Comparing the Voices of Users of Mobile Financial Service Apps Provided by Private and Public Organizations in Bangladesh

Md Al Amin* and Yang Sok Kim**

Abstract

Today, most banks and financial institutions have launched their mobile apps across various platforms, including the Google Play Store, Apple App Store, and Windows Phone Store, to support their customers. In Bangladesh, these apps are offered by both private and public financial organizations. As their service practices differ, it is assumed that their satisfaction factors also vary among their users. To examine this assumption, we collected reviews from the Google Play store written by users of the Nagad and Bkash, which are two well-known private and public financial app providers in Bangladesh. We identified major topics using the Latent Dirichlet Allocation (LDA) technique. The study reveals that Nagad app users experience more technical issues, including account creation, verification, login, and payment options for SIM cards and phones. In contrast, Bkash users face more problems related to updates and performance issues. It also shows that Bkash users are more satisfied with their positive user experience compared to Nagad users, who face more service-related problems, such as poor customer service, transaction fees, and low service quality. This research clearly indicates that similar apps operated by different types of organizations exhibit different satisfactory factors. Therefore, it is necessary to address other issues to satisfy their unique users.

Keywords: Mobile Financial Service (MFS) | Mobile Apps | LDA | Review Analysis |Bangladesh

I. INTRODUCTION

With the introduction of emerging technologies, innovative products, and increased pressure from customers for their diverse demands, the business environment must become dynamic and undergo rapid changes. Mobile Financial Services (MFS) are the financial activities operated by private and public banks. MFS help inquire about bank balances, execute account transactions, make installments, and do stock exchange through a small device like a cell phone by using apps [1].

MFS apps provide numerous opportunities in traditional financial activities because they can reach a larger population and have transformative power [2]. In particular, MFS apps can help people in developing countries because most of them do not have accounts in formal financial institutions. This is not only due to their poverty, but also due to the distance, cost, and complex paperwork involved [3].

Bangladesh actively embraced MFS apps. The Central Bank of Bangladesh permitted 28 commercial banks to operate MFS, but 20 of these banks began operations in July 2016. Over time, many mobile banking apps have been created in Bangladesh. Nagad, Bkash, Sure Cash, Upay, Rocket, Nexus Pay, and

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Tap are widely used MFS apps in Bangladesh.

Although many banks operate MFS apps, the majority of customers also use Nagad, a public MFS app of the Bangladesh Post Office, and Bkash, a private MFS app of Brac Bank Limited [4]. Nagad and Bkash are closely competing. Both apps offer good services, but they have encountered some issues among users. Therefore, they need to address these issues to establish sustainable mobile financial services in Bangladesh.

Since different organizations operate private and public MFS apps and rely on various resources, strategies, and operations, their users are expected to exhibit different issues with these apps and require distinct responses from MFS app providers.

To thoroughly comprehend customer feedback, it is essential not only to acknowledge it but also to take proactive measures to address and rectify any concerns. Businesses traditionally collect feedback through various channels, including emails, satisfaction questionnaires, online assessments, and in-person interactions [5]. However, the emergence of online reviews, posted on platforms such as Google Play Store, has proven to be a valuable and trustworthy resource for gauging consumer demand and assessing a product's competitiveness in the market.

In contrast to conventional survey techniques, online user reviews offer a more authentic and comprehensive understanding of the consumer experience. User reviews play a crucial role in determining the success of an application by providing insights into firsthand experiences [6].

Since online reviews are vast and written in natural language, manual analysis is a challenging task. Recent advances in Natural Language Processing (NLP), particularly in topic modeling, enable the automated extraction of topics with minimal intervention and are widely used to analyze reviews.

This study aims to identify and categorize the prevalent issues in online reviews of private and public MFS apps in Bangladesh. This study employs Latent Dirichlet allocation (LDA), a topic modeling algorithm, to extract meaningful topics from the collection of reviews. This research aims to highlight the differences among different MFS app providers and provide actionable insights for them.

