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Benchmarking User Experience on Mobile Banking Applications in Indonesia: A Comparative Study Using the User Experience Questionnaire

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ABSTRACT

Intense competition in digital banking services demands the optimization of User Experience (UX); however, the UX quality across mobile banking applications has not yet been comprehensively mapped. This study conducts a comparative analysis of mobile banking applications in Indonesia through a preliminary observation using a purposive sampling technique. The evaluation was carried out using the User Experience Questionnaire (UEQ) to measure six UX dimensions, with reliability testing confirming that the instrument was reliable. The results show all applications achieved positive scores across the six UEQ dimensions. BRImo (BRI) ranked highest overall, particularly in the efficiency (2.225) and dependability (2.188) dimensions, BNI Mobile Banking excelled in the novelty dimension, with the highest score (2.088). In addition, BNI Mobile Banking recorded higher efficiency (2.113) and dependability (1.913) scores compared to Livin' by Mandiri and BCA Mobile. Meanwhile, BCA Mobile outperformed Livin' by Mandiri in the perspicuity (1.988) and stimulation (1.925) dimensions, whereas Livin' by Mandiri only surpassed BNI Mobile Banking and BCA Mobile in the attractiveness dimension (1.900). However, the results of the Kruskal–Wallis test indicate that the differences in scores among the applications were not statistically significant. Based on the global UEQ benchmark, all four applications demonstrate very good UX quality, predominantly in the excellent category. BRImo is the only application that achieved the excellent category across all dimensions, while Livin' by Mandiri obtained two dimensions in the good category, followed by BNI Mobile Banking and BCA Mobile, each with one dimension in the good category.

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1. INTRODUCTION

The rapid growth of digital technology has significantly transformed how people in Indonesia manages their financial activities. One of the most impactful developments is the rise of mobile banking applications, which enable users to carry out transactions anytime and anywhere [1]. Major Indonesian banks—such as BCA, Mandiri, BNI, and BRI—are continuously competing to offer mobile banking apps that are easy to use and equipped with comprehensive features [2]. As competition intensifies, user experience (UX) has become a key factor in ensuring customer satisfaction and long-term loyalty [3]. From a theoretical perspective, user experience is closely linked to several foundational concepts in human–computer interaction (HCI). UX is shaped by usability principles, cognitive load theory, emotional design [4], and user perception models that emphasize the importance of intuitive interfaces. While user interface (UI) focuses on visual layout and interaction elements, UX encompasses the user's holistic impressions, including emotions, expectations, and satisfaction throughout the interaction process. In financial applications such as mobile banking, UX plays an even more critical role due to high user expectations for security, clarity, and efficiency. The Technology Acceptance Model (TAM) supports this notion, stating that perceived ease of use and perceived usefulness significantly influence user adoption [5]. Thus, strong UX design contributes directly to trust-building, reduces perceived risk, and helps retain users in highly competitive digital banking ecosystems.

UX, however, goes far beyond visual design. According to ISO 9241-210:2010, UX encompasses all aspects of a user's interaction with a system, including their perceptions, emotions, beliefs, and reactions before, during, and after using it [4]. This aligns with the broader view that UX represents the full range of users' responses throughout their interaction with a product [5]. Schrepp, Hinderks, and Thomaschewski (2017) describe UX as users' perceptions and reactions when interacting with a product, system, or service. In financial applications like mobile banking, evaluating UX is crucial for understanding how well an app provides comfort, simplicity, and emotional satisfaction [6]. Perceived innovation and ease of navigation are particularly important for influencing adoption decisions [7], while positive experiences help foster loyalty and strengthen users' trust in financial institutions [8]. To assess UX, this study uses the User Experience Questionnaire (UEQ), developed by Laugwitz et al. (2008). The UEQ evaluates six core dimensions—Attractiveness, Perspicuity, Efficiency, Dependability, Stimulation, and Novelty [9], [10], [11]. Every dimensions were counted using a seven-point semantic differential scale ranging from –3 to +3 [12]. Hasil pengukuran ini kemudian dibandingkan dengan standar

internasional. These results are then compared with international UEQ benchmarks, which classify UX quality into categories such as Excellent, Good, or Average [9], [13]. The benchmarking approach relies on a reference dataset [14] that helps identify each application's strengths and weaknesses relative to similar products.

Theoretically, UEQ is widely used because it measures both pragmatic quality (such as clarity and efficiency) and hedonic quality (such as stimulation and novelty). This dual perspective aligns with modern UX theory, which distinguishes functional aspects from emotional and motivational aspects of user interaction [12]. Compared to other tools like the System Usability Scale (SUS) or UMUX-Lite, UEQ offers richer multidimensional insights, making it suitable for products requiring comprehensive evaluation such as mobile banking. Benchmarking with UEQ also provides scientific justification for comparing multiple applications because it uses standardized datasets that position each product relative to global UX norms [13], [15]. This strengthens the study's analytical foundation and ensures that evaluation results are grounded in validated UX frameworks.

