Implications of Mobile Financial Service Users' Adaptive Usage Behavior: The Vicious Cycle of Negative Experience, Social Construct, and Confidence

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The COVID-19 pandemic increased the usage of Mobile Financial Services (MFSs) everywhere, including in developing countries such as Bangladesh. The increment of usage is paired with continuing misuse and abuse in several ways that impact users' MFS usage behaviors. This qualitative study aimed to understand users'

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adoptive MFS usage behaviors due to negative experiences and their implications among several communities. The study took place across all eight divisions in Bangladesh and did focus group discussions involving N = 313 participants (female = 203, male = 108, and transgender = 2) covering urban, suburban, and rural regions. Study findings present the ways participants limit their usage, delegate MFS operations, and rely on others to avoid misuse and abuse. The stories also indicate the inability of these measures to avoid monetary loss, which creates more negativity. We discuss the cyclic relationship between negative experiences, social constructs, and confidence. We suggest potential technology interventions to break the cycle.

CCS Concepts: • **Human-centered computing → Empirical studies in HCI;**

Additional Key Words and Phrases: Negative experiences, mobile financial services, digital financial services, digital inclusion, women, Bangladesh

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1 Introduction

The evolution of **Mobile Financial Services (MFSs)** has been a double-edged sword for people in developing countries. MFSs (payments, remittances, and credit accessed and delivered through digital channels) have evolved rapidly in recent years [8, 78]. They have added value in terms of connecting, supporting, and empowering individuals as well as communities from developing countries such as Pakistan [60], Bangladesh [36], and Indonesia [7]. Accordingly, during the COVID-19 pandemic, when contactless cash transactions were required, it allowed continuous payment and options for emergency money transfers [9, 36, 78]. While MFSs have positively impacted many areas of human lives, negative experiences have also grown [30, 31, 37]. These negative experiences include both fraud-related negative incidents (e.g., fraudulent activities) and use-case-related incidents (wrong transaction, inability due to literacy or familiarity). Fraud incidents and misuse by abusers are common in developing countries, and they are prominent in South Asian countries [37, 46, 56]. In Bangladesh, both MFS users and agents are victims of fraud incidents [2, 44], and the prevalence of fraud incidents is higher than in neighboring countries such as India, Nepal, and Sri Lanka [42]. People lose a significant amount of money and fear using MFSs [23, 37]. The collectivist nature of society yields the propagation of negativity. Although the significance and importance of MFSs cause users to use these services, negative incidents hold them back from using them freely enough to unleash their full potential [34]. As a result, MFS-aided financial inclusion initiatives and innovative approaches did not receive as much appreciation as they perhaps deserved and rather created scrutiny. Numerous new users are joining hurriedly, most of whom are joining just to get aid or salary. Many of them are unaware of different features, usages, and regulations and are exploited by fraudsters. In this critical situation where the users must continue MFSs to keep their financial activities going despite having inadequate information and a sense of insecurity, they employ different coping mechanisms to combat negative experiences.

While research shows how MFS users face different negative experiences and their impact, the ways users mold their usage behavior and the implication of such improvised usage behavior are underexplored. Researchers exploring adaptive usage behavior found that some victims reported ignoring all doubtful communication, limiting the use of the system, and adopting different coping strategies [37, 60]. Jain et al. found that the measures users adopted overwhelm and expose them to further vulnerabilities [37]. Rohanifar et al. revealed multiple factors (e.g., intermediaries, terrorist

assemblage, and re-skilling existing employees) that impede the adoption of cashless transactions [62]. Hence, a qualitative understanding of users' coping behaviors for avoiding negative experiences and the implications of the adoptive behaviors while using MFSs is necessary to provide a better infrastructure. To complement the literature, this work explores the adaptive behavior of MFS users in Bangladesh due to the negative experiences they perceive. We conducted a qualitative study covering all eight divisions in Bangladesh.

We did 63 focus group discussions with N = 313 participants in total (female = 203, male = 108, and transgender = 2) with various socioeconomic statuses from rural, suburban, and urban regions. The study revealed that the participants' adaptive behaviors to combat negative experiences led them to over-reliance on MFS agents and other known acquaintances. The agents also failed to protect their money, and the over-reliance was exploited in many cases. In light of the study findings and concurrent literature, the article discusses the inter-relation of negative experiences and adaptive behavior along with social constructs (e.g., gendered narration and victim blaming). It shows that lack of confidence and increased dependency along with social constructs create further vulnerability. Invisibility due to dependency also deteriorates social constructs further. Such scenarios create a vicious cycle where perceptions of negative experiences lead to behaviors resulting in further vulnerabilities. Jain et al. also presented a cyclic vulnerability model. Through the sequential flow of socio-technical actions, vulnerabilities, the potential for fraud, harm, and coping mechanisms, they presented the cyclic relationship [37]. We extend their work by illustrating ways exploitation of social and religious norms, economic conditions, and the patriarchal culture (e.g., gendered narrations and invisibility of women) interplay according to our study findings and concurrent literature [60, 62]. We also point out the potential technologies to break the cycle through contextual technological modifications, along with tools for MFS agents.

Bangladesh, being a country with emerging MFS users, presents an example scenario that applies to many similar regions of the Global South and low-resource communities in Western regions. Through our study and qualitative analysis, we pointed out agent dependency, gendered narrations of negative incidents, victim blaming, and religious and cultural factors that complicate and intensify the negative experiences while using MFSs. While these aspects have come up separately in concurrent research works, we present the interplay among them that hurts the overall MFS ecosystem in Bangladesh dealing deep wounds to the potential of financial technologies like MFSs. The study contributes to the HCI and ICTD community by providing insights regarding the scenario and technology suggestions to enlighten system designers, implementers, researchers, and policymakers while designing and implementing MFSs or policies.

2 Related Work

In this section, we present the positive impact of MFSs in developing regions and their growth during the pandemic first, before digging deep into works focusing on the negative experiences of MFSs. Although the works focusing on or presenting the scenarios related to negative experiences are more relevant to ours, works examining the positive impact play a crucial role in providing the context of works that dealt with negative experiences and ways to mitigate them like ours.

2.1 Importance of MFSs in Developing Regions and Their Emergence during the Pandemic

MFSs have added great value in terms of seamless financial transactions, particularly considering developing regions, where a large number of people are unbanked [24, 33]. In a developing country context, MFSs add convenience by offering various services. Studies conducted in India [74], Kenya [25], and Afghanistan [18] have shown MFSs to have a positive impact on savings. Additionally, MFS-aided cashless salary payment to employees is transparent, instantaneous, and auditable

[17, 19]. The significance of MFSs on ultra-poor communities is in empowering women through financial stability and other factors in various regions such as arid and semi-arid lands of Africa, Tanzania, and India [12]. Access to digitized payments increases women's control over earnings and increases their ability to negotiate working outside the household [29]. Studies also explored that MFS usage reduces poverty [26, 43, 72] and increases the per capita income and per capita consumption [15, 47]. Suri and Jack explored that through the usage of M-PESA in Kenya, 194,000 households were lifted from poverty [72]. A study in Uganda showed a per capita consumption increase of 13% when mobile money services were used [47].

Similar potential of MFSs in bringing economic growth has come up in the studies in Bangladesh also [58], despite being a comparatively new financial technology (details of the history of MFSs and a technology usage scenario in Bangladesh are provided in Appendix C.1). A study found a fall in poverty, reduction of borrowing money, and increase in savings among the bKash users [43]. The importance of MFSs became more prominent during the COVID-19 pandemic situation [36] as it disrupted every aspect of human lives including businesses, the economy, and the education sector [67]. The middle-income and low-income communities struggled severely during this period, including formal and informal workers [11, 39, 52]. The economic impact was visible in the drop in domestic economic activity, the decline in exports of ready-made garments, and a fall in remittances from Bangladeshis living mostly in Middle Eastern countries, affected by the pandemic [38]. Many activities shifted online (e.g., online shopping [75]), which also yielded more use cases of online payments. Abdillah et al. explored the usage of digital payment methods such as Gopay and Gojek in Indonesia and showed increased usage during the pandemic [7]. Zetzsche et al. also present the financial crisis and MFS emergence in the global context during the pandemic [78].

The added value of MFSs shows the significance of negative experiences on this platform, which affect user interaction. Hence, to relish the full potential of MFSs in bringing economic growth, the improvised MFS usage of the users is an important area to explore, which is the focus of this work.

2.2 MFS-related Negative Experiences and Possible Impacts

Negative experiences also became more prominent, as recent studies have reported, in the developing country context. New mobile users and less tech-savvy users are vulnerable to facing fraudulent activities [56]. In addition to a lack of familiarity and knowledge, the associated economic consequences of making a mistake prevents many mobile users from using mobile money according to Vashistha et al. [74]. They suggested that this hesitation comes from fear of losing money and embarrassment in public if they fail. Studies in Tanzania [57] and Pakistan [60] found that scams and ICT breakdowns hampered customers' trust in MFS agents. Research on digital payment adoption during demonetization in India found that a lack of trust in other digital tools, rumors of negative experiences, fear of fraud, and highly cash-reliant businesses make people reluctant to use digital payment [54]. The lag between the introduction of digital tools and the evolution of trust in supporting institutions was a critical factor in merchants' hesitance. Their vulnerabilities were scrutinized through different social engineering frauds via SMS and WhatsApp as found by Jain et al. [37]. Ibtasam et al. found women to face challenges such as limited or restricted mobility, societal norms or safety concerns, lack of agency where men are considered the financial decision-makers supported by religious beliefs, and lack of access to technology artifacts while exploring women's financial inclusion in Pakistan [35]. Another research work in Pakistan revealed that MFSs must meet the privacy and secrecy needs of users who use mobile phones as shared resources [48]. While designing the digital version of a collaborative money management system, ROSCA, in Pakistan [46], women's smartphone access emerged as a primary barrier along with permission to participate in a research study to try out the system, showing society-imposed gender roles playing an important part. The researchers found that the lack of

reliability in digital systems detracts users from adopting them and solely the smartphone-based design of financial technology would amplify the exclusion of women from such systems [46]. These issues are also critical in Bangladesh, where patriarchal practices affect people's technology access and usage [71]. This is reflected in the gender disparity in mobile phone penetration [64, 65]. Research in Bangladesh exploring the adoption of cashless transaction systems found that the role of intermediaries in transactions, resistance from senior employees, and lack of training impede the mass adoption of cashless transaction services [62]. Concerns relating to safety issues and fear of losing money are prevalent among the MFS users, where security stories and word of mouth have a notable impact on them. Fees associated with MFSs also detract users from using cashless transactions [34].

