Evaluating User Perceptions to Identify User-Friendly Mobile Financial Apps in Bangladesh: A Case Study

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Evaluating User Perceptions to Identify User-Friendly Mobile Financial Apps in Bangladesh: A Case Study

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Abstract: Effective user-friendly MFS is crucial to raising user satisfaction and adaptation rates. A survey was prepared focusing on three MFSs - Bkash, Nagad and Rocket. This study aims to evaluate user perceptions to identify the most user-friendly apps or aspects of apps in Bangladesh. Three key factors such as UI of apps, color harmony and apps functionalities and performance are analyzed to assess user satisfaction and preferences. From bivariate analysis, we found businessman uses MFS most compared to the job holder, Rocket have most complex registration process and UI than Bkash and Nagad, extra icon on homepage confused users, advertisement on homepage is not beneficiary and so on. From MLR analysis, the businessman uses Nagad and Rocket MFS more likely compared to Bkash and Nagad, it is found that the registration process of Nagad and Rocket are more complex compared to Bkash, Nagad has consistent button distribution, and so on.

Key words: Mobile app, User interface, User experience, UI/UX, Mobile financial service, Bangladesh

1 Introduction

The rapid growth of mobile financial applications has revolutionized the banking and financial services sector, offering unprecedented convenience and accessibility to users worldwide. In Bangladesh, where mobile phone adoption is swiftly increasing, these applications have the potential to significantly enhance financial inclusion and economic participation [1]. With a large segment of the population still unbanked or under-banked, mobile financial services can provide vital access to financial resources, bridging the gap between traditional banking services and the needs of underserved communities[2]. Research by Zhang and Maruping (2008) [3] underscores the impact of user trust on the adoption of mobile financial services, particularly in emerging markets. Meanwhile, Gu, Lee, and Suh (2009) [4] highlight the importance of perceived security and privacy in influencing users' willingness to adopt mobile banking technologies.

The success of mobile financial apps, however, largely depends on user adoption, which is strongly influenced by the usability and user-friendliness of these platforms. User perspectives are crucial in this regard, affecting both the initial adoption and continued use of these applications[5]. Despite the potential of mobile financial apps, there is a significant gap in existing literature regarding the specific factors that drive user satisfaction and engagement in Bangladesh. It is crucial for developers and financial institutions to understand these factors to create and implement solutions that meet user expectations and improve the overall user experience [6].

Moreover, Pousttchi and Schurig (2004) [7] discuss

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the challenges and opportunities in mobile payment systems, emphasizing the need for a user-centric design. Laukkanen (2007) [8] further explores the role of innovation resistance in the adoption of mobile banking, particularly among older populations. This research seeks to fill this gap by assessing user perspectives to pinpoint the characteristics of user-friendly mobile financial applications in Bangladesh. Using a detailed case study approach, the study will explore the key features that contribute to positive user experiences and high levels of satisfaction. By gathering and analyzing data from a diverse group of users, the research aims to identify the design features, functionalities, and user interface elements that users value most[9]. The findings from this study will provide essential insights for app developers, financial service providers, and policymakers. By emphasizing the attributes that users consider most important, this research aims to guide the development of more intuitive, accessible, and user-focused mobile financial applications. Ultimately, the study seeks to contribute to the broader goal of financial inclusion in Bangladesh, ensuring that mobile financial services can reach and benefit a wide audience [10]. In the following sections, we will explore the relevant literature on mobile financial apps and user perspectives, describe our research methodology, present the case study findings, and discuss their implications for the development of user-friendly mobile financial applications in Bangladesh.

2 Research Methodology

2.1 Study design

The current study was a cross-sectional design to evaluate user perceptions to identify user-friendly mobile financial apps in Bangladesh. Data were collected both online and offline between July and December 2023. We conducted a field survey for user study evaluation and also used Google Forms to collect data online. Prior to data collection, a pilot survey including 13 samples was conducted to verify the validity and reliability of the questionnaire; the results of this survey were excluded from the final data collection. It took five to seven minutes to finish the survey.