A number of earlier studies have used UEQ to assess UX in digital applications, including in the financial sector. For example, Pratama et al. (2024) [15] evaluated the UX of Livin' by Mandiri, while Giridharma and Putra (2025) examined BNI's wondr app using the same tool [16]. However, most of these studies focus on individual applications and do not provide a comparative view across multiple mobile banking platforms in Indonesia.

Before conducting the comparative analysis, this study also includes an initial observation stage. Systematic observation using direct sensory assessment is essential for identifying and validating real conditions in the field [17]. Building on this foundation, the study aims to compare the user experience of several mobile banking applications in Indonesia and assess their UX quality based on international UEQ benchmarks. The results are expected to offer empirical insights into the UX aspects that most shape user perceptions and serve as valuable guidance for developers seeking to improve interface quality and user interaction. Additionally, comparing the applications with international benchmarks helps reveal how far Indonesian mobile banking apps have progressed toward meeting global UX standards.

2. RESEARCH METHOD

This research employs a descriptive comparative quantitative approach using the User Experience Questionnaire (UEQ) as the main instrument [18] [19]. This approach was chosen to obtain a measurable empirical overview of the differences in user experience quality among the applications. Systematically, the research is carried out in four main stages, as illustrated in Figure 1. These stages include: (1) Research Preparation, (2) Research Planning, (3) Data Collection, and (4) Results and Analysis.

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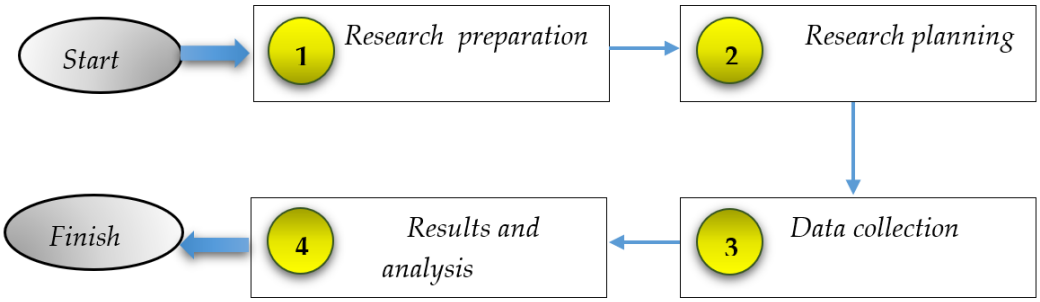

Figure 1. Research Stages

2.1. Research preparation

This stage serves as the initial step, involving problem identification through preliminary observation and a literature review. The observation was carried out by distributing an initial questionnaire via social media to map the most frequently used mobile banking applications among potential respondents. This step aims to address the research gap found in previous studies, which were limited to evaluating a single application, by conducting a comparative analysis across multiple applications as well as global benchmarking. Next, the theoretical foundation related to user experience evaluation was strengthened using sources such as e-books, scientific journals, and credible digital articles [20]. This stage resulted in the formulation of the study's main research problem, namely a comparative analysis of user experience in mobile banking applications in Indonesia, along with an evaluation of their quality positions based on international UEQ benchmark standards.

2.2. Research planning

The research planning process began by determining the study's focus based on preliminary observations involving 53 respondents. From this initial stage, four mobile banking applications emerged as the most frequently used, as shown in Figure 2.

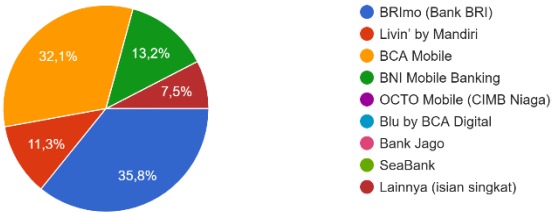

Figure 2. Distribution of mobile banking application usage in preliminary observations

The initial survey results showed that BRImo was the most frequently used application, accounting for 35.8% of users (19 respondents). This was followed by BCA Mobile at 32.1% (17 respondents), BNI Mobile Banking at 13.2% (7 respondents), and Livin'

by Mandiri at 11.3% (6 respondents). The selection of these applications as research objects was further supported by secondary data from CNBC Indonesia, which lists these four banks as having the largest market share and assets in the country [21]. This ensures that the comparative study focuses on applications from Indonesia's leading banking institutions. Most respondents were private-sector employees residing in Bali, with 1–2 years of experience using mobile banking services. The most common transactions performed were interbank transfers or transfers between personal accounts, while ease of use, stability, and transaction speed were the primary reasons for choosing these applications. These findings suggest that the Efficiency and Dependability dimensions play a crucial role in shaping user satisfaction.