While these works mostly presented the negative experiences in MFSs, very few of them explored users' adoptive behavior due to those experiences. Razaq et al. found that some victims reported ignoring all doubtful communication due to their inability to differentiate fraudulent messages [60]. Jain et al., in this regard, found that merchants primarily limited the use of digital payments to only regular and trusted customers [37]. They adopted multiple strategies to combat fraud, such as not allowing customers to walk away with purchased items before they confirmed the transactions, asking family members and co-workers to manage transaction verification during busy hours, maintaining logs, and repurposing webcams to capture fraudulent customers. These adaptive measures in many cases put an extra burden on the users and expose them to further vulnerabilities, exhibiting a cyclic relationship between socio-technical actions, vulnerabilities, fraud, and harm [37]. The exploration of improvised user behavior due to negative experiences should be considered as a design opportunity that is culturally relevant in the local context for more accessible and culturally appropriate designs as suggested by the HCI research community [13, 70]. This research enhances existing research works particularly in capturing the way MFS users mold their usage in the context of Bangladesh.

2.3 Suggestions to Mitigate Negative Experiences

Researchers in the domain have tried to provide contextual suggestions to mitigate the negative experiences of MFS users in line with their research focus and population. Rohanifar et al. suggested utilizing the power of online movements to raise awareness [62]. Educating users regarding social engineering attacks, fraudulent schemes, and privacy concepts through awareness-raising programs is deemed necessary by Razaq et al., who also highlighted the role of social contacts, including friends, family, and mobile money agents, in providing support for victims of mobile frauds [60]. They further suggested strengthening the offline trust in the people whose credibility is being utilized by fraudsters (e.g., officials from different organizations including law enforcement agencies). Pervaiz et al. suggested that greater interaction with experienced users would enable new users to learn quickly about how to avoid SMS scams [56]. Female employers, entrepreneurs, and highly educated or technology-familiar women can serve as technological and social ambassadors for other women, as suggested by Ibtasam et al. [35]. They also discussed the importance of promoting gender equality in financial matters. Clear delineation of roles and responsibilities between the law-enforcing agencies and regulators is emphasized to prevent fraudulent verification [60]. Vashistha et al. endorsed the importance of building trust where a policy that provides strong customer regulation protection and encourages MFS service providers to offer effective recourse can have a positive impact. When it comes to improving the adoption of cashless transactions in Bangladesh, "graceful integration of new systems while retiring the previous systems" is deemed vital.

Researchers in this domain have also suggested technology modification and innovation to address users' concerns. While addressing PIN sharing and privacy-related issues, researchers

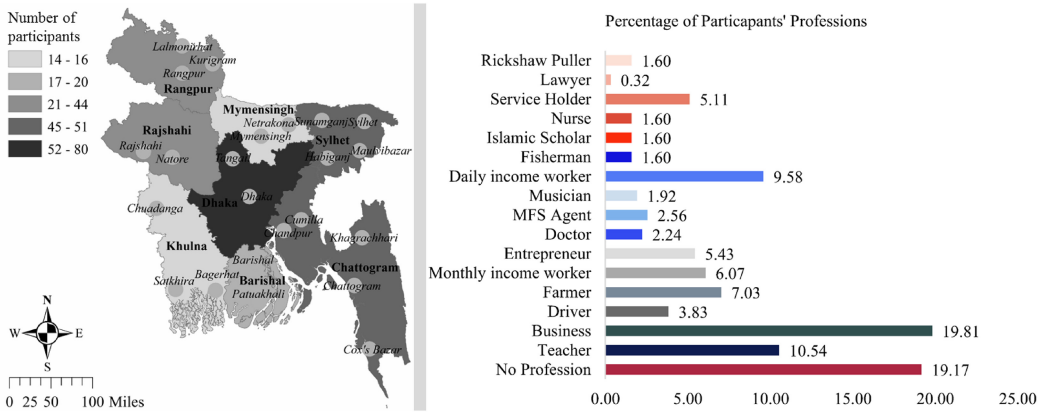

Fig. 1. (Left) Map of Bangladesh presenting participants' living divisions and districts. (Right) List of participants' professions.

emphasized improving the memorability of passwords, innovative ways to secure PIN verification [40], biometric authentication, and pictorial passwords [62]. The usage of pictures and icons is also emphasized in accommodating low-literate users [46]. Vashistha et al. suggested "a more forgiving system" that includes a reversal mechanism to enhance user confidence regarding wrong transactions [74]. While addressing the intermediation of the agents in the cultural context of the Global South, ephemeral and auditable credentials are proposed to allow agents to access a customer's account without requiring a customer's account credentials [57]. Razaq et al. discussed the need to redesign reporting to ensure the privacy of individuals and to offer a convenient friction-less reporting process and provide a few potential report parameters [60]. Disabling fraudulent phone numbers and fraud detection apps are mentioned also to combat fraud [56].

This research extends these works by presenting contextual ways to mitigate negative experiences users face in the context of Bangladesh, where contextual similarities are observed with respect to the Global South. It aims to highlight the appropriateness of different approaches adopted by the concurrent researchers and align them according to the considered population in this research.

3 Research Method

This qualitative research considers the negative experiences using MFSs and their implications as reported by the study participants. The study considered N = 313 participants (female = 203, male = 108, and transgender = 2) of various demographics and professions. Participant categorization by profession is provided in Figure 1. The study considered participants from all eight divisions of Bangladesh (the participant distribution in the study is presented in Figure 1) and took place over 15 months, from December 2020 to March 2022.

3.1 Study Design

The qualitative study considers semi-structured focus group interviews with mostly open-ended questions asking participants to share experiences, stories, and perspectives. The questions focused primarily on the participants' financial behavior, technology, and MFS usage scenario. While asking about the MFS usage scenario, different stories related to fraudulent activities came up. Then the researchers followed up on the stories by asking about the ways these experiences have changed their MFS usage behavior. In many instances, participants themselves shared how they

mold their usage to ignore negative experiences. Each session lasted over an hour and was conducted in the native language (Bengali). For the interviews, we examined the COVID-19 outbreak situation and prioritized participants' preferences. We performed interviews in person, online, and in hybrid formats where the moderator joined with the participants and other researchers joined online. Individuals who continued to work outside the home during the study period or who had personal preferences for in-person meetups participated in the in-person interviews. The researchers matched the preferences of the participants in choosing the mode of the interview. While setting up focus group interviews, the researchers tried to set up groups of four to five participants to ensure in-depth conversation, as Krueger preferred [41]. Every individual of the groups was asked about their preferences or reservations about the researchers' presence in terms of gender, background, or any other concerns. The focus groups were formed as female-only and male-only groups without any mixed-gender groups. The interviews were undertaken in locations where the participants felt at ease.

3.2 Participant Recruitment

The purposive sampling method was used to recruit participants to ensure diversity in regions (urban, rural, and semi-urban), economic backgrounds, and education levels, while the focus group interview included participants from similar professions and socioeconomic backgrounds [16, 27]. The participant selection process was guided by region and other user demographics as the recruitment criteria to ensure representation across different user demographics. The researchers approached **Key Informants (KIs)** to reach the participants in every region they studied. KIs were trusted and known individuals locally with in-depth local knowledge who helped the researchers connect with the participants and set up the interview. The researchers explained the research objective, guidelines, and recruitment criteria to KIs, who communicated with the participants accordingly. KIs provided the researchers with prior knowledge about the participants' demographics, norms, and perceptions. The participants preferred focus group interviews in most cases where the MFS agents were the exceptions, as they preferred individual interviews in their workplace. The selection of groups and discussion of interview space allowed the researchers to be familiar with the group of participants before the actual interview, which had a positive impact. The participant recruitment process as well as data collection continued till the last interview. The process was halted once the researchers found no further insights and reached the data saturation level [22].

3.3 Interview Process and Moderation

The researchers initiated the discussion with some initial demographic information, followed by a semi-structured discussion on financial technology—during and before the COVID-19 pandemic. One researcher moderated the interview, while the other researchers were present in the interview as note-takers and assisted the moderator with follow-up questions. The female focus groups were moderated by female researchers and the male group interviews by male researchers to ensure comfort. The MFS agents, all male in the study, were interviewed by male researchers. The researchers paid special attention to ensuring that every participant's voice was heard during the interview. The moderator was experienced in handling challenges like domination in discussion. The researchers facilitated storytelling and detailed experience sharing. Most participants shared their negative experiences with MFSs while sharing how MFSs can be improved. They were very happy to be able to share their stories and thanked the researchers for listening to them. As the research study was conducted during the COVID-19 pandemic, all the in-person interviews followed the COVID-19 safety protocols set by the World Health Organization [6] and the Ministry of Health and Family Welfare of Bangladesh [5].