2.2 Sample

The Cochran technique was applied to determine the most suitable sample size given the probability of picking a choice, the desired confidence level, and the permitted percentage of error in the population. The sample size was determined using the following equation since it works very well in situations involving huge populations [11].

$$n = \frac{z^2 \cdot p \cdot q}{d^2} = \frac{1.96^2 \cdot 0.5 \cdot (1 - 0.5)}{0.04248^2} = 532.2101 \approx 532$$

Here, n =number of samples, z=1.96 (95% confidence level), p= the probability of picking a choice=50% or 0.5 (for highly dispersed populations), q= (1 p), d=allowed error percentage= 4.248% or 0.04248. According to the calculation, a sample size of 532 was determined. After omitting incomplete and biased data collected from the participants, the total reviewed sample size was 532.

2.3 Measures

Throughout the entire questionnaire, 26 questions were asked in three different categories. The three categories are: overall application functions and performance; color harmony among these three MFS (Bkash, Nagad, and Rocket); and user interface of the MFS. We collected data from both rural and urban area of Bangladesh. In addition, we collected these data from people of different ages and professions.

2.4 Data analyses

A cross-sectional bivariate and multivariate analysis were employed to check the significant factors evaluating user perceptions to identify user-friendly mobile financial apps in Bangladesh. At 1, 5, 10, and 15% levels of significance, the chi-square test was employed to evaluate the bivariate relationship. For multinomial logistic regression analysis, the mobile financial app was considered as the dependent variable, and other variables like profession, complex registration process, app that contains complex UI, meaningful icon, and so on were considered as independent variables. MLR model was used to compute odds ratio (OR) with 95% confidence intervals to evaluate the associated factors with the dependent variable named used mobile financial app.

3 Analysis and results:

3.1 Bivariate analysis between used mobile financial app and its associated attributes

This study explored the relationship between various user attributes and the adoption of mobile financial applications. The dependent variable in this

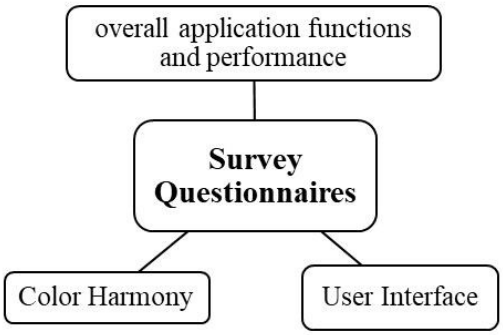

Fig. 1

analysis was the usage of "Mobile Financial App," while the independent variables included "Age," "Profession," "Complex Registration Process," "App with Complex UI," "Consistent Color Combination in App," "Consistent Icon Size and Icon Color," "Meaningful Icon," "Extra Icons on Homepage Confusing Users," "Consistent Button Distribution," "Single PIN Deletion Feature in bKash," "Fingerprint Facility in MFS Besides PIN," "Receive Login Alerts About Account-Related Suspicious Activities," "Ease of Viewing or Finding Money Receipts," "Ease of Bill Payment Process," "Ease of Viewing Money Transaction History," "Advertisement on Homepage Beneficial for Users," "Error Prevention Feature for Money Transactions," and "Maximum Transaction Limit."

The analysis revealed that 81.4% of users aged between 31-65 years, as well as 80% of businessmen, predominantly used all mobile financial services (MFS) apps, particularly Nagad and Rocket, a significantly higher usage rate compared to job holders. Approximately 83.9% of users identified the registration process, and 80.7% found the UI of Rocket more complex compared to Nagad and bKash. These variables were significantly associated with app usage (χ^2 test P-Value = 0.000 and χ^2 test P-Value = 0.003, respectively).

Furthermore, the study highlighted a strong preference for specific design elements such as consistent color combinations, consistent icon size and color, meaningful icons, and consistent button distribution, all of which were significantly associated with app usage (P-Value = 0.000). Most users found consistent color combinations in all apps, including Nagad and Rocket. However, 72.7% of users agreed that extra icons on the homepage were confusing.

