beceran does not offer.

Table 5. Improvement Recommendations for Sayurbox

Sayurbox			
Attributes Code	Attributes Name	Gap Value	Improvement Recommendations
EF3	This application is easy to use	-0.53	Add a video tutorial feature for using the application.
F4	The products are delivered quickly	-0.47	The addition of same-day delivery.
SA1	The application always runs smoothly during use	-0.47	Review the lines of code in several functions of the application.
R3	This application provides online customer service	-0.43	Add a chat feature for Sayurbox admin.
F3	This application provides product offerings without causing me any losses	-0.43	The appearance of pop-up offers can be reduced.
EF2	This application loads pages quickly	-0.40	Check the API connection in the application and analyze the queries in the backend.
EF4	This application makes it easy for me to find the groceries I need	-0.37	Add the "favourite" feature.
SA3	The pages in this application continue to run smoothly when I input information	-0.37	Check the API connection in the application and analyze the queries in the backend.
P2	This application does not share my shopping history	-0.37	Add privacy settings option.
B5	The payment process can be done easily and quickly	-0.37	Optimization of the payment system runs smoothly.

CONCLUSION

The analysis results of M-Commerce Beceran and Sayurbox using the nine dimensions of M-S-QUAL indicate that, on average, respondents feel that the service quality of both applications still does not meet their expectations. However, both applications still have advantages in terms of usability, where Beceran excels in fast loading times, and Sayurbox excels in attractive visual design and comprehensive features. The existing results from users of both applications can be used as feedback for the evaluation and development of the Beceran and Sayurbox applications to better meet user desires and expectations. For future research, data analysis could integrate the Importance Performance Analysis (IPA) method into M-S-QUAL measurement to identify attributes that need to be prioritized for improvement according to the quadrant rules in the IPA method. This study has limitations in that respondents are only from Central Java, so these results do not represent the entire Java Island region.

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