THE POTENTIAL AND LIMITATIONS OF A PUBLIC MOBILE PAYMENT SERVICE: DID BANGLADESH ELECTRONIC MONEY TRANSFER SYSTEM MAKE A DIFFERENCE IN “UNBANKED” COMMUNITIES?

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Abstract

Bangladesh Post Office introduced the Electronic Money Transfer System (EMTS), a mobile payment support service similar to Kenya’s M-PESA, to help citizens send money orders quickly and safely. EMTS data show dramatic increase in electronic money order issuance, amount remitted, and amount of commission that outnumbered corresponding figures of ordinary money orders. Also EMTS shortened the average money order delivery time from several days to a day and reported a very high delivery rate. However, EMTS concentrated on urban areas rather than rural areas. Electronic money orders within urban communities accounted for about 90 percent of total issuance, amount remitted, and commission. EMTS was not successful in making a difference in “unbanked” communities. Also EMTS encountered commercial competitors and thus its issuance and amount of remittance have dramatically declined since 2012. The rising and ebbing of EMTS provide valuable lessons on potential and limitations of public mobile payment services.

Keywords: Mobile Payment, E-government, M-government, Electronic Money Order.
1 INTRODUCTION

M-PESA in Kenya has been known as the most successful mobile financial service for its innovative way to introduce the e-money concept and marketing strategy. M-PESA attracts citizens who are difficult to access traditional financial services (i.e., bank and credit card services) in rural communities and thus want person-to-person remittance service (payment service) to send money from one place to the other, and who use their mobile phone frequently in their life (Hughes & Lonie, 2007; Mas & Ng’weno, 2010). In 2009, a total of 8.6 millions of M-PESA customers cashed in and cashed out from 14,800 agents, deposited and withdrew USD 650 millions per month, transferred USD 320 millions or 10 percent of Kenyan GDP per month among individuals (Mas & Ng’weno, 2010, p. 3).

Like Kenya, Bangladesh encounters a similar circumstance. About 75 percent of population lives in rural areas where bank branches are rarely available and about 60 percent of population uses mobile phones (Bangladesh Bureau of Statistics, 2010; International Telecommunication Union, n.d.b). And there are about 10,000 post offices across the country that can be used as financial service agents. Taking this task environment into account, Bangladesh Post Office introduced the Electronic Money Transfer System (EMTS) in 2010 to provide a mobile payment service to the “unbanked” citizens. Both M-PESA and EMTS employed a basic mobile service, simple message service (SMS), to make mobile payment easy even for less educated citizens.

A question here is whether EMTS really made a difference in providing payment service to “unbanked” rural citizens. While M-PESA is run by a commercial company Safaricom in market, EMTS was developed and run by Bangladesh Post Office under bureaucratic settings. It will be interesting to examine if the public mobile payment service is as successful in vitalizing rural communities as its commercial counterpart.

This paper first reviews the task-technology fit theory and Kenya’s M-PESA and then introduces Bangladesh’s Electronic Money Transfer System. Section 4 and 5 respectively describe EMTS money order data and method to be employed. Analysis section summarizes results of electronic money order issuance, amount of being remitted, average delivery time, and commission earned. Section 7 discusses the impact of EMTS on “unbanked” rural communities and limitations of public mobile payment services before conclusion.

2 LITERATURE REVIEW

This section critically reviews task-technology fit research and then introduces mobile payment services with focus on Kenya’s M-PESA.

2.1 Task-technology Fit

Task-technology fit says that success or good performance is predicted by the degree of appropriate match between a task and a technology used to perform the task (Gebauer & Ginsburg, 2009; Goodhur & Thompson, 1995; Zigurs & Buckland, 1998). This taxonomic or contingent approach catalogues characteristics of each task (e.g., complex versus less complex and routinized versus non-routinized) and technology (e.g., one-way versus two-way and wired versus mobile) and then look for ideal profiles of task contingencies and technologies or “viable alignments of task and technology” that are likely to enhance performance (Zigurs & Buckland, 1998, pp. 314 & 323).

In their technology-to-performance chain, Goodhur and Thompson (1995, 216-219) suggest that characteristics of task, technology, and individual (user) determine the task-technology fit, and that technology utilization as well as this task-technology fit jointly influence performance impact. Similarly, Gebauer, Shaw, and Gribbins (2010) argue that mobile use context moderates (or limits feasibility of) the fit between managerial tasks and mobile information technology. For instance,
notification functionality (technology) and a task with high time criticality have the best fit under limited quality of network connection (use context) (pp. 264-268).

Baum and Di Maio (2000) propose a four-phase e-government model of presence, interaction, transaction, and transformation, which served as a prototype of other e-government models. Phases or stages in these e-government models mostly reflect gradation of technological sophistication and implicitly suggest a linear, stepwise, and progressive development of e-government with a motto of “more technology is better” (Coursey & Norris, 2008, pp.523-525). In addition to this technological aspect, characteristics of a task and target users (context or environment) should be considered properly in order to find the best niche of an e-government application. For example, an auto vehicle registration service fits transaction (data processing) technology, while an emergency alert service via text messaging needs just one-way interaction (notification). Both services will not be fully used when Internet (mobile) penetration rate and competence are low.

This paper introduces a case where a technologically less sophisticated e-government application in a developing country has provided public services (i.e., mobile payment service) successfully. A large portion of citizens in developing countries live in rural areas; do not have their bank accounts and thus suffer from the lack of financial services; tend to be less networked and educated than those in urban areas; and, however, use mobile phones frequently for their daily life (Pope et al., 2011, pp. 97 & 100). Market (bank industry) fails to