Additionally, 72.7% of respondents supported the addition of a fingerprint facility alongside PINs. Although this feature was added to bKash recently, it was absent during the survey. Conversely, 76% of users did not favor receiving login alerts about account-related suspicious activities. Users unanimously found that the ease of viewing or finding money receipts and transaction history was significantly associated with app usage. Similarly, ease of bill payment was also significant, with nearly 75% of users finding it easy to use all apps, particularly Nagad and Rocket. Notably, 74.4% of users expressed dislike for advertisements on the homepage, and 72.8% strongly agreed that there should be a feature to prevent erroneous money transactions. The study also found a significant association for the maximum transaction limit, with 73.7% of users finding the range between 25,000-45,000 BDT sufficient.

3.2 Multinomial Logistic Regression analysis between used mobile financial app and its associated factors

Table 2 presents a summary of the multinomial logistic regression of the used mobile financial app and its associated factors. From the analysis, it is found that the businessman uses Nagad and Rocket MFS more likely compared to Bkash and Nagad MFS. From the MLR analysis, it is found that the registration process of Nagad and Rocket is more complex compared to Bkash MFS. According to MLR, all MFS (Bkash, Nagad, and Rocket) have consistent color combinations in apps. According to the users of Nagad and Rocket, all MFS has two times more meaningful icons but according to the users of Bkash and Nagad, Nagad has more meaningful icons compared to others. From MLR it has appeared that Nagad has consistent button distribution compared to Bkash and Rocket. A single-pin deletion

