

BICM Research Seminar 46

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Paper details	
Title	Evaluating AI Chatbot Performance: A Comparative Analysis of Conventional and Islamic Banks
Authors	Dr. Mohammad Tareq Professor Department of Accounting & Information Systems University of Dhaka
	Kashfia Sharmeen Assistant Professor Bangladesh Institute of Capital Market
Presentation details	
Presenter researcher	Kashfia Sharmeen
Date	22 July 2025 (Tuesday)
Time	03:00 PM – 4:30 PM
Venue	BICM Multipurpose Hall
Expected Participants	Faculty Members of BICM & Invited Guests
Discussants	Tarique Amin Bhuiyan Former Managing Director Dhaka Stock Exchange
	Dr. Md. Rakibul Hoque Professor Department of Management Information Systems University of Dhaka
	Dr. Mohammad Islam Biswas Assistant Professor North South University

About the Presenter

Kashfia Sharmeen serves as an Assistant Professor at the Bangladesh Institute of Capital Market (BICM), where she currently coordinates the institute's flagship Masters in Applied Finance and Capital Market program, affiliated with the University of Dhaka. She holds an MBA with distinction from Cardiff University, UK, specializing in Finance, and has enhanced her expertise in Financial Technology through specialized coursework at the University of Pennsylvania and The University of Hong Kong, while continuing her advanced studies in FinTech.

Her primary research interests encompass FinTech, sustainable finance, corporate finance, Islamic finance and banking, capital market instruments, ESG and corporate governance. Ms. Sharmeen's scholarly contributions have been published in prestigious peer-reviewed journals, including Sustainable Technology and Entrepreneurship (ScienceDirect ELSEVIER), the International Journal of Islamic and Middle Eastern Finance and Management (Emerald Group Publishing Ltd.), Thunderbird International Business Review (John Wiley & Sons, Inc.), and the Journal of Islamic Monetary Economics and Finance. She has also served as a reviewer for several academic journals, including multiple ELSEVIER publications.

The paper abstract is given below. If you have any questions regarding the seminar or you wish to present a paper or invite a guest researcher, please do not hesitate to contact S. M. Kalbin Salema, Assistant Professor, BICM at kalbin@bicm.ac.bd.

Evaluating AI Chatbot Performance: A Comparative Analysis of Conventional and Islamic Banks Dr. Mohammad Tareq¹ & Kashfia Sharmeen²

Abstract

This study compares the performance of AI chatbots in conventional and Islamic banks in Bangladesh, addressing a critical gap in understanding AI implementation in dual banking systems. Through a mixed-method approach involving 120 banking customers (60 for each bank type), we conducted both quantitative performance evaluation and qualitative interaction analysis. Our quantitative evaluation included two subjective measures (communication accuracy and user satisfaction) and three objective metrics (engagement through word count, response relevance using TF-IDF vectorization, and conversation coherence using PMI). Quantitative analysis revealed that conventional bank chatbots demonstrated significantly higher communication accuracy (mean = 19.18) compared to Islamic bank chatbots (mean = 17.03; $F(1,118) = 5.65$, $p = 0.01$) and higher communication satisfaction scores (mean = 28.25 vs 23.88; $F(1,118) = 5.71$, $p = 0.01$). The objective metrics also showed the conventional bank's chatbot (Bank Asia PLC) outperforming the Islamic bank's chatbot (Union Bank) in engagement (average word count = 30.80 vs 17.60), response relevance (0.22 vs 0.18) and conversation coherence (PMI score = 1.24 vs 1.21). For objective metrics, we first analyzed word count for conversations as an engagement indicator. Second, we developed a relevance metric (Manning et al., 2008) using TF-IDF vectorization and cosine similarity to measure semantic alignment between user inputs and chatbot responses (on a 0-1 scale, with higher values indicating stronger relevance). Third, we employed Pointwise Mutual Information (PMI) (Church et al., 1990) to assess topic coherence by measuring topic-relevant term co-occurrences beyond random chance. Qualitative analysis of chatbot interactions revealed that while both systems handled basic banking queries effectively, neither performed well on critical questions about service comparisons, fee structures, and transparency. However, conventional bank chatbots still demonstrated relatively better capability in managing these complex queries. These findings suggest fundamental limitations in the underlying language models of both chatbot systems, particularly in handling critical banking queries. Islamic bank chatbots face additional challenges due to insufficient domain knowledge of Shariah principles, suggesting the need for more sophisticated LLMs enhanced with both advanced banking knowledge and, for Islamic banks, specialized training in Islamic banking principles. This study contributes to the emerging literature on AI implementation in banking sectors of developing economies and provides practical implications for improving Islamic banking chatbot systems.

JEL classification: G21, O33, Z12, C63

Keywords: Artificial Intelligence (AI), chatbot, conventional and Islamic banks, communication satisfaction, communication accuracy

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