Table 1. Grouping of UEQ items based on six dimensions

Dimension	UEQ Items
Attractiveness	1, 7, 8, 11, 21, 26
Perspicuity	2, 4, 6, 17
Efficiency	5, 9, 19, 20
Dependability	10, 14, 15, 16
Stimulation	3, 12, 13, 22
Novelty	18, 23, 24, 25

The main instrument used to evaluate User Experience in this study was the Indonesian version of the User Experience Questionnaire (UEQ). The questionnaire was distributed online to participants who were active users of the four selected mobile banking applications. A purposive sampling technique was applied, requiring respondents to meet two criteria: (1) they must have used one of the mobile banking apps for at least six months, and (2) they must actively conduct financial transactions through the app. The UEQ instrument consists of 26 items designed to measure six key dimensions—Attractiveness, Perspicuity, Efficiency, Dependability, Stimulation, and Novelty—using a 7-point semantic differential scale ranging from –3 to +3. The layout of the UEQ questionnaire provided to participants is shown in Figure 3, while the grouping of each item according to its respective dimension is presented in Table 1.

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No	Pasangan Kata	–3	–2	–1	0	+1	+2	+3
1	Produk ini terlihat menarik (Tidak menarik – Menarik)	☐	☐	☐	☐	☐	☐	☐
2	Produk ini mudah dipahami (Tidak mudah dipahami – Mudah dipahami)	☐	☐	☐	☐	☐	☐	☐
3	Produk ini dirancang secara kreatif (Kreatif – Konvensional)	☐	☐	☐	☐	☐	☐	☐
4	Produk ini mudah digunakan (Mudah digunakan – Rumit digunakan)	☐	☐	☐	☐	☐	☐	☐
5	Produk ini praktis (Tidak praktis – Praktis)	☐	☐	☐	☐	☐	☐	☐
6	Informasi pada produk ini jelas (Membingungkan – Jelas)	☐	☐	☐	☐	☐	☐	☐
7	Produk ini terlihat menyenangkan (Menyebalkan – Menyenangkan)	☐	☐	☐	☐	☐	☐	☐
8	Tampilan visual produk ini terlihat menarik (Tidak menarik – Menarik)	☐	☐	☐	☐	☐	☐	☐
9	Produk ini efisien saat digunakan (Tidak efisien – Efisien)	☐	☐	☐	☐	☐	☐	☐
10	Produk ini dapat diandalkan (Tidak dapat diandalkan – Dapat diandalkan)	☐	☐	☐	☐	☐	☐	☐
11	Penggunaan produk ini terasa menyenangkan (Tidak menyenangkan – Menyenangkan)	☐	☐	☐	☐	☐	☐	☐
12	Produk ini terlihat inovatif (Tidak inovatif – Inovatif)	☐	☐	☐	☐	☐	☐	☐
13	Produk ini terasa menginspirasi (Membosankan – Menginspirasi)	☐	☐	☐	☐	☐	☐	☐
14	Produk ini fleksibel untuk digunakan (Tidak fleksibel – Fleksibel)	☐	☐	☐	☐	☐	☐	☐
15	Produk ini aman saat digunakan (Tidak aman – Aman)	☐	☐	☐	☐	☐	☐	☐
16	Fitur-fitur produk ini terintegrasi dengan baik (Tidak menyatu – Terintegrasi dengan baik)	☐	☐	☐	☐	☐	☐	☐
17	Produk ini terasa sederhana (Sederhana – Kompleks)	☐	☐	☐	☐	☐	☐	☐
18	Fitur baru pada produk ini terlihat menarik (Menarik – Tidak menarik)	☐	☐	☐	☐	☐	☐	☐
19	Produk ini responsif saat digunakan (Tidak responsif – Responsif)	☐	☐	☐	☐	☐	☐	☐
20	Produk ini membantu dalam menyelesaikan tugas (Tidak membantu – Membantu)	☐	☐	☐	☐	☐	☐	☐
21	Produk ini terasa seru saat digunakan (Tidak seru – Seru)	☐	☐	☐	☐	☐	☐	☐
22	Produk ini memiliki desain yang modern (Kuno – Modern)	☐	☐	☐	☐	☐	☐	☐
23	Produk ini mampu menarik perhatian pengguna (Tidak menarik perhatian – Menarik perhatian)	☐	☐	☐	☐	☐	☐	☐
24	Produk ini nyaman digunakan (Tidak nyaman – Nyaman digunakan)	☐	☐	☐	☐	☐	☐	☐
25	Tampilan produk ini terlihat teratur (Tidak teratur – Teratur)	☐	☐	☐	☐	☐	☐	☐
26	Produk ini menyenangkan untuk digunakan (Membuat frustrasi – Menyenangkan digunakan)	☐	☐	☐	☐	☐	☐	☐