Variable Categories		Used Mobile Financial App			Total	χ^2 test (P-Value)
Variable Name	**Variable Levels**	**All/Nagad, Rocket**	**Bkash, Nagad**	**Bkash, Rocket**		
Age	17-30 years	351 (71.8%)	96 (19.6%)	42 (8.6%)	489 (100%)	1.959 (0.376)
	31-65 years	35 (81.4%)	5 (11.6%)	3 (7.0%)	43 (100%)	
Profession	Business	96 (80.0%)	16 (13.3%)	8 (6.7%)	120 (100%)	12.941 (0.012)
	Job Holder	67 (77.0%)	9 (10.3%)	11 (12.6%)	87 (100%)	
	Student	223 (68.6%)	76 (23.4%)	26 (8.0%)	325 (100%)	
Complex Registration Process	All	11 (68.8%)	4 (25.0%)	1 (6.3%)	16 (100%)	33.767 (0.000)
	Bkash	54 (61.4%)	24 (27.3%)	10 (11.4%)	88 (100%)	
	Nagad	30 (58.8%)	17 (33.3%)	4 (7.8%)	51 (100%)	
	Rocket	146 (83.9%)	12 (6.9%)	16 (9.2%)	174 (100%)	
	None of them	145 (71.4%)	44 (21.7%)	14 (6.9%)	203 (100%)	
App that Contains Complex UI	All	7 (58.3%)	5 (41.7%)	0 (0.0%)	12 (100%)	23.101 (0.003)
	Bkash	45 (71.4%)	14 (22.2%)	4 (6.3%)	63 (100%)	
	Nagad	49 (63.6%)	24 (31.2%)	4 (5.2%)	77 (100%)	
	Rocket	113 (80.7%)	13 (9.3%)	14 (10.0%)	140 (100%)	
	None of them	172 (71.7%)	45 (18.8%)	23 (9.6%)	240 (100%)	
Consistent Color Combination in App	All	77 (81.1%)	14 (14.7%)	4 (4.2%)	95 (100%)	36.538 (0.000)
	Bkash	194 (69.5%)	55 (19.7%)	30 (10.8%)	279 (100%)	
	Nagad	54 (71.1%)	22 (28.9%)	0 (0.0%)	76 (100%)	
	Rocket	39 (78.0%)	2 (4.0%)	9 (18.0%)	50 (100%)	
	None of them	22 (68.8%)	8 (25.0%)	2 (6.3%)	32 (100%)	
Consistent Icon Size and Icon Color	All	80 (87.9%)	8 (8.8%)	3 (3.3%)	91 (100%)	51.674 (0.000)
	Bkash	199 (66.6%)	65 (21.7%)	35 (11.7%)	299 (100%)	
	Nagad	62 (72.1%)	24 (27.9%)	0 (0.0%)	86 (100%)	
	Rocket	32 (80.0%)	1 (2.5%)	7 (17.5%)	40 (100%)	
	None of them	13 (81.3%)	3 (18.8%)	0 (0.0%)	16 (100%)	
Meaningful Icon	All	90 (88.2%)	7 (6.9%)	5 (4.9%)	102 (100%)	44.766 (0.000)
	Bkash	162 (64.5%)	62 (24.7%)	27 (10.8%)	251 (100%)	
	Nagad	66 (71.0%)	24 (25.8%)	3 (3.2%)	93 (100%)	
	Rocket	59 (84.3%)	3 (4.3%)	8 (11.4%)	70 (100%)	
	None of them	9 (56.3%)	5 (31.3%)	2 (12.5%)	16 (100%)	
Extra Icon on Homepage Confuses Users	Yes	277 (72.7%)	70 (18.4%)	34 (8.9%)	381 (100%)	0.613 (0.736)
	No	109 (72.2%)	31 (20.5%)	11 (7.3%)	151 (100%)	
Consistent Button Distribution	All	2 (100.0%)	0 (0.0%)	0 (0.0%)	2 (100%)	29.243 (0.000)
	Bkash	248 (73.2%)	59 (17.4%)	32 (9.4%)	339 (100%)	
	Nagad	86 (68.8%)	37 (29.6%)	2 (1.6%)	125 (100%)	
	Rocket	50 (75.8%)	5 (7.6%)	11 (16.7%)	66 (100%)	
Single Pin Deletion Feature Should be Added in Bkash	Yes	320 (71.3%)	95 (21.2%)	34 (7.6%)	449 (100%)	10.488 (0.005)
	No	66 (79.5%)	6 (7.2%)	11 (13.3%)	83 (100%)	
Fingerprint Facility Can be Added in MFS besides PIN	Yes	311 (72.7%)	83 (19.4%)	34 (7.9%)	428 (100%)	0.881 (0.644)
	No	75 (72.1%)	18 (17.3%)	11 (10.6%)	104 (100%)	
Receive Login Alert About Account Related Suspicious Activities	Yes	367 (72.4%)	98 (19.3%)	42 (8.3%)	507 (100%)	1.159 (0.560)
	No	19 (76.0%)	3 (12.0%)	3 (12.0%)	25 (100%)	
Easy to View or Find Money Receipt	All	4 (100.0%)	0 (0.0%)	0 (0.0%)	4 (100%)	21.035 (0.002)
	Bkash	266 (72.5%)	70 (19.1%)	31 (8.4%)	367 (100%)	
	Nagad	62 (66.7%)	27 (29.0%)	4 (4.3%)	93 (100%)	
	Rocket	54 (79.4%)	4 (5.9%)	10 (14.7%)	68 (100%)	
Easy Bill Payment Process	All	3 (75.0%)	0 (0.0%)	1 (25.0%)	4 (100%)	26.266 (0.000)
	Bkash	288 (73.5%)	73 (18.6%)	31 (7.9%)	392 (100%)	
	Nagad	55 (67.1%)	25 (30.5%)	2 (2.4%)	82 (100%)	
	Rocket	40 (74.1%)	3 (5.6%)	11 (20.4%)	54 (100%)	
Easy to See Money Transaction History	All	58 (81.7%)	5 (7.0%)	8 (11.3%)	71 (100%)	23.533 (0.001)
	Bkash	165 (67.1%)	54 (22.0%)	27 (11.0%)	246 (100%)	
	Nagad	150 (75.8%)	41 (20.7%)	7 (3.5%)	198 (100%)	
	Rocket	13 (76.5%)	1 (5.9%)	3 (17.6%)	17 (100%)	
Advertisement on Homepage is Beneficial for User	Yes	153 (69.9%)	47 (21.5%)	19 (8.7%)	219 (100%)	1.583 (0.453)
	No	233 (74.4%)	54 (17.3%)	26 (8.3%)	313 (100%)	
Prevention of Error Money Transaction Feature Can Be Added	Strongly Agree	270 (72.8%)	72 (19.4%)	29 (7.8%)	371 (100%)	2.217 (0.899)
	Agree	87 (70.7%)	23 (18.7%)	13 (10.6%)	123 (100%)	
	Disagree	2 (66.7%)	1 (33.3%)	0 (0.0%)	3 (100%)	
	Neutral	27 (77.1%)	5 (14.3%)	3 (8.6%)	35 (100%)	
Maximum Transaction Limit	25000-45000	73 (73.7%)	11 (11.1%)	15 (15.2%)	99 (100%)	10.772 (0.029)
	46000-60000	212 (71.9%)	61 (20.7%)	22 (7.5%)	295 (100%)	
	61000-2500000	101 (73.2%)	29 (21.0%)	8 (5.8%)	138 (100%)	