3.4 Qualitative Content Analysis

Qualitative content analysis of the study was initiated through informal analysis, which started after the first interview and continued till the last. The interviews, taking place in Bengali, were translated and transcribed into English. The transcriptions were initially coded using the inductive thematic analysis approach for qualitative coding [20]. The coding and categorization process was not guided by any predetermined theoretical frameworks or assumptions [20]. The Computer-aided Qualitative Data Analysis Software Atlas.ti was used in the coding process [4]. The open coding phase was initiated during the interviews of the first region (Dhaka). The transcripts were reviewed and discussed several times before the coding phase. During the open coding phase, 117 codes were identified (e.g., Security: Lack of Awareness; Security: PIN Sharing; Fear: Wrong Transaction; etc.). These codes contributed to being able to come up with high-level themes (e.g., MFS Usage Behavior, Impact of Negative Experiences, Infrastructure, etc.). Individual themes were further analyzed, and we made a chart of negative experiences, writing down the important codes respectively along with comments as presented in Figure 8. A snapshot of the codebook is provided in Table 2. Five members of the research team were involved in the coding process. Throughout the coding process, weekly or bi-weekly research meetings were held to allow peer debriefing [53]. If any disagreements occurred in the coding process, the researchers discussed and reached a consensus. The iterative discussion, notes, and themes are presented in Appendix B through Figure 5, Figure 6, and Figure 7.

3.5 Research Ethics and Incentives

The study was approved by the **Institutional Review Board (IRB)** of the corresponding author's institution (IRB number is not included because of anonymity). All the participants involved in the study were adults (above the age of 18). The researchers explained the aim of the research, the procedures and topics of the interviews, and the general guidelines before starting each interview. The participants were encouraged to ask any questions regarding the procedure. If the participants agreed, they provided informed consent. Participants were asked for consent for recording their interviews. All the data from the study, i.e., recordings, transcriptions, notes, coding documents, and so forth, are saved in secured drive storage with access limited to the researchers, which can be used for research anonymously. Each participant received a gesture of gratitude worth BDT 1,000, which is equivalent to approximately 12 USD (1 USD = 83.95 BDT on average at the time of study) after the completion of the interviews. The researchers did not mention the incentive before the completion of interviews to ensure that monetary incentives did not affect respondent behavior.

3.6 Positionality

The researchers' backgrounds, positions, and research exposures are disclosed for the readers to understand the perspectives utilized and the credibility of the research lens to conduct the qualitative research [28, 53, 73]. The researchers were born and brought up in Bangladesh and are fluent in their native language. The research team had diversity in backgrounds of gender, religion, and area of residence covering urban, semi-urban, and rural upbringing, which contributed positively in terms of connecting with the participants and the cultural norms of the country. Additionally, all the researchers have been involved in qualitative studies regarding inclusive technology designs in Bangladesh and know socio-cultural norms and practices. The team is eager to ensure technology inclusion, which motivated their engagement and involvement in this study. The experience and exposure of the researchers also influenced the way the research results have been analyzed, interpreted, and presented.

4 Findings

The participants shared about experiencing many MFS misconducts, which are abuses in MFSs. Such abuses were conducted primarily through fraudulent phone calls and in-person interactions, categorized as impersonation, lottery offers, scholarship and stipend offerings, and so forth, related to monetary loss. The participants expressed their concerns regarding MFS security and monitoring, their vulnerability to human errors, and complications in using the systems. These challenges prevent the spontaneous usage behavior of MFS users. Users mold their MFS usage in trying to avoid monetary loss based on their experience.

4.1 Users Restrict Their MFS Usage Due to Negative Experiences

The primary coping strategy for the participants who had any MFS-related negative experiences of their own or in their family was to limit their MFS usage. Such behavior has also come up in the literature [37, 60]. This section presents the scenario in the context of our study based on the perception of the participants.

4.1.1 Being Overly Cautious after Experiencing Fraudulent Incidents. Many participants exhibited an overly cautious mentality while operating MFSs, especially the ones who faced or heard about different fraudulent activities. These activities involve different impersonation techniques through phone calls that fraudsters employ to trick users. According to the stories of the participants, the callers impersonated religious and spiritual characters and official and authoritarian characters to abuse the users emotionally through social constructs and existing societal power structures. For example, some fraudsters began their phone conversation by identifying themselves as "JINNS" or "KING of JINNS" and a pious man (sometimes known as "Jiner Badshah" or "Dorbesh Baba" in Bengali). These impersonated calls usually appeared at midnight and used authoritative tones, cursing the participants severely when they did not receive the money. Many participants engaged in long conversations rather than ignoring the call right away to avoid the curse as they believed the impersonated voices. This belief is socially acceptable in Bangladesh because religious and spiritual practices are deeply rooted in the Indian subcontinent region, impacting societal behavior and technology usage practices [49]. The following quotation of a participant shows he was cursed after having conversations with the "King of Jinn" several times:

> "Once I got a call. The caller told me he'll send me a doll made of gold and asked me to burn some scented sticks and candles in the mosque. [...] I replied by asking him to give me the doll and I will pay him 1 lakh taka. Then he cursed me and I replied by scolding the caller with slang. He said you will be gone, you will be dead."- P271, Barisal Launch Workers, Male, Age Range: 18–29, Urban, Barisal.

Pandemic-related health and economic vulnerabilities also contributed to the severity of the impersonated religious and spiritual character-centric frauds, leaving the victims emotionally paralyzed. The curses of danger and death shook many participants, who might not have been otherwise if the pandemic situation was not critical. The economic desperation of users was exploited amid unforeseen circumstances of the COVID-19 pandemic, and cases of scamming through scholarship and allowance notices and enticement through lottery winnings rose according to the participants. Additionally, fraudsters targeted timelines of merit scholarships and government allowance disbursements to scam people to make calls look authentic. In this study, we found that the abusers mainly focused on the participants in rural areas as their awareness level was slightly lower. Also, in their families, mobile phones are being shared, and family members unaware of the scam could fall into such a trap. For example, a participant, P313, whose allowance came to his

mother's account, shared: *"(The fraud) asked for the secret PIN and told her she'll get more money the next morning. My Mom shared the secret PIN, and they took the money and locked that account."*

The societal power structure was also exploited through the impersonation of different officials and authoritarian characters such as police, authorities from the education board, or the high officials from the MFSs' offices. In contrast to the previously discussed impersonated characters, these characters made quick calls and tried to extract sensitive information (PIN or OTP) from the call receivers, creating fear or stress among them regarding receiving money on the MFS account. These calls were tailored to simultaneous events or occasions, making them hard to ignore, and were prevalent in both urban and rural areas. For example, a participant shared a money loss case of his relative where the victim got a call from an impersonated MFS official hours after making a transaction that was quite significant for the socioeconomic condition of the victim. The participant's narration was as follows:

> "My relative was sent 19500 taka to his account. Suddenly, he got a call from (a person impersonating) Bkash (officer) saying, 'your number got money illegally. There is a police case on this number. Check that your number got a message. Tell me the PIN.' He told the pin and lost the full money instantly. He got scared hearing of a police case." - P282, Barisal Ride Sharing Business, Male, Age Range: 50–65, Rural, Barisal.

Moreover, wrong transactions and the complications of reversal of any mistransactions also affected the spontaneous MFS usage of the participants, as participant P38 shared: "Because of my previous accident I am scared of bkash (MFS) transactions," in following up on another participant P37's story, which stated, *"My sister sent money for my parents. But mistakenly the number was wrong and she didn't get the money back."* Another low-income participant shared her story as follows:

> "My husband faced a similar kind of problem. He mistakenly sent money to another person's number. That person was a girl. I called her and said, Sister 5000 taka is huge for us, if you want you can keep 1000 and please send me the remainder. She said, I will not be rich with your money, I will send it to you. Then she didn't sent it and didn't pick up my phone calls."- P11, RMG Worker, Age Range: 18–29, Urban, Dhaka

These stories suggest that poor people were scared of losing money through MFSs as any amount of money was significant to them. Similarly, negativity is also common among people of better financial status and educational levels. For example, participant P19, a school teacher, shared a similar tone, noting, *"Sometimes I feel very scared if I send money to others mistakenly."*

The negative experiences perceived by the participants created fear among them and hampered their confidence in safely handling MFS accounts. The participants not only shared their own experiences but also described their family members' and relatives' stories, indicating the impact of those incidents on their own MFS usage behavior. Losing money also resulted in them having a fear of keeping money in MFSs. A male participant with a stone business, P234, explained this fear in simple words: *"People are afraid to keep money in bkash (MFS), having a fear of losing money."* Concerns regarding MFS security and fraudulent activities deterred participants' typical MFS usage behavior, as entrepreneur participant P114 shared: *"I do not keep a big amount in my bKash (MFS) account. I cash out whenever I have 3 to 4 thousand taka in my account. I do not keep over 1500 taka. Because there is no heavy security, anything can happen."* Another participant highlighted her way to avoid any misconduct in MFSs such as fraudulent calls as follows:

> "My mother used to get a lot of such calls from different numbers. I have heard similar incidents from my friends. This is why I do not keep money in Bkash, but whenever it is needed, I just transfer money in bKash from my city touch account in a minute.

> Usually, I keep less than 1000 taka in my bKash."- P54, University Teacher, Female, Age Range: 30–39, Urban, Dhaka.

The above quotations suggest that the participant only keeps an insignificant amount in her MFS account to prevent misconduct. This behavior is common among many participants regardless of their income and education level. The participants who are from the lower-income groups tend to withdraw the money from their account as soon as receiving it, as shared by an RMG worker, P12. This resembles the overly cautious behaviors of the participants in order to avoid all types of misconduct in MFSs.