Figure 3. Display of 26 question items on the UEQ questionnaire

Figure 3 presents all 26 UEQ items in the form of bipolar adjective pairs, measured on a −3 to +3 semantic differential scale. Options on the left side indicate more negative evaluations, whereas options on the right side reflect more positive perceptions [22]. Meanwhile, Table 1 displays the classification of each item into the six main UEQ dimensions—Attractiveness, Perspicuity, Efficiency, Dependability, Stimulation, and Novelty—based on the item sequence in the questionnaire.

2.3. Data Collection

The data collection stage was carried out as the implementation of the previously established research plan. The UEQ questionnaire was distributed online via Google Forms using a single survey link accessible to users of the four selected mobile banking

applications. Respondents were screened to ensure a relatively balanced distribution across the applications so that each study object received an adequate amount of data. Regarding sample size, the official UEQ (User Experience Questionnaire) guidelines state that 20–30 respondents per application are sufficient to produce stable and statistically interpretable results, provided that the respondents represent the relevant user group [23] [24]. The data collection process was conducted over a period of more than two weeks, from November 8 to November 23, 2025. The total number of responses successfully exceeded the minimum target of 80 participants. The distribution of respondents for each application is presented in Table 2.

Table 2. The Distribution of Respondents based on four Mobile Banking

No.	Mobile Banking Applications	Respondents
1	BRImo	64
2	Livin' by Mandiri	24
3	BNI Mobile Banking	33
4	BCA Mobile	21
Total		142

Table 2 presents the respondent data that were selected based on the predefined research criteria. Initial data collection was conducted using a non-probability sampling approach, with online questionnaire distribution via Instagram and WhatsApp. After the screening process based on the inclusion criteria, a simple random sampling technique was applied within each application group to select 20 respondents per group [25], respondents for each application. The randomization process was carried out using the "RAND()" function in Microsoft Excel, which generated random numerical values for each respondent. These values were then sorted, and respondents were selected sequentially according to the order until the required sample size was achieved. This procedure ensured that each respondent who met the criteria had an equal probability of being selected, thereby minimizing potential bias in the sampling process.

2.4. Result and Analysis

At this stage, the analysis is conducted after the entire data collection process has been completed. The quantitative data is processed by entering the responses from the 20 randomly selected participants into the UEQ Data Analysis Tool (Version 12). The tool then generates the scores for each UEQ dimension across all applications. These scores are subsequently compared with the global UEQ benchmark to determine their quality categories—such as bad, below average, above average, good, or excellent. The analysis results are presented in the form of charts and tables to facilitate clearer interpretation of the UX comparison among the mobile banking applications.

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3. RESULTS AND DISCUSSION

3.1 The Result of UEQ Analysis

This section presents the results of processing 26 questionnaire items grouped into six UEQ dimensions for the four applications examined in this study: BRImo (BRI), Livin' by Mandiri, BNI Mobile Banking, and BCA Mobile. Each application received scores across the six UEQ dimensions, namely Attractiveness, Perspicuity, Efficiency, Dependability, Stimulation, and Novelty. The results are presented in Table 3.

Table 3. Average scores of UEQ dimensions on four mobile banking applications

a				b		
UEQ Scales (Mean and Variance) BRImo (BRI)				**UEQ Scales (Mean and Variance) Livin' by Mandiri**		
Attractiveness	2.058	1.66		Attractiveness	1.900	0.65
Perspicuity	2.050	1.46		Perspicuity	1.788	0.77
Efficiency	2.225	1.33		Efficiency	1.863	0.85
Dependability	2.188	1.33		Dependability	1.900	0.84
Stimulation	2.025	1.80		Stimulation	1.875	0.88
Novelty	2.050	1.62		Novelty	1.863	0.81
c				**d**		
UEQ Scales (Mean and Variance) BNI Mobile Banking				**UEQ Scales (Mean and Variance) BCA Mobile**		
Attractiveness	1.883	0.94		Attractiveness	1.875	0.70
Perspicuity	1.813	1.48		Perspicuity	1.988	1.10
Efficiency	2.113	0.89		Efficiency	2.025	0.84
Dependability	1.913	1.05		Dependability	1.738	1.17
Stimulation	1.900	0.99		Stimulation	1.925	1.01
Novelty	2.088	1.05		Novelty	1.863	0.83