II. Literature Review

2.1 Mobile Financial Services

MFS apps enhance financial services through accessibility, account management, transactions, customer service, and security. MFS is a significant innovation for wireless Internet transactions [7]. MFS apps offer security, convenience, privacy, and customization across various devices, including smartphones and wearable devices. Their use surged during the COVID-19 pandemic, reshaping banking experiences and creating future opportunities [8]. In addition, the surge in smartphone usage and government initiatives promoting cashless transactions have led to a remarkable and rapid adoption of mobile and online banking. MFS apps, including

those for internet banking, are readily accessible through downloads from websites or app stores such as Apple App Store, Google Play Store, and Windows Phone Store.

In Bangladesh, major banks prioritize app-based Internet banking for secure and technologically advanced services, ensuring accessible and speedy banking experiences. Recognizing the importance of service quality, many Bangladeshi banks have developed their Internet banking apps to meet customer demands. The growing interest in mobile-based digital banking is particularly notable among the tech-savvy younger generation [9].

2.2 Online Review Analysis

Users' feedback shared on social media, comprising online reviews and comments, plays a crucial role in shaping customer relationships and perceptions of products or services [10]. Additionally, the rapid growth of user-generated information through digital interactions on social media platforms provides valuable insights into customer opinions and criticisms [11]. Studying online reviews is highlighted as an effective means of understanding customer preferences and enhancing service delivery [12]. In the early stage, online review analysis was conducted as a sentiment classification problem, where significant concerns were the accuracy of classifiers on the emotional tone of the text [13]. Opinion mining is another review analysis approach that focuses on the users' opinions on specific objects [14].

2.3 Topic Modeling

Research on topic models, particularly generative models such as LDA, has recently gained momentum in text analysis, with studies exploring hierarchical extensions and evaluating the quality of topics [15]. Techniques such as Latent Semantic Analysis [16] and Latent Dirichlet Allocation [17] are increasingly applied for unsupervised analysis, text classification, topic evolution, image recognition, and more. This study employs LDA for online review analysis, where documents are represented as word collections and topics are identified with their relative proportions. As a generative probabilistic model, LDA depicts documents as mixtures of latent topics, each defined by a distribution over words, using iterative sampling to estimate the joint probability distribution.

2.4 Satisfaction Factors of MFS Apps

LDA represents each topic using a set of words, known as topic words. Based on the topic words, the analyst must interpret the meaning of the topic within the given problem domain. This is regarded as the most challenging part of topic modeling because it requires creative and intuitive knowledge of the topics. To enhance our interpretation of the topic, we researched the satisfaction factors of MFS apps that were suggested in empirical studies. For example, Tater and John [18] observed that levels of innovation, responsiveness, communication, security and privacy, accessibility, reliability, openness, and trust constitute critical determinants of

customer satisfaction in mobile banking applications. In a similar vein, Saibaba [19] emphasized that service quality, information quality, system quality, perceived risk, and perceived trust emerge as the most influential factors shaping customer satisfaction with mobile banking service applications. Moreover, Uddin and Nasrin [20] underscored that perceived usefulness, confirmation of expectations, trust, service quality, system quality, information quality, perceived cost, perceived benefit, and perceived ease of use collectively play a pivotal role in enhancing customers' overall happiness and satisfaction with mobile banking applications. Furthermore, Shankar and Tiwari [21] demonstrated that security, navigation, customer support, convenience, and efficiency are equally indispensable in determining customer satisfaction within the mobile banking context. Finally, enjoyment, security, design, and the underlying application system were identified as vital elements that significantly contribute to customer satisfaction in the use of mobile banking applications [22].

III. METHOD

To identify topics from Nagad and Bkash customer reviews, data were collected from the Google Play Store, then pre-processed, transformed, modeled, and compared Topics across both apps.