4.1.2 Close MFS Accounts and Delegate MFS Operations. The impacts of fear varied among the participants of different demographics. While many participants limited their MFS operations, many of them preferred to close their MFS accounts permanently or temporarily. These participants mostly were literate urban residents belonging to high-income groups and had alternate options to operate money, such as banks. A housewife from Chandpur, P265, shared: *"After losing my money from the Bkash account, I stopped using that and closed my account forever."* Participant P138, a businessman from Rajshahi, shared a similar concern: *"I opened it (mobile wallet account), but after an attack by a hacker, I stopped."* Another participant, a housewife from Rajshahi, shared that she temporarily stopped using mobile wallets after losing money but could not resume when she needed to due to conflict in MFS account opening guidelines.

> "I had a bkash account. But stopped using this. I got a few abusive calls on the number, that's why I switched off the phone number. After that I tried to open a new bkash account but I couldn't because they said only one account can be opened through one NID (national ID)." - P126, Housewife, Female, Age Range: 40–49, Semi-urban, Rajshahi.

Participants shifted their mobile money usage behavior not only due to negative experiences regarding losing money but also because many of them found the process complicated. Participants shared that MFS transactions appeared difficult to some of them, which initiated discomfort, resulting in outsourcing the transaction task to the MFS agents, as a rickshaw puller, P300, shared. *"If I have little money, like 200 to 300 taka, I just send it. If I have 500 to 1000 or more, I go to the agent and give him the number."* Also, for this reason, some participants did not create personal MFS accounts and preferred to use agent numbers. While this scenario of delegating MFS operation-related tasks is common among low-literate users, it is also prevalent among literate technology-familiar participants. A teacher, who is technology familiar and able to efficiently use social media and video conferencing tools to conduct online classes, relied on agents for MFS operations rather than doing them herself:

> "I don't have a personal account. My money comes in an agent account. After sending money to the agent account, they call me, and I go to the agent shop to collect the money. The transaction seems tough to me. There are possibilities of wrong transactions" - P56, Teacher, Female, Age Range: 30–39, Semi-urban, Dhaka

Moreover, a knowledge gap is observed among some participants regarding ways to secure personal information regardless of their educational backgrounds. They sometimes face problems with this issue and lose money mistakenly. A participant reported that his wife lost money because she was unaware of MFS scams. He shared personal information with the abusers:

> "With bkash; sometimes they (fraud) call asking for pin code; say I am speaking from the bkash office. My wife was told, 'Your account will be disabled; give me your PIN code, and I'll fix it.' She is a girl; she doesn't know. She has yet to learn how the money

> will be transacted. In that case, she gave the pin code, and 1000 taka was gone instantly." - P157, Working Man, Male, Age Range: 30–39, Urban, Rajshahi.

As the above quotation portrays, along with many other instances of fraud incidents, words like *"She is a girl; she doesn't know,"* indicating victim blaming and gendered narrations of losing money, are prevalent if the victim is female. Due to the patriarchal structure of society, women are belittled for not being able to handle mobile money properly, although these incidents tend to happen with many users regardless of their gender, as we have found in our study. These perceptions hampered the avenues for women to use MFSs with confidence or to learn about MFSs. One MFS agent, P46, explained his experience about people's MFS usage by commenting that women lack knowledge of using MFSs more than men due to the patriarchal societal structure. He also shared that working women often continue the transaction with the help of a male person: *"One of the reasons is societal. In Dhaka city, those who are prosperous follow more patriarchy, and those who are working as household workers come up with a male person."* This agent also added that older women also lack knowledge, are not comfortable with MFSs, and outsource the tasks to children:

> "The present generation has already started doing transactions, but the previous generation means 40/50 years old women are not comfortable with new technologies. They thought our time is over now, and our children will know these things better." - P46, MFS Agent, Male, Age Range: 18–29, Urban, Dhaka

Misconduct, wrong transactions, complications in performing MFS operations, and the societal structure of victim blaming led many participants to a heavy reliance on the MFS agents to handle different transactions. This approach also came with its own challenges, especially as many of them have a knowledge gap regarding MFS security. The following section continues on the presentation of the implications of these discrepancies on MFS usage behavior.

4.2 Over-reliance Leads to Abuses

Participants opting to use MFSs primarily through agents have also faced a large array of negative experiences, including monetary loss, extra charges, harassment calls, and so forth.

4.2.1 MFS Agents Fail to Protect Customers' Money. People lose money due to mistakes made by the MFS agents, and the complicated process of reversal of wrong transactions makes it almost impossible to get the money back. The participants shared that MFS agents sometimes type the wrong digits in a number, resulting in money going to the wrong recipient. The agents also admitted to this issue. An agent in Sylhet, P252, shared about losing 2,000 takas: *"While typing, I made a mistake on one digit and lost 2 thousand takas. I sent the money to one personal number and when I called the number, the person was talking irrelevently and did not tell the truth."* Such mistakes by the agents initiate distress and mistrust among customers, as shared by another agent, P75. In those cases, MFS authorities did not help them get the money back and they had to suffer for that as described by the agent as follows:

> "One of my customers came to me and sent 8 thousand taka. I sent the money and after 10 minutes, he returned and said that the money was not sent. After inquiring about the issue, I found the customer had made a mistake. He did not want to accept his mistake. I called on that number. The number was off. Already 8 months have passed. I tried a lot on that number. Still off. I reported to the Bkash (MFS) office. The Bkash office told us that they would help us. But they didn't. How can I bring back that money? It's a lot of money."- P75, MFS Agent, Male, Age Range: 30–39, Semi-urban, Dhaka.

Moreover, it is not only the mistakes of MFS agents that the participants had to endure while using MFS services through the agents; the agent shop environment also created discrepancies. Most agent shops are situated in a marketplace or a crowded and congested place. The congestion and chaos also affect the security of information in those shops, and the chance of personal information leakage was a point of concern expressed by the participants. The participants shared that MFS agent shops are always full of people, where abusers might stay in disguise, acting as customers. They feel that abusers take notes and photos of the transaction records (e.g., phone number, transaction details, etc.) kept by the MFS agents, as most agents maintain physical notebooks for record-keeping. A participant, P281, shared the following scenario: *"Frauds were moving around the agent's shop and trying to take photos of it. Then called on that number."*

Sometimes such complaints are aggregated by gender (Appendix Figure 4). The female participants mainly mentioned the data insecurity that was often linked to harassment resulting in fraud incidents. Such information leakage impacts women more as they often receive abusive calls from abusers and get harassed. This harassment scenario is common in South Asian research [64], and such harassment incidents decreased women's intention to use MFSs from agent shops. A female student shared: *"When I do cash-out from a known shop, he never asks for my number. However, When I cash out from an unknown shop for an emergency, he asks for my number. This way, female users' mobile numbers spread to miscreants."* An MFS agent summed up the whole scenario succinctly as follows:

> "Women are not interested (in MFS) because of harassment calls. Suppose a female customer came here and told me her number, but I had many people at my shop; if any of them noted her number, she would get a harassment call. Sometimes I do my work here, but I have 10 more customers in front of me, and one of them took a photo of my transaction book. So how can I manage these things? I am so busy with my work." - P46, MFS Agent, Male, Age Range: 18–29, Urban, Dhaka

These issues of negative experiences of agent-reliant MFS usage are unintended from the agents' side. However, many issues were shared by the study participants where the agents were allegedly involved, which are presented in the following section.

4.2.2 MFS Agents Take Unfair Advantages Due to Over-reliance. There were incidents where some MFS agents took unfair advantage of the participants. These occurrences were prevalent in remote areas and in adverse situations mostly. During the pandemic, the government disbursed allowances through MFSs all over the country. While MFSs played a significant role in reaching marginalized communities, getting that money was a great challenge for the people who were not accustomed to MFSs or did not have access to them. In many areas, the agents forced the users to buy phones or SIM cards to receive the allowance, as shared by many participants. They had to buy phones and SIM cards worth around 1,700 to 1,800 taka to claim the government allowance of 2,500 taka, as shared by a participant, P207, who lives in a remote village of the Sylhet region. A participant from rural hilly areas shared the experience as follows:

> "Union parishad sent a list for (the COVID-19 pandemic time) allowance receivers, but then they (MFS agents) asked to purchase a new mobile number and new phone, so people needed to buy a new phone and sim card to get the allowance. They only do it to sell sim cards. There is no need to buy a new phone."- P95, Tribal Man, Male, Age Range: 30–39, Semi-Urban, Chattogram.

Similar allegations of charging extra money for various MFSs came from the participants living in the hilly areas or other remote places. In rural areas, MFS agents take extra charges for transactions over the regulated charges as there are limited alternatives. In some places, the agents only

offer the popular services and do not provide other services at all, creating inconvenience for the users relying fully on agents. Some participants shared that they always face these unfair demands and must fulfill them. A participant, P125, shared that she paid BDT 500 to open an account that was originally free of cost. Another Indigenous participant, P93, shared the increased charges during the pandemic: *"The shops situated in village areas charge extra money. During mobile recharge, they also charge 2 taka extra; sometimes, it increases to 5 taka. During COVID, they also charge extra."*

Over-reliance not only results in the intended abuse from the MFS agents but also causes extra workload on them. In various instances, the measures that agents take to simplify their workload pose a serious threat to the security of the users' MFS accounts, which was found in this study. Local MFS agents often use a specific PIN code for the people who rely on them to maintain their accounts, and sometimes for the whole village, there are one or two common PINs as all the villagers operate their MFS account through the agent. Participants know that MFS agents know the PIN and others have the same PIN, as shared by one female participant as follows:

> "I told the agent that the school's stipend money had come to my mobile. They took my phone and pressed the PIN code. They know the PIN code. Everyone has the same pin code." - P183, Housewife, Female, Age Range: 40–49, Rural, Rangpur.

This showed their lack of knowledge in securing PINs and how they take the security aspect of this phenomenon for granted. This might easily result in a monetary loss or in a disastrous compromise of MFS security for several users in that locality.