Based on Table 3, all mobile banking applications achieved positive scores across the six UEQ dimensions, indicating that the overall user experience is perceived as good, although each application has its own strengths and areas for improvement. Application (a) BRImo recorded scores for attractiveness (2.058), perspicuity (2.050), efficiency (2.225), dependability (2.188), stimulation (2.025), and novelty (2.050). The highest scores were found in Efficiency (2.225) and Dependability (2.188), suggesting that the application is perceived as efficient and reliable in its performance. Meanwhile, Stimulation (2.025) received the lowest score, indicating that the sense of excitement or motivational aspects of using the app could be further enhanced. Application (b) Livin' by Mandiri showed relatively stable scores across dimensions, with attractiveness (1.900), perspicuity (1.788), efficiency (1.863), dependability (1.900), stimulation (1.875), and novelty (1.863). The highest scores were found in Attractiveness (1.900) and Dependability (1.900), whereas Perspicuity (1.788) was the lowest, indicating a need for improvement in interface clarity or the comprehensibility of usage flows. For application (c) BNI Mobile Banking, the scores were attractiveness (1.883), perspicuity (1.813), efficiency (2.113), dependability (1.913), stimulation

(1.900), and novelty (2.088). The application stands out in Efficiency (2.113) and Novelty (2.088), yet Perspicuity (1.813) remains the lowest dimension, suggesting that

clarity of instructions or navigation should be improved. Meanwhile, application (d) BCA Mobile obtained scores for attractiveness (1.875), perspicuity (1.988), efficiency (2.025), dependability (1.738), stimulation (1.925), and novelty (1.863). Its highest score appears in Efficiency (2.025), indicating that users perceive the application as efficient during use. However, Dependability (1.738) is the lowest score, meaning that aspects related to accuracy and consistency of performance need further enhancement. Descriptively, variations in the mean user experience scores across each UEQ dimension were observed among the applications. Prior to conducting inferential statistical analysis, a reliability test was first performed to ensure the internal consistency of the UEQ instrument used in this study. Subsequently, these variations were analyzed using inferential statistical testing to determine whether the observed differences were statistically significant.

3.2 Reliability Testing of the UEQ Instrument

Reliability testing was conducted to ensure the internal consistency of the User Experience Questionnaire (UEQ) instrument used in this study. The reliability assessment was performed using Cronbach's Alpha coefficient, which measures the level of consistency among items within each UEQ dimension. Cronbach's Alpha values range from 0 to 1, and values between 0.70 and 0.95 are considered adequate to indicate acceptable instrument reliability [26]. This test was applied to the six UEQ dimensions, namely Attractiveness, Perspicuity, Efficiency, Dependability, Stimulation, and Novelty. The results of the reliability testing are presented in the following table.

Tabel 4. Results of the UEQ Instrument Reliability Test

Dimension	Items	Cronbach's Alpha	Description
Attractiveness	6	0,879	Reliabel (Good)
Perspicuity	4	0,848	Reliabel (Good)
Efficiency	4	0,855	Reliabel (Good)
Dependability	4	0,868	Reliabel (Good)
Stimulation	4	0,837	Reliabel (Good)
Novelty	4	0,882	Reliabel (Good)

Based on Table 4, all UEQ dimensions have Cronbach's Alpha values above 0,70. This indicates that each dimension demonstrates good internal consistency, and the UEQ instrument used in this study is considered reliable. Therefore, the collected data are deemed suitable for further analysis in the statistical hypothesis testing stage.

3.3 Statistical Hypothesis Testing

After conducting descriptive analysis and reliability testing to ensure the internal consistency of the instrument, this study proceeded with statistical hypothesis testing to determine whether there were significant differences in UEQ scores among the four mobile banking applications. The selection of the statistical test method followed established

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guidelines for choosing analytical techniques based on the measurement scale and data distribution [27], If the data met the normality assumption, the parametric One-Way ANOVA test was applied to compare the means across independent groups. However, if the normality assumption was not satisfied, the nonparametric Kruskal–Wallis test was used as an appropriate alternative for comparing more than two independent groups. In this analysis, the variables examined were the scores of the six UEQ dimensions. The basis for hypothesis decision-making followed the principle of significance testing [28], with a significance level (α) set at 0.05. If the significance value (p-value) was less than 0.05, the null hypothesis (H_0) was rejected, indicating a statistically significant difference in scores among the applications. Conversely, if the p-value was greater than 0.05, H_0 was not rejected, indicating no statistically significant difference. Thus, this inferential testing aimed to confirm whether the variations in UEQ scores observed in the descriptive analysis were statistically significant or occurred by chance.