We analyzed reviews of Nagad (85,410) and Bkash (213,328) collected from Google Play (2018–2023) using the Play Scraper tool, compiling user details, review content, scores, likes, and versions into a dataset. To prepare the dataset, we retained only positive (score > 3) and negative (score < 3) reviews, excluding neutral, short (<3 words), non-English, and inconsistent reviews using the distilbert-base-uncased-finetuned-sst-2-english model. Finally, balanced datasets were then created for both apps, as shown in Table 1.

Table 1. Step-by-step shortening of the dataset

Sorting Stage	Nagad	Bkash	Total
Original Dataset	85410	213328	298738
Remove neutral and binarization	82134 (P: 64587/ N:17547)	201614 (P:154827/ N:46787)	283748
After removing extremely short text	18265	58585	76850
After removing non-English text	10059	40856	50915
After removing inconsistent reviews	8028	31657	41054
After balanced sampling	8028	8028	16056

(Note: *P* positive, *N* negative)

Before applying the topic modeling technique, we preprocessed the data by converting text to lowercase and removing non-alphanumeric characters, URLs, numbers, tags, punctuation, and stopwords using SpaCy. This resulted in the final dataset for analysis. For LDA topic modeling, we transformed the text into a document-term matrix using the Bag-of-Words (BOW) model [23], converting words into numerical features for analysis.

We used the Tomotopy LDA package to generate eight topics, removing reviews (words < 5) and the top five words that appear most frequently. The model was trained for 500 iterations with seed 42. Since Tomotopy LDA does not have the option to compute coherence scores, we used Gensim LDA, which showed eight topics as optimal (Fig. 1).

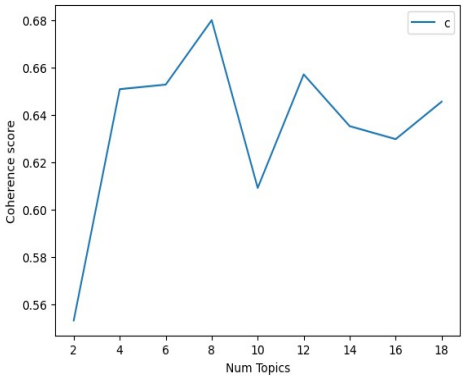

Fig. 1. Optimal Number of Topics

IV. RESULTS AND DISCUSSION

4.1 Topic Words by Weights

Each topic is represented by a group of words and their weights. The weights are essentially probabilities that represent the likelihood of a word appearing in a topic. For a topic t, each word w has an associated weight $P(w|t)$. This probability indicates how strongly a word is associated with a particular topic. A higher likelihood means that the word is more representative or more frequently associated with that topic. The top 10 words with high weight values in each group are summarized in Table 2.

Table 2. Topic Keywords and Weights

Topics	Keywords and Weights
0	Charge (0.0833), Send (0.0562), Bad (0.0494), Mobile (0.0489), Cash (0.0466), Banking (0.0429), Service (0.0398), High (0.0265), Freelancer (0.0218), and Bangladesh (0.0197).
1	Nice (0.0855), Easy (0.0754), Helpful (0.0471), Thank (0.0394), Useful (0.0352), Great (0.0248), Love (0.0245), Service (0.0226), Life (0.0201), Bangladesh (0.0190).
2	Account (0.106), Open (0.0565), Time (0.0482), Try (0.0481), New (0.0391), Problem (0.0284), Create (0.0281), Bad (0.0221), Register (0.0221), Registration (0.0208).
3	Add (0.0781), Pay (0.0550), Bill (0.0479), Option (0.0446), Card (0.0300), Recharge (0.0298), Payment (0.0286), Bank (0.0212), Account (0.0173), Mobile (0.0171).
4	Update (0.0720), Time (0.0504), Open (0.0481), Work (0.0456), Problem (0.0309), Bad (0.0256), New (0.0228), Version (0.0225), Slow (0.0164), Need (0.0164).
5	Code (0.0979), Verification (0.0638), Try (0.0372), Problem (0.0349), Work (0.0296), Number (0.0295), Time (0.0256), Send (0.0236), Type (0.0236), Log (0.0215).
6	Sim (0.126), Card (0.0481), Phone (0.0429), Slot (0.0335), Account (0.0269), Number (0.0261), Work (0.0240), Log (0.0190), Change (0.0182), Insert (0.0159).
7	Service (0.0667), Bad (0.0633), Customer (0.0474), Account (0.0377), Experience (0.0193), Time (0.0175), People (0.0149), Care (0.0139), Day (0.0137), Poor (0.0135).