Moreover, participants' concerns about the essential support from authorities and service centers and the quality of services impacted their usage of MFS behavior. The participants mentioned the lack of avenues to report any misconduct. They also raised concerns about the effectiveness of reporting any misconduct, as participant P311 shared that he never heard of anybody who had gotten his money back after losing it through fraudulent activities.

5 Discussion

Researchers have focused on negative experiences users face while using MFSs in various ways [56, 74]. Rohanifar et al. pointed out the role of intermediaries, terrorist assemblage, and re-skilling the existing employees as impediments to cashless transaction system adoption in Bangladesh [62]. Razaq et al. showed different social engineering techniques that led to financial harm [60]. Jain et al. explored the vulnerabilities of low-income merchants in India while adopting digital payments and showed a cyclic relationship between socio-technical actions, vulnerabilities, potential for fraud, and consequent harm [37]. We extend the examination of this cyclic relationship by illustrating the interrelations of the different nodes of the cycle (i.e., negative experiences, lack of confidence, dependency, and social constructs) according to the implications of negative experiences of MFS usage (e.g., monetary loss, victim blaming, gendered narrations, exploitation by abusers, etc.) to build upon the work of Jain et al. [37] in light of our study findings and the concurrent literature [60, 62]. As the cyclic relationship presented in [37] also reflected among our participants, we tried to extend and enhance the relationship by pointing out the interplay among various factors that intensify negative experiences for the users, which is presented in the following section.

5.1 Vicious Cycle of Negative Experiences, Social Constructs, and Confidence

The impact of negative experiences while using MFSs includes a lack of confidence, limited usage, and increased dependency on MFS usage as we have found in our study. Social constructs (i.e., shared beliefs, norms, expectations, and social behavior in the society) and increased dependency complicate things even further, and the abusers exploit these vulnerabilities to victimize the users, which further worsens the users' confidence in MFSs and increases dependency. Thus, it creates a

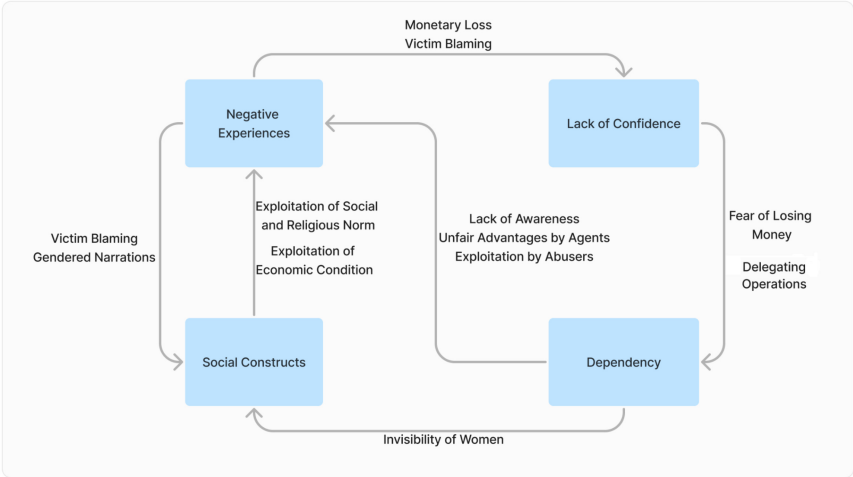

Fig. 2. Vicious cycle of negative experiences in MFS usage.

vicious cycle of negative experiences that influences social constructs, which lowers the confidence in using the system. Figure 2 presents the cycle, showing the interrelations of negative experiences, social constructs, and confidence according to our study findings.

Negative Experiences Cause Lack of Confidence and Affect Social Constructs: Monetary loss due to negative experiences and the associated victim blaming and gendered narrations create a lack of confidence and affect social constructs, such as society's perception of the users who lose money. Vashistha et al. and Pal et al. also found similar hesitation and reluctance among their participants while using the mobile payment system because they feared making mistakes and embarrassing themselves in public [54, 74]. Security stories and word of mouth are found to have a notable impact on customers in the context of Bangladesh, which often shook users' trust in the system and hampered their confidence in using the system [34]. The significant impact of losing hard-earned money on users' confidence in using the system can also be explained by the work of Perry and Ferreira, who argued that money is not merely a means of exchange but a "system of relationships, a chain of promises, and a record of people's transactions with one another" [55]. Moreover, the negative experiences from MFSs may push women and minority community members further back in MFS access, as has been seen in the negative experiences from technology usage in the South Asian context [35, 65]. The lack of trust in the law enforcement system during the cases of technology-based abuse along with victim blaming has been found in this context [64]. The findings of our study also exhibit the social construct of victim blaming among many participants along with gendered narration of the incidents as they share concern around women's naivety in case of financial abuse and misconduct through MFSs despite men and women facing almost the same amount of fraud incidents as presented in Findings (Section 4.1.2). Thus, the negative experiences from MFSs have a deeper social implication of pushing women and marginal communities further away from technology.

Lack of Confidence Translates into Increased Dependency: Users fear money loss as they lack confidence and delegate MFS operations, resulting in dependency. As we have seen among our participants, their usage behavior showed that they tended to avoid doing transactions by themselves. These situations result in them relying heavily or fully on MFS agents, other family members, or known acquaintances. Such coping mechanisms are defense strategies exhibited by the victims to minimize the extent of harm in their lives, as argued by Calo [21].

Many participants of our study refrained from using MFSs to avoid the possibilities of mistakes, misconduct, or abuse despite knowing the operations. For example, a female participant from an Indigenous community shared how she runs her own business but relies on her brother for MFS transactions to avoid possible misconduct. The same observation was shared by agents who also referred to women not using MFS themselves even though they know how to operate it to avoid possibilities of misconduct. Among the emerging MFS users, many were anxious to handle finances independently through MFSs in fear of losing money although they are literate and understand the mechanism. Thus, over-reliance due to perceived negative experiences creates discrepancies. In such cases, MFSs being an enabler for financial independence is creating dependency among participants who rely greatly on the agents.

Dependency Causes Negative Experiences and Affects Social Constructs: Dependency causes a lack of awareness and exploitation by abusers and agents, which creates further negative experiences as well as resulting in the invisibility of women, affecting social constructs. The MFS users, as reported by the agents, often remain unaware of many features of the current MFSs due to that dependency. The apparent coping strategy of depending on others contributes to the invisibility of women in these cases, where their identity and voices are lost and marginalized [50]. The social construct of men being in charge of financial matters is enforced by such dependencies, as seen in the literature [60]. Although there are government- and authority-influenced interests to encourage women to use MFSs, the dependency on agents is hampering the independence and confidence level of all the users, including females. The dependency on the agents places many in vulnerable positions regarding data protection, particularly in a society where personal information sharing is common [10, 32, 62]. The level of vulnerability can go further, beyond the individual level. As presented in Findings (Section 4.2.2), an entire village having the same PIN makes the whole region's local savings vulnerable; the participants were convinced that using the same PIN was a norm. Moreover, there are a few instances of agents exploiting that increased dependency by taking unfair advantages or charging extra fees. Research in similar contexts has also shown that increased dependency on intermediaries intensifies vulnerability [37], and Rohanifar et al. pointed out that the increased involvement of intermediaries was one of the factors that impeded the adoption of cashless transactions in Bangladesh [62].

Social Constructs Both Cause and Intensify Negative Experiences: Exploitation of social and religious norms along with the socioeconomic scenarios leads to further negative experiences. The influences of religion are ingrained in the lifestyle of people in the South Asian context [45, 51, 69]. Many of the social norms are justified by religion, which plays an important role in local politics [61]. Abusers exploit these social norms and vulnerabilities. A simple request of seeking money becomes a religious duty when it is associated with a religious figure [1]. The abuses reported regarding the impersonation of religious figures are based on these social norms and emotions, where abusers use authoritative tones to manipulate the victims, as the stories of our study participants indicate. This type of impersonation has been reported as a major fraud call case in the national report also [1]. The other calls similarly exploit the desperation (e.g., lottery, scholarship recipient calls, or ransom requests) of the general people through different social engineering techniques, which has increased during the COVID-19 pandemic. Abusers also take advantage of recent events and phenomena to outsmart victims. They call the users when allowances (e.g., government allowance, scholarships, etc.) are being disbursed by authorities. Different social engineering techniques customized to the target user are employed by the fraudsters, which have commonly appeared in the South Asian context [37, 56, 60].

Thus, instances of negative experiences along with social constructs create a lack of confidence among MFS users. It creates dependency to rely on agents and other known acquaintances and to

ignore the negative experiences while continuing MFS usage. Abusers and a few MFS agents with ethical shortcomings exploit these social and infrastructural vulnerabilities, which begets more negative experiences that impede users' confidence further, creating a vicious cycle.

5.2 Breaking the Cycle through Fraud Detection and Usability Enhancement Add-ons

In accordance with our study findings and the suggestions from the concurrent literature, we are pointing out the potential technologies and system modifications to break the vicious cycle discussed in the previous subsection. Although these suggestions are not comprehensive, they open ways for technology designers and researchers to take on specific design research to carry the work forward.