Tabel 5. Results of the Kruskal–Wallis Test on the Six UX Dimensions Across Four Banks

Dimension	Chi-Square	df	Asymp. Sig. (p-value)	Description
Attractiveness	3.219	3	0.359	Not statistically significant.
Perspicuity	2.428	3	0.488	Not statistically significant.
Efficiency	4.396	3	0.222	Not statistically significant.
Dependability	3.773	3	0.287	Not statistically significant.
Stimulation	1.942	3	0.585	Not statistically significant.
Novelty	2.752	3	0.431	Not statistically significant.

Based on Table 5, the results of the Kruskal–Wallis test on the six UX dimensions across the four banks indicate that all dimensions have significance values of $p > 0.05$. Therefore, there are no statistically significant differences among the four banks across the six dimensions tested.

3.4 UEQ Global Benchmark

This section presents a comparison of the six UEQ dimension scores for each application with the UEQ Global Benchmark to determine the quality level of user experience based on international standards. Through this benchmark, each dimension can be classified into categories such as *bad*, *below average*, *above average*, *good*, or *excellent*, allowing the overall UX quality of each application to be evaluated according to the global UEQ standard. The benchmark results for each application are presented in the following subsections.

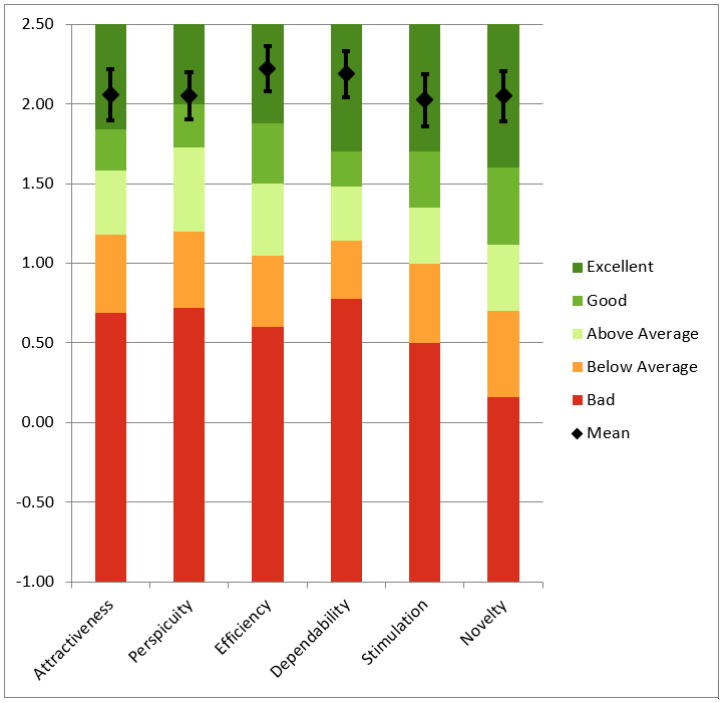

Figure 4. UEQ global benchmark results for the BRImo (BRI) application

Based on Figure 4, all six UEQ dimensions for the BRImo (BRI) application fall into the excellent category, indicating that the scores are within the top 10% of products in the global UEQ benchmark. This is reflected in the diamond markers, which consistently appear in the dark green area of the benchmark chart. These results suggest that BRImo delivers a highly optimal and well-developed user experience, excelling in both pragmatic aspects (usability, efficiency, and reliability) and hedonic aspects (attractiveness, comfort, and innovation).

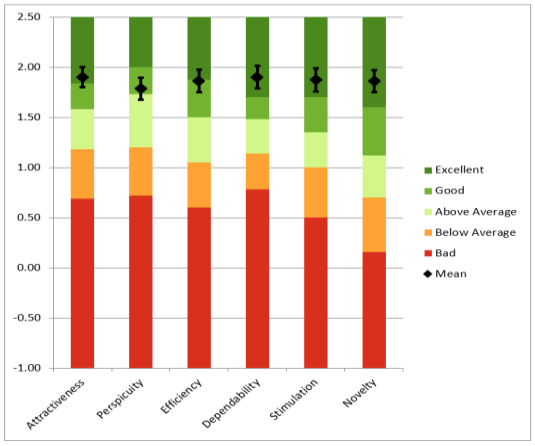

Figure 5. UEQ global benchmark results for the Livin'by Mandiri application

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Based on Figure 5, four out of the six UEQ dimensions for the Livin' by Mandiri application fall within the dark green area of the global UEQ benchmark. The diamond markers positioned in this area indicate an excellent category, meaning the scores are within the top 10% of all products in the benchmark. Meanwhile, the Efficiency dimension appears slightly lower in the light green area with a good rating, and Perspicuity is also placed in the light green area with a good rating, indicating that both dimensions outperform approximately 75% of applications in the UEQ benchmark database. Overall, these results show that Livin' by Mandiri delivers a very strong and competitive user experience, performing particularly well in attractiveness, dependability, stimulation, and novelty. However, there remains some room for improvement in clarity of use (perspicuity) and efficiency so that these dimensions can be brought in line with the others.