Table 1 The cross tables of attributes with χ^2 test statistics and p-value.

feature should be significantly added in Bkash. Bill payment process and money transaction history seen process are more significantly easier compared to rocket MFS.

4 Discussion

According to the bivariate analysis between the used mobile financial app and the associated attributes result of this study, a clear overview of the user-friendly mobile financial app is found after evaluating all dependent variables against all independent factors. The study found a significant relationship between profession and the use of financial apps (Bkash, Nagad, and Rocket). Business professionals, job holders, and students all showed a strong preference for using all three apps or a combination of Nagad and Rocket, with smaller percentages using combinations involving Bkash. The study revealed that the complexity of the registration process significantly influenced app usage. Users who found the process complex mostly used all three apps or Nagad and Rocket. On the basis of these criteria, Bkash and Rocket are more user-friendly. App usage was highly influenced by the user experience. Similar trends were observed among users of Nagad and Rocket, with the majority of users who thought Bkash was easy to use preferring to use all applications or only Nagad and Rocket. Users of Rocket accounted for the largest share of the total usage rate, while non-users preferred either Nagad and Rocket or all apps. According to the study, viewing money receipts on all applications was deemed easy by all respondents, with Rocket having the best level of usability. Seventy-five percent of users considered bill payments to be straightforward overall, while users of Bkash, Nagad, and Rocket reported similar simplicity. According to users, viewing transaction history was similarly simple, with Rocket once again ranking first in usability. Transaction limit preferences varied significantly, with around 74% finding range (25,000-45,000) more sufficient. A summary of Multinomial Logistic Regression analysis between used mobile financial apps and their associated factors is also found in this study. It turned out that businessmen would rather use Rocket and Nagad than Bkash. According to an MLR study, compared to Bkash, the registration processes for Nagad and Rocket are more complicated. Though the color schemes of all MFS apps are similar, users of Nagad and Rocket feel the icons to be more meaningful, and Nagad has a more evenly distributed button set. For Bkash, a functionality to erase a single PIN is advised. In contrast to Rocket, Bkash offers a simpler way to monitor transaction histories and pay bills. As discussed above, Bkash seems to be the most user-friendly MFS overall, especially when it comes to viewing transaction histories and making bill payments. Nonetheless, business people favor Nagad and Rocket because they provide better button distribution and more significant icons. The ”best” MFS may vary depending on the needs and tastes of the user because each one has advantages.

5 Conclusion

The goal of mobile financial service providers should be to provide intuitive, user-friendly platforms that are simple to use and comprehend[12]. The growth of MFSs promoted users in any critical state of a nation, such as a pandemic, since the social distance buying and selling activity expanded people’s thinking [13]. By assessing user opinions, this study looks into how user-friendly three popular mobile finance applications are. Respondents’ divergence suggests that it may be possible to develop ways to improve these programs’ shortcomings or create whole new ones. According to this research, a number of factors, including age, occupation, design, registration procedure, performance, transaction limit, and payment mechanism, can influence the uptake of mobile banking. During the survey, the authors discovered a few problems, such as the fact that some people are merely registered users and are not active users, thus their opinions might not be accurate. The majority of users in this study are from metropolitan areas; however, all demographic groups, both urban and rural, can be included in future studies to yield even more fascinating findings. Most importantly, commercial banks will take into account mobile banking in light of the study’s findings and develop a successful plan to draw in new and returning consumers by raising customer satisfaction and streamlining operations [14]. This will eventually contribute to the nation’s financial inclusion [14]. The results and suggestions of this study offer the nation’s policymakers more significant information regarding financial inclusion [14]. Policymakers can get insight into the obstacles associated with mobile banking and take the required actions to promote