Fraud Detection and Reporting: Potential fraud detection through psychological analysis of MFS users and fraud activity patterns can reduce fraud. In our study, we have seen that fraudsters employed different techniques (e.g., allowance disbursement timeline-oriented spam calls, transaction specific, sociocultural, and religious norm driven) to trick the users. Such patterns of fraud provide scope for data-driven intelligent fraud detection technologies to analyze those patterns to identify potential MFS user groups who are at risk of specific fraud types and provide appropriate warnings beforehand. Researchers exploring SMS frauds in Pakistan also suggested fraud detection apps to reduce fraudulent activities [56]. However, access to different data streams remains a potential challenge, along with privacy concerns and data-sharing regulations. MFS providers currently utilize user behavior monitoring to analyze their transaction patterns to identify fraudulent activity and inappropriate transactions. Online activity logging and monitoring transactions across different channels can be vital to strengthen behavioral analysis. There are different learning techniques like federated learning to encapsulate data to mitigate privacy concerns [59, 76]. Additionally, fraud reporting mechanisms need to be focused to ensure that the users have an easy-to-use and private fraud reporting process, which would help develop a data repository where all fraud incidents and relevant additional information are available. It will not only enable the accumulation of the needed data streams to build intelligent systems but also provide the users a place to seek support in case of falling victim to fraud. Such mechanisms should allow women to report without needing mobility or assistance, as suggested by Razaq et al. [60]. They emphasized the need for redesigning reporting channels and mechanisms for a frictionless reporting process.

Accommodating the Mistakes to Yield User-oriented Design: Throughout our study, we have observed that certain areas like the irreversible nature of lost money through wrong transactions or frauds are the most fearsome to the users, and they are common among most users regardless of their technology efficiency and familiarity. If the system can provide a margin for error to the users, then the user experience can be improved for most users. Researchers suggested "a more forgiving system" where wrong transactions can be reversed through a buffered mechanism [74]. Such mechanisms require that transactions be pending until the money sender manually confirms that the money has gone to the intended receiver. Although such mechanisms may slow down the transaction process, they can provide a sense of security and allow for reversal of wrong transactions, which is missing in the current infrastructure. The lack of such mechanisms currently limits many users from using MFSs by themselves, especially in contexts where victim blaming and gendered narrations are common, as presented in Findings (Section 4.1.2). Additionally, if the accounts where the fraudsters received money can be disabled immediately upon reporting the incidents, this can be helpful in recovering the money lost through different types of frauds in MFSs, which was also suggested by Vashistha et al [56]. Many users struggle with passwords, and the memorability of passwords can be improved by using pictorial passwords [62].

Potential Tool for Facilitating the Agents: Agents are an integral part of the MFS infrastructure in Bangladesh, and their role is highly emphasized in the literature [62]. They serve a large number of people who would have been deprived of access to the technology otherwise. Although the agents face a significant challenge in coping with the workload, any mistakes or wrong transactions are not overlooked by their customers. Their reputation and business are severely affected in such cases [57]. It creates mistrust among their entire customer base, which can go to the extent that their shops are closed as a result of vengeance misdirected at them because the victims cannot get hold of the fraudsters [60]. The workload of mass account handling makes the agents adopt different measures to improve their productivity and efficiency. These measures often create catastrophic scenarios and put the safety of all users' accounts at high risk. A technological tool that would allow the agents to deal with mass accounts at different levels of interaction and control while providing privacy and security of the data can be one ideal technology for them. Such an application can have functionalities such as the agents being able to add the accounts of their customers in the application and define the level of interaction and control they need over the account. While managing a user, the system can generate and keep track of different users' PINs, which can be encapsulated from the agents also. The agents should be able to operate the account only with the publicly available information along with a temporary authentication key. Researchers have emphasized ephemeral and auditable credentials for allowing agents to access a customer's account without requiring a customer's account credentials [66, 68, 77, 79]. Raghunath et al. emphasized that such approaches can help agents to be more transparent and reduce the chance of fraudulent uses of a customer's information [57]. They also suggested "bi-directional reputation systems with strong sybil-proof guarantees" to ensure trustworthiness among customers and agents.

The prevalence and impact of negative experiences while using MFSs can be reduced through more focused and contextual technology integration, along with equipping MFS agents with tools to operate as technology facilitators. These measures can reduce the abuse and misuse of MFSs and subsequently prevent users from falling into the vicious cycle of negative experiences, social constructs, and confidence. Hence, they can significantly contribute to improving the experiences of MFS users in Bangladesh and in similar resource-constrained settings of the Global South.

6 Limitations

This study exhibits several limitations, including the limited generalizability issue with qualitative research. Additionally, the study findings are presented based on Bangladeshi MFS users' perceptions till March 2022, when the data collection ended. The fraud mechanisms and coping behaviors might have evolved since then. Hence, this study can be followed up with a timely mixed-method study to address these limitations.

7 Conclusion

The research work entirely focuses on the perception of participants regarding negative experiences related to MFSs. It aims to explore the ways participants improvised their MFS usage behavior due to these experiences. The participant pool includes women and minority communities along with other participants who have been socially marginalized from technology and financial activities, on whom the impact of the abuse can be long lasting, which was prominent from the study findings. The findings of the study also showed an insightful pattern of negative experiences, which led us to present a vicious cycle of negative experience, social constructs, and confidence. The adaptive behavior of participants to avoid negative experiences led to further vulnerability and negative experiences. We presented the scope of technology to break the cycle, where ways

to reduce negative experiences and technology-aided infrastructure and policy improvements are suggested. In this work, we discuss the potential of MFS agents to act as technology facilitators for users who are traditionally deprived of technologies due to their lack of access and literacy. This country-wide qualitative study with 313 participants presents the scenario of Bangladesh as a case that is identical in many countries of the Global South as well as low-resource communities in Western regions to the HCI, CSCW, and ICTD communities to gain insight regarding the vulnerabilities of adaptive measures taken by MFS users.

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Appendices

A Appendix

Descriptive statistics about negative experiences relating to MFSs are presented here. It must be noted that, as a qualitative study, the data is not representative of the entire country—it mostly focuses on the depth of the problems as they impact on the participants.

Figure 3 refers to the dependencies of participants on the MFS agents, taking into account the literacy level and regional information along with the gender-related information.

The fraud activities and money loss experiences are presented in Figure 4, where regional and educational information is included along with gender-specific information.

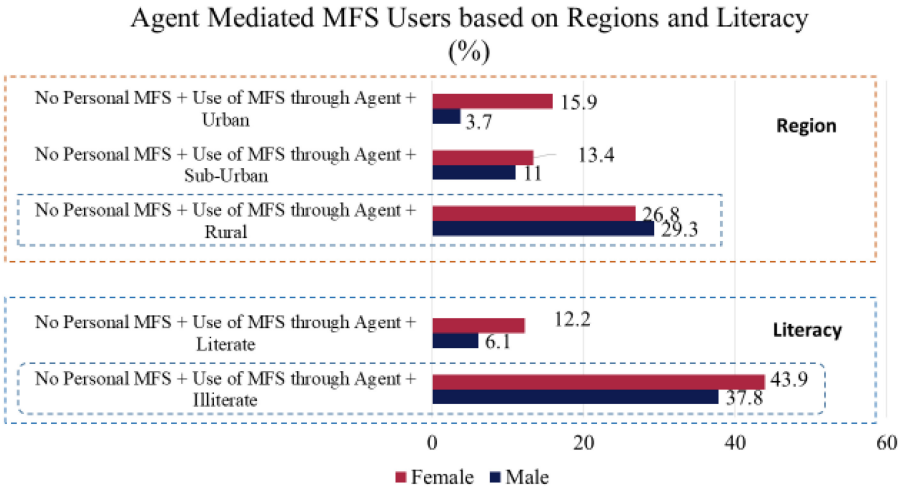


Fig. 3. Area and literacy breakdown of participants using MFSs through agents despite having no personal account among n = 82 participants.

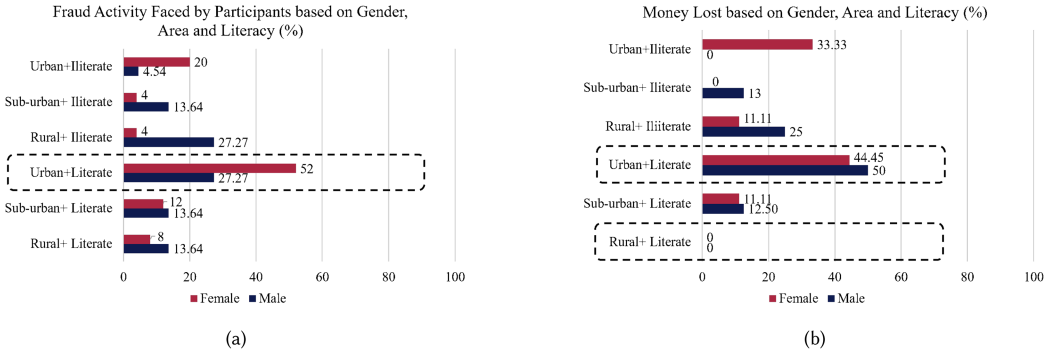


Fig. 4. (a) Fraud activity faced by n = 47 participants. (b) Lost money after receiving calls from fraudsters among n = 17 participants based on gender, area, and literacy.

B Appendix

This appendix presents the analysis process. Initially the data was coded into Atlas.ti followed by capturing the themes relating to the negative experiences exclusively as presented in the follow-up discussion. Figure 5 presents a snapshot of the coding interface of Atlas.ti.