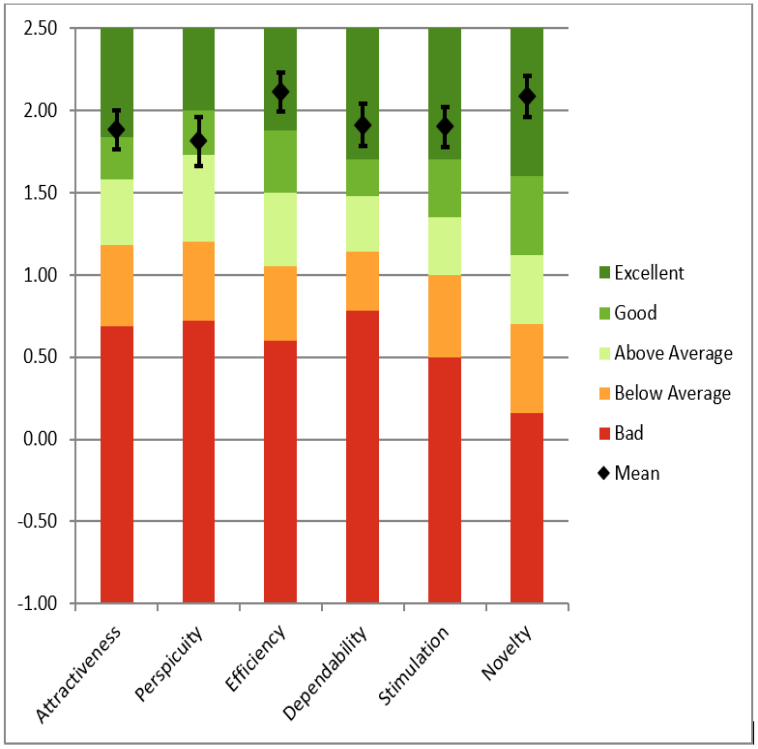

Figure 6. UEQ global benchmark results for the BNI Mobile Banking application

Based on Figure 6, most UEQ dimensions for the BNI Mobile Banking application fall within the dark green area of the global UEQ benchmark. The diamond markers in this area indicate an excellent rating, meaning the scores place the application within the top 10% of all products in the UEQ benchmark database. However, the Perspicuity dimension is positioned lower, in the light green area with a good rating, indicating that although it does not reach the highest category, it still performs better than approximately 75% of other applications. Overall, these findings show that BNI Mobile Banking provides a very strong and competitive user experience, with high performance in attractiveness, efficiency,

dependability, stimulation, and novelty. Nevertheless, the clarity of use (perspicuity) still has room for improvement to reach the same level of excellence as the other dimensions.