Topic 0, labeled “Transaction Fees and Service Quality,” highlights user dissatisfaction with high charges and poor services, reflected in keywords such as charge (0.0833), send (0.0562), cash (0.0466), bad (0.0494), service (0.0398), and high (0.0265). Topic 1, defined as “Positive User Experience,” emphasizes satisfaction with the apps, using words like nice (0.0855), easy (0.0754), helpful (0.0471), valuable (0.0352), great (0.0248), and love (0.0245). Topic 2, “Account Creation Issues,” focuses on account-related problems, with account (0.106), open (0.0565), create (0.0281), time (0.0482), problem (0.0284), and registration (0.0208). Topic 3, “Payment Options and Features,” shows user demands for expanded functionalities, including add (0.0781), pay (0.0550), bill (0.0479), option (0.0446), card (0.0300), and recharge (0.0298).

Topic 4, “Update and Performance Issues,” emphasizes complaints about app speed and functionality, with keywords like updates (0.0720), time (0.0504), open issues (0.0481), problems (0.0309), and version (0.0225). Topic 5, “Verification and Login Issues,” highlights login difficulties through terms such as code (0.0979), verification (0.0638),

problem (0.0349), number (0.0295), and log (0.0215). Topic 6, “SIM Card and Phone Issues,” identifies device-related problems, including SIM (0.126), card (0.0481), phone (0.0429), slot (0.0335), and insert (0.0159). Lastly, Topic 7, “Poor Customer Service,” highlights dissatisfaction with support services, as indicated by words like service (0.0667), bad (0.0633), customer (0.0474), care (0.0139), and poor (0.0135).

4.2 Topic Words by Word Count

Fig. 2 shows topic words with their counts and weights. It appears that the word weights are not strongly related to the word counts. Common words, such as "bad" (Topic 0, Topic 2, Topic 4, and Topic 7), "services" (Topic 0, Topic 1), "account" (Topic 3, Topic 6), and "time" in Topic 5, are not always the most heavily weighted words. However, some frequent words, such as "account" in Topic 2 and "services" in Topic 7, are also among the most heavily weighted terms in their respective topics.

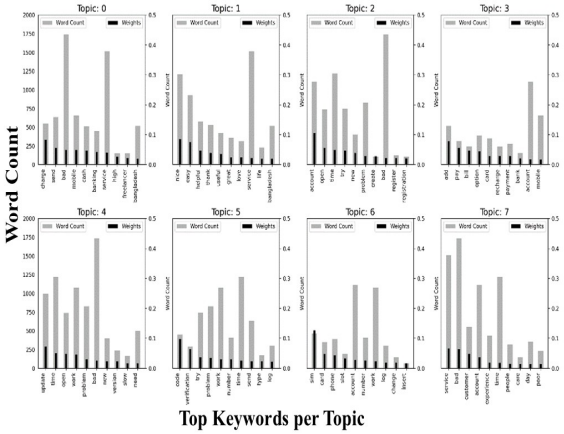

Fig. 2. Word count and the importance of topic Keywords.

4.3 Topic Differences between MFS Apps

Fig. 3 illustrates the topic differences between MFS apps, with each bar representing the distribution of reviews by topic. Topic 0, which accounts for 16.6% of Nagad reviews and 14.6% of Bkash reviews, highlights high transaction fees and poor service, with Nagad users expressing more concern about these issues. Topic 1, reflecting positive user experiences, includes 40.5% of Nagad reviews and 47.6% of Bkash reviews. This indicates greater satisfaction among Bkash users, possibly due to operational differences, as Nagad is publicly operated while Bkash is privately managed.