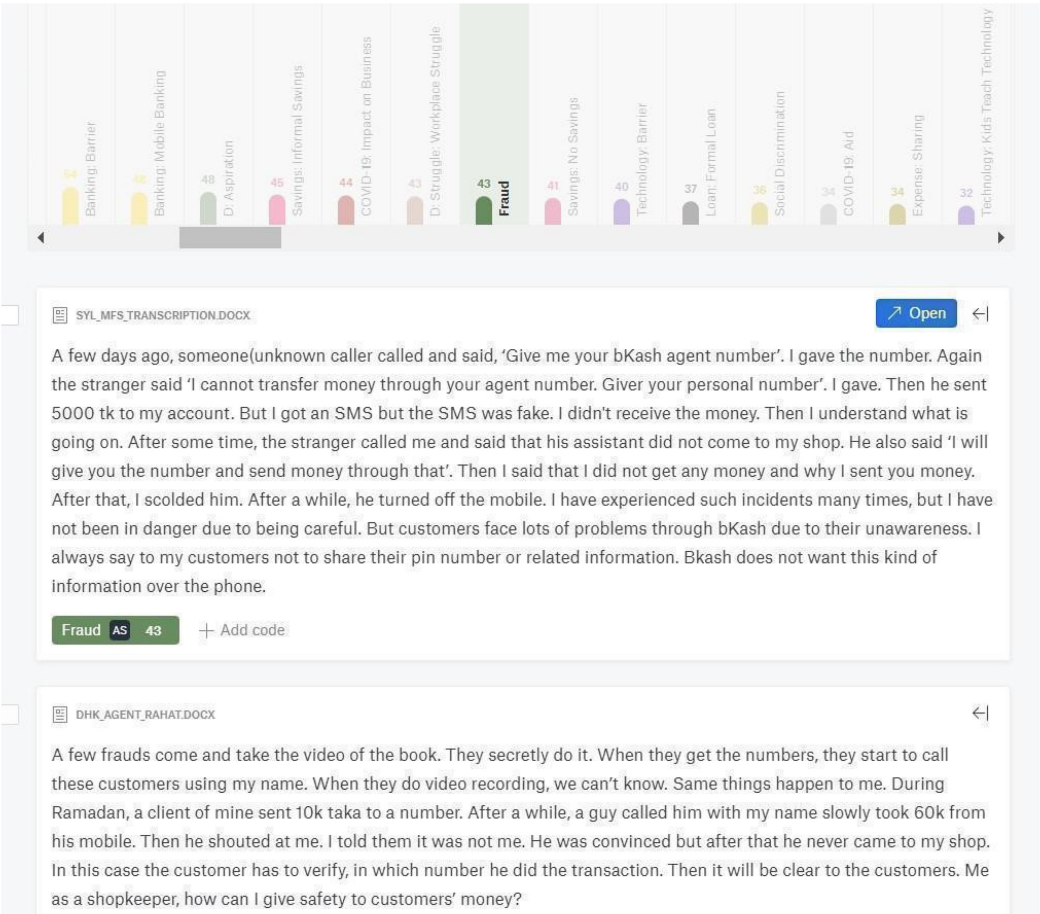


Fig. 5. Coding with Atlas.ti.

B.1 Chart Image

Primarily we have tried to make a chart of negative experiences by brainstorming with respective quotations and findings as presented in Figure 8.

In a broad category, we have separated the following points (Yellow Notes), as can be seen in Figure 8:

— Trust in MFS Agent
— Fraud Activity
— Impact of Fraud Activity
— MFS Security Issue
— Infrastructural Challenges of MFS
— Losing Money

We are describing one broad category (e.g., Fraud Activity) as an example.

We have come across participants' stories about several types of fraud activities. Some fraudsters come to the agent shop directly and show fake visiting cards to fool the agent for money. Fraudsters also call from a special pattern of number, e.g., 01718000000, so that people trust them easily and share the confidential information (e.g., PIN/password) and lose money. Some fraudsters call at midnight and impersonate themselves as Jin-er-Badshah, portraying themselves as so powerful that any desired things can be achieved by them. But people need to send them their specified amount of money through MFS accounts to get the desired things; otherwise, they curse the call receivers.

We also found some fraudsters in the Mazar area called and asked for money to be sent on an MFS account; if the user disagreed, they cursed that user. At the time of stipend or allowance disbursement, fraudsters collect particular numbers of recipients and call the targeted people. They share that the call receiver will get a scholarship if they share the information, or that they need to update their information to get the stipend in their MFS accounts within a particular time frame, by which they collect user-sensitive information to grab the money. A few fraudsters called people who own personal vehicles and forced them to send the money to MFSs by threatening to get involved in a police case.

Throughout our study, we have come across many such stories about fraud incidents, which we organized here in the board presented in Figure 8. All the other broad categories are organized in bits and pieces of information in the same way to get an overall view of the findings of the study.

B.2 Codebook

Individual themes were further analyzed that gave us information about the requirements of frauds from victims, as can be seen in Figure 7. It shows requirements from diferent frauds consisting of fraud calls to get rewards, fake lottery calls, spam messages, scholarship frauds, account logout messages, system upgrade frauds, and ransom-money-related problems.

B.3 Terminologies

The terminologies used in the article based on local context are presented in Table 1.

Table 1. List of Terminologies Used in the Article

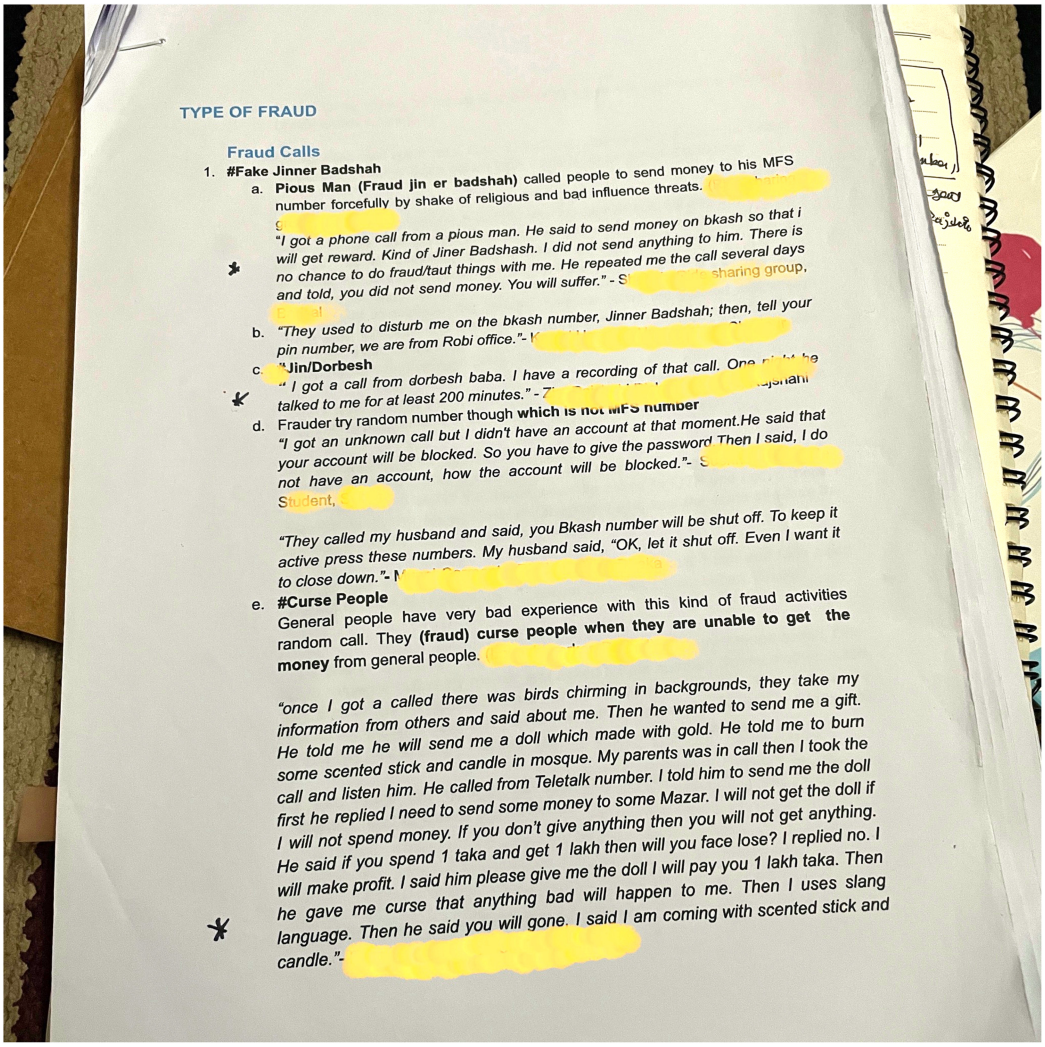
Terminology Used	Meaning
bKash	Popular MFS providers in Bangladesh
Cash-out	Popular term for withdrawing money from MFS accounts
City touch	An online banking application
Dorbesh	Spiritual leader
Jiner Badshah	Emperor of Jinnie/Jinn
Mazar	The tomb of known spiritual leaders

C Appendix

C.1 MFS History and Technology Context in Bangladesh

People in this country are comparatively new to using financial technologies in general. MFSs were first introduced by the Bangladesh Bank in 2011 to provide mobile banking services to both the banked and unbanked population of the country [3]. Within a few years, MFSs started to lead the financial technology industry of Bangladesh. Most MFS providers in Bangladesh operate under the authority of different banks, such as Dutch Bangla Bank, BRAC Bank, and UCB Bank. At present, a user can conduct cash-in (deposit) and cash-out (withdraw), person-to-person, business-to-person, person-to-business, government-to-person, and person-to-government transactions through MFSs, which include utility bill payments, tuition fee payments, and insurance premium payments. Although international transactions using MFSs are not permitted yet at the time of the study, receiving inward foreign remittances is permitted. Bangladesh has several MFS providers that cater to making the transaction of money as seamless as possible. Namely, Bkash, Nagad, and Rocket are among the top MFS providers in Bangladesh [3].

However, interoperability among different MFS providers or banks has not yet been implemented. In fact, some MFS providers have significant differences in their implementation, which the users need to differentiate while using several services. For example, Bkash, Nagad, and many other MFS providers use mobile numbers as the MFS account number, whereas another leading MFS provider, Rocket, adds one additional digit at the end of one mobile number to construct the account number, which the users must remember while doing transactions. Otherwise, the transaction fails, which creates a discrepancy in the MFS infrastructure. Although there are different services available to the users, most users use MFSs as a money transfer medium rather than a mobile wallet where they just send money to people and withdraw any money that comes into the account instantly. Such behavior is attributed to the fraudulent activities in MFSs, which is presented in detail later in the section.