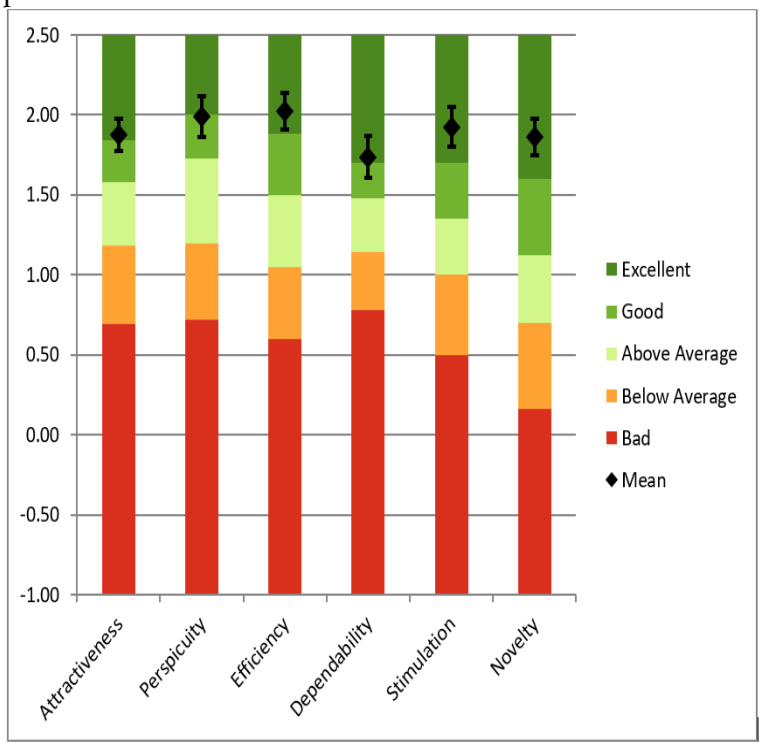

Figure 7. UEQ global benchmark results for BCA Mobile application

Based on Figure 7, most UEQ dimensions for the BCA Mobile application fall within the dark green area of the UEQ benchmark, as indicated by the diamond markers positioned in the excellent category. This signifies that the scores place the application within the top 10% of all products in the UEQ benchmark database. However, the Perspicuity dimension appears slightly lower, positioned in the light green area with a good rating, which indicates that this dimension still performs better than approximately 75% of other applications. Overall, the results show that BCA Mobile delivers a very strong and competitive user experience, demonstrating excellent performance in attractiveness, efficiency, dependability, stimulation, and novelty. Nevertheless, clarity of use (perspicuity) still has room for improvement to reach the same level of performance as the other dimensions.

3.5 The comparison of Benchmarking Result among the Mobile Banking

Based on the comparison with the global UEQ benchmark, all four mobile banking applications demonstrate a very strong UX performance, with most dimensions falling into the excellent category. These findings align with previous studies (Pratama et al., 2024; Giridharma & Putra, 2025), which similarly reported that the UX quality of banking applications in Indonesia has reached a competitive international level. However, the most

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notable variation appears in the Perspicuity dimension. BRImo stands out as the only application that achieves an excellent rating across all dimensions, indicating the most consistent and optimal UX. In contrast, Livin', BNI Mobile Banking, and BCA Mobile remain in the good category for perspicuity, suggesting a need for improvement in interface clarity and ease of understanding. For Livin' by Mandiri, this study also reveals interesting dynamics when compared with the findings of Pratama et al. (2024). While both studies agree that perspicuity remains in the good category, shifts occur in other dimensions. The earlier study reported that novelty was still rated as good, whereas the present study shows an improvement to excellent. However, this improvement is accompanied by a decline in efficiency, which now falls under the good category. This indicates that while Livin' has succeeded in enhancing its sense of novelty, the application still needs to streamline its interaction flow to achieve better efficiency. The case of BNI leads to a different implication. This study evaluates the older mobile banking application, BNI Mobile Banking, which shows its main weakness in the perspicuity dimension (rated good). This finding indirectly supports the rationale behind the launch of BNI's new application, wondr by BNI, which, according to Giridharma & Putra (2025), successfully improves clarity. Interestingly, the earlier study reports that wondr by BNI remains in the good category for stimulation and novelty, while the older application assessed in this study scores excellent on both dimensions. This highlights the need to maintain a balance when improving clarity in the new application without sacrificing stimulation and novelty—two aspects that had been strengths of the previous version.

4. CONCLUSION

Through a comparative study initiated by a preliminary observation of four mobile banking applications (BRImo (BRI), Livin' by Mandiri, BNI Mobile Banking, and BCA Mobile) evaluated using the User Experience Questionnaire (UEQ) method, the results of the six UEQ dimensions indicate varying performance dynamics across the applications. The reliability test results show that all UEQ dimensions have Cronbach's Alpha values ≥ 0.70, confirming that the instrument is reliable. BRImo ranks highest overall, particularly in the efficiency (2.225) and dependability (2.188) dimensions, while BNI Mobile Banking performs strongest in the novelty dimension (2.088). Additionally, BNI Mobile Banking records higher efficiency (2.113) and dependability (1.913) scores compared to Livin' by Mandiri and BCA Mobile. Meanwhile, BCA Mobile demonstrates superior performance in perspicuity (1.988) and stimulation (1.925) compared to Livin' by Mandiri, whereas Livin' by Mandiri only outperforms BNI Mobile Banking and BCA Mobile in the attractiveness dimension (1.900). Further analysis using the Kruskal–Wallis test indicates that the differences in scores among the applications are not statistically significant ($p > 0.05$). When positioned within the global UEQ benchmark, all four applications demonstrate highly competitive user experience quality, predominantly in the excellent category. In this context,

BRImo shows the most consistent performance (Excellent in all dimensions), while the other applications—Livin' by Mandiri, BNI Mobile Banking, and BCA Mobile—still have room for improvement from the good to the excellent category, particularly in the perspicuity (clarity) dimension.

These findings imply that although functionality is already optimized, developers should prioritize interface simplification to ensure ease of user understanding, as well as enhance efficiency, especially for Livin' by Mandiri. Future research is recommended to increase the number of respondents, employ the UEQ+ method as an extension of UEQ, and consider evaluating mobile banking applications from regional banks to gain a broader understanding of UX quality in local banking services.

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