Variable	Used Mobile Financial App (ref = Bkash, Rocket)					
	All/Nagad, Rocket			Bkash, Nagad		
	OR	p-value	95% CI for OR	OR	p-value	95% CI for OR
Profession (ref: Student)						
Business	1.780	0.232	0.692-4.578	0.664	0.475	0.216-2.042
Job Holder	0.700	0.441	0.282-1.736	0.212*	0.011	0.064-0.700
Complex_registration_process (ref: None of them)						
All	1.119	0.924	0.110-11.349	0.784	0.860	0.053-11.641
Bkash	0.437	0.111	0.158-1.210	0.660	0.489	0.204-2.140
Nagad	0.864	0.830	0.229-3.265	1.544	0.564	0.352-6.768
Rocket	1.005	0.991	0.423-2.386	0.255*	0.017	0.083-0.782
App_that_contains_Complex_UI (ref: None)						
All	....	0.998	0.000	....	0.998	....
Bkash	2.006	0.293	0.548-7.342	1.690	0.488	0.383-7.457
Nagad	2.092	0.236	0.618-7.085	1.975	0.332	0.499-7.823
Rocket	1.117	0.813	0.447-2.789	0.442	0.169	0.138-1.413
Consistent_color_combination_in_app (ref: None)						
All	2.251	0.425	0.307-16.532	1.017	0.988	0.106-9.781
Bkash	0.735	0.730	0.127-4.235	0.431	0.411	0.058-3.205
Nagad	....	0.000	....	....	....	....
Rocket	0.597	0.583	0.095-3.764	0.085*	0.065	0.006-1.161
Meaningful_icon (ref: None)						
All	2.290	0.433	0.289-18.157	0.460	0.542	0.038-5.577
Bkash	0.831	0.850	0.123-5.627	0.991	0.993	0.104-9.454
Nagad	1.459	0.744	0.150-14.156	1.578	0.731	0.117-21.230
Rocket	1.611	0.645	0.212-12.274	0.201	0.232	0.015-2.784
Consistent_button_distribution (ref: Rocket)						
All	....	0.998	....	0.749	....	0.749-0.749
Bkash	0.921	0.885	0.304-2.795	0.606	0.538	0.123-2.981
Nagad	3.167	0.213	0.517-19.390	3.662	0.240	0.420-31.910
Single_pin_deletion_feature_should_be_added_in_bkash (ref: No)						
Yes	1.587	0.294	0.669-3.763	6.237*	0.006	1.683-23.111
Easy_to_view_or_find_money_receipt (ref: Rocket)						
All	....	0.999	....	18.813	1.000	....
Bkash	1.379	0.589	0.430-4.415	4.714	0.059	0.941-23.621
Nagad	1.485	0.628	0.300-7.339	5.016	0.111	0.689-36.495
Easy_bill_payment_process (ref: Rocket)						
All	0.132	0.279	0.003-5.165	....	....	....
Bkash	1.776	0.386	0.484-6.514	1.687	0.582	0.262-10.852
Nagad	1.925	0.511	0.273-13.552	4.747	0.202	0.434-51.950
Easy_to_see_money_transaction_history (ref: Rocket)						
All	1.713	0.555	0.287-10.241	1.459	0.806	0.072-29.695
Bkash	1.369	0.718	0.249-7.527	3.176	0.427	0.183-55.116
Nagad	4.302	0.111	0.714-25.920	6.016	0.226	0.330-109.645
Maximum Transaction Limit (ref: 61000-2500000)						
25000-45000	0.422	0.101	0.150-1.182	0.207*	0.020	0.055-0.777
46000-60000	0.749	0.538	0.299-1.878	0.695	0.501	0.241-2.007

OR***, OR**, and OR* indicate the significance levels at 1%, 5%, 10%, and 15% respectively

Table 2 Multinomial logistic regression analysis of used mobile financial app and its associated factors

financial inclusion, as the study examined demanders' perceptions regarding the adoption of mobile banking [14].

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Data availability

The corresponding author will provide the datasets that were collected from the respondent and analyzed as part of this study upon reasonable request.

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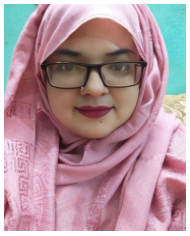

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