TYPE OF FRAUD

Fraud Calls

1. **#Fake Jinner Badshah**
   a. **Pious Man (Fraud jin er badshah)** called people to send money to his MFS number forcefully by shake of religious and bad influence threats.

   "I got a phone call from a pious man. He said to send money on bkash so that i will get reward. Kind of Jiner Badshash. I did not send anything to him. There is no chance to do fraud/taut things with me. He repeated me the call several days and told, you did not send money. You will suffer." - S sharing group,

   b. *"They used to disturb me on the bkash number, Jinner Badshah; then, tell your pin number, we are from Robi office."*-

   c. **Jin/Dorbesh**

   " I got a call from dorbesh baba. I have a recording of that call. One talked to me for at least 200 minutes." -

   d. Frauder try random number though **which is not MFS number**

   "I got an unknown call but I didn't have an account at that moment.He said that your account will be blocked. So you have to give the password Then I said, I do not have an account, how the account will be blocked."- S

   Student,

   "They called my husband and said, you Bkash number will be shut off. To keep it active press these numbers. My husband said, "OK, let it shut off. Even I want it to close down."-

   e. **#Curse People**

   General people have very bad experience with this kind of fraud activities random call. They **(fraud) curse people when they are unable to get the money** from general people.

   "once I got a called there was birds chirming in backgrounds, they take my information from others and said about me. Then he wanted to send me a gift. He told me he will send me a doll which made with gold. He told me to burn some scented stick and candle in mosque. My parents was in call then I took the call and listen him. He called from Teletalk number. I told him to send me the doll first he replied I need to send some money to some Mazar. I will not get the doll if I will not spend money. If you don't give anything then you will not get anything. He said if you spend 1 taka and get 1 lakh then will you face lose? I replied no. I will make profit. I said him please give me the doll I will pay you 1 lakh taka. Then he gave me curse that anything bad will happen to me. Then I uses slang language. Then he said you will gone. I said I am coming with scented stick and candle."-

Fig. 6. The quotation categories through the analysis process.

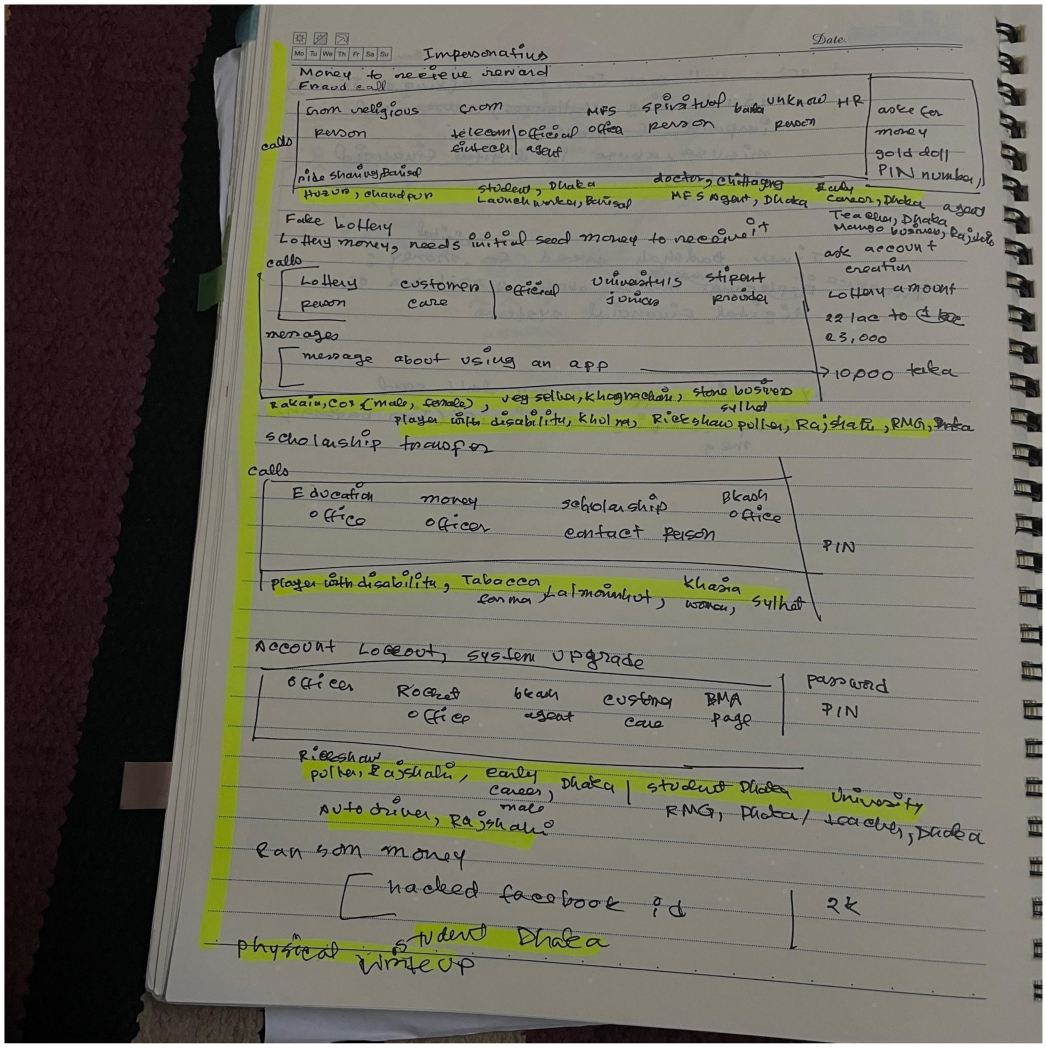


Fig. 7. Analysis of individual fraud types.

Fig. 8. Chart image of negative experiences in MFSs.

C.2 MFS Fraud Scenario in Bangladesh

With the emergence of MFSs, fraudulent activities in MFSs have also increased. In Bangladesh, 1 in 10 MFS users is a victim of financial fraud [23]. Also, this rate is nearly 13% in case of MFS agents [44], where urban MFS agents face more fraudulent activities (20% [2]) compared to rural MRS agents (10% [2]). On average, each victim in Bangladesh loses more than BDT 9,000 (USD 100), which is two times higher in case of MFS agents [44]. One study also shows that 32% of Bangladeshi people do not use MFSs due to the fear of fraud incidents [23], which presents fraud as a significant barrier to financial inclusion. In a report [1], the **Bangladesh Financial Intelligence Unit (BFIU)** mentions eight common types of fraud that are faced by Bangladeshi MFS users: auto-theft, hello-party, lucrative offer, "Jinner Badsha" (King of Jinn), extortion, kidnapping, anonymous transaction, and digital hundi.

Table 2. Partial Codebook of This Research

Top-level Category	Definition	Codes
MFS Fraud Activity	Mobile Financial Services usage and Fraud Activity	
		Lottery/Reward
		Stipend
		Jin er Badshah
		Curse People
		Special Pattern of Number
		Fake Money Exchanger
		Fake System Upgrade
		Fake Education Board Officer
		Fake Police case
		Fake Banker
		Close/Lock Account
		Account Upgrade
		System Update
		Fake Offer
		Visiting Card
		Agent Shop fraud
		Fake Promotional Messages
Impact of Negative Experience	After fraud activity Impact of Negative Experience	
		Losing MFS User
		Keep Less Amount
		Insecurity
		Negative Influence
		Less Confidence
		Less Trust
Infrastructure	Infrastructural difficulties of Mobile Mobile Financial Services Customers	
		Agent Shop
		Wrong Transaction
		Number Mistake
		Promotional Miscommunication
		MFS Security
		MFS System
		Internet
		NID
		High Cash Out Charge
		Manual Verification
		Customer Service

In the auto-theft type, fraudsters steal auto-vehicles and ask the owner to send money; in the hello-party fraud, fraudsters pretend to be the mobile operator and inform victims about winning precious products. In the lucrative offer type, a group of fraudsters try to attract people with different offers. "Jinner Badshah" is a common type of fraud that is possibly faced by 1 out of 25 Bangladeshi phone users where the victims are asked to send an amount of money to receive a jar of ancient gold [1]. This fraud is faced mostly by MFS users from rural areas [14]. Recently, a new type of fraud kidnapping has appeared where the fraudsters move around the city with their vehicles and receive ransom money through MFSs from the victims' family members [1]. In the extortion-type fraud, fraudsters demand money by introducing themselves as infamous terrorists or their associates [1]. Though the central Bank of Bangladesh has set rules to prevent anonymous transactions, the BFIU found millions of accounts that make this type of transaction, violating the rules [1]. Fraud via digital hundi is a threatening activity to the rise of MFSs [63]. In this fraud, remittance agents send e-money to the local agents, who can be MFS agents, and this results in lowering foreign currency in Bangladesh [63].

In Bangladesh, more than 50% of the victims of different frauds either faced impersonation fraud or compromised their PIN [23]. In the case of women, the most common issue is the misappropriation of cash [14]. Also, they receive calls from unknown numbers where the caller refers to a medical emergency of a close one and asks for money [14]. Seeking support from the customer service is one of the steps taken to prevent fraud activities [37]. However, 30% of MFS users and 45% of MFS agents in Bangladesh who complain do not find a solution from the customer service of MFS providers [2]. MFS providers have adopted different measures to reduce fraudulent activities that primarily focus on awareness generation. They use different advertisements and awareness campaigns illustrating the need to keep PIN numbers and other MFS account information secret. They emphasize not sharing PINs with unknown individuals impersonating MFS or other officials. There is a very popular advertisement named, "Bkash theke Nahid Bolchi" (I am Nahid from Bkash) that presents a common scenario of fraudsters asking for PINs and claiming to be MFS officials.

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