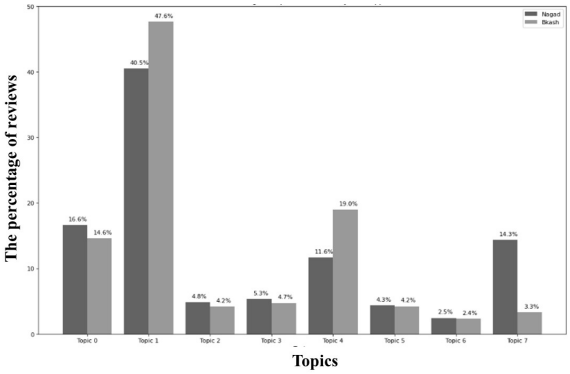

Fig. 3. Comparison of the reviews' contribution to forming each topic.

For Topics 2, 3, 5, and 6—account creation issues, payment options and features, verification and login problems, and SIM card or phone issues—users of both Nagad and Bkash face similar challenges. They struggle with opening new accounts, request more payment options and features, experience verification and login difficulties during transactions, and report incompatibility with certain smartphones and SIM card slots. Topic 4 highlights update and performance issues, comprising 11.6% of Nagad reviews and 19% of Bkash reviews. This indicates that Bkash users face more problems, such as frequent bugs, slower performance, or device incompatibility, due to differences in update frequency and quality. Topic 7

concerns poor customer service, with 14.3% of Nagad reviews and 3.3% of Bkash reviews. This suggests that Nagad users encounter more inadequate support, likely due to weaker infrastructure, slower response times, or limited resources compared to Bkash.

V. CONCLUSION, LIMITATION, AND FUTURE DIRECTION

The financial services industry has transformed with the introduction of mobile apps, providing convenient access to banking services. Using LDA topic modeling, this study analyzed reviews from Nagad and Bkash, identifying eight distinct topics. Results show Nagad users report higher fees, poorer service, and weaker customer support, while Bkash users report more positive experiences but face frequent updates and performance issues. Both groups share challenges in account setup, payments, verification, and device compatibility. Addressing these issues can help improve sustainable MFS apps in Bangladesh. This study has limitations, including irregularities in Google Play data (such as mixed languages, single-word reviews, and the exclusion of Bengali text) and a focus on reviews containing at least three words. It examined only two Bangladeshi MFS apps and data solely from Google Play. Future research could include translated Bengali reviews, more apps, broader comparisons, and additional platforms and timeframes.

REFERENCES

[1] R. Tiwari, S. Buse, and C. Herstatt, "Mobile services in banking sector: The role of innovative business solutions in generating competitive advantage," *Working Paper*, no. 48, 2007.

[2] R. Cull, A. Demirgüç-Kunt, and T. Lyman, "Financial inclusion and stability: What does research show?," *World Bank Policy Research Working Paper*, no. 6273, 2012.

[3] World Bank, "Financial inclusion strategies reference framework," *World Bank Report*, no. 78661, 2012.

[4] J. Parvez, A. Islam, and J. Woodard, "Mobile financial services in Bangladesh," *USAID, mSTAR and FHI360 Report*, no. 49, 2015.

[5] J. Mou, G. Ren, C. Qin, and K. Kurcz, "Understanding the topics of export cross-border e-commerce consumers feedback: An LDA approach," *Electronic Commerce Research*, vol. 19, no. 4, pp. 749–777, 2019.

[6] A. Al Ryan, M. S. Mahmud, H. H. C. Mahi, M. S. Hossen, N. I. Shimul, and S. R. H. Noori, "Fintech: Deep learning-based sentiment classification of user reviews from various Bangladeshi mobile financial services," *Proceedings of the International Conference on Computational Intelligence in Data Science (ICCIDS)*, pp. 126–140, Cham: Springer Nature Switzerland, Feb. 2023.

[7] S. Shahid, J. U. Islam, S. Malik, and U. Hasan, "Examining consumer experience in using m-banking apps: A study of its antecedents and outcomes," *Journal of Retailing and Consumer Services*, vol. 65, p. 102870, 2022.

[8] M. Mustafa, M. A. Shawer, and S. Hamouche, "The technology of mobile banking and its impact on the financial growth during the COVID-19 pandemic in the Gulf region," *Turkish Journal of*

Computer and Mathematics Education, vol. 12, no. 9, pp. 389–398, 2021.

[9] M. R. Khan, S. Rana, and M. I. Hosen, "Impact of trustworthiness on the usage of m-banking apps: A study on Bangladeshi consumers," *Business Perspectives and Research*, vol. 10, no. 2, pp. 234–250, 2022.

[10] X. Xu, "Examining the relevance of online customer textual reviews on hotels' product and service attributes," *Journal of Hospitality & Tourism Research*, vol. 43, no. 1, pp. 141–163, 2019.

[11] X. Xu, "Examining an asymmetric effect between online customer reviews emphasis and overall satisfaction determinants," *Journal of Business Research*, vol. 106, pp. 196–210, 2020.

[12] D. P. Frederick and G. Bhat, "Review on customer perception towards online food delivery services," *International Journal of Creative Thoughts (IJCRT)*, vol. 9, no. 7, pp. b301–b314, 2021.

[13] W. Medhat, A. Hassan, and H. Korashy, "Sentiment analysis algorithms and applications: A survey," *Ain Shams Engineering Journal*, vol. 5, no. 4, pp. 1093–1113, 2014.

[14] B. Liu, "Opinion mining," in *Web Data Mining: Exploring Hyperlinks, Contents, and Usage Data*, pp. 411–447, 2007.

[15] J. Chang, J. Boyd-Graber, C. Wang, S. Gerrish, and D. M. Blei, "Reading tea leaves: How humans interpret topic models," *Advances in Neural Information Processing Systems*, vol. 22, 2009.

[16] S. Deerwester, S. T. Dumais, G. W. Furnas, T. K. Landauer, and R. Harshman, "Indexing by latent semantic analysis," *Journal of the American Society for Information Science*, vol. 41, no. 6, pp. 391–407, 1990.

[17] D. M. Blei, A. Y. Ng, and M. I. Jordan, "Latent Dirichlet allocation," *Journal of Machine Learning Research*, vol. 3, pp. 993–1022, Jan. 2003.

[18] D. Tater and D. John, "Factors influencing adoption and customer satisfaction of m-banking apps in India," *Dogo Rangsang Research Journal*, vol. 13, no. 6, pp. 7–23, 2023.

[19] S. Saibaba, "Examining the determinants of mobile banking app continuance intention in India: An extension of the IS success model," *Journal of Internet Commerce*, vol. 23, no. 1, pp. 50–89, 2024.

[20] M. K. Uddin and S. Nasrin, "Customer satisfaction and intention to use mobile financial services: A systematic literature review," *European Journal of Business and Management Research*, vol. 8, no. 1, pp. 274–283, 2023.

[21] A. Shankar, A. K. Tiwari, and M. Gupta, "Sustainable mobile banking application: A text mining approach to explore critical success factors," *Journal of Enterprise Information Management*, vol. 35, no. 2, pp. 414–428, 2022.

[22] B. A. Fianto, C. K. Rahmawati, and I. Supriani, "Mobile banking services quality and its impact on customer satisfaction of Indonesian Islamic banks," *Jurnal Ekonomi dan Keuangan Islam*, vol. 7, no. 1, pp. 59–76, 2021.

[23] A. McCallum and K. Nigam, "A comparison of event models for naive Bayes text classification," in *Proceedings of the AAAI-98 Workshop on Learning for Text Categorization*, Madison, WI, 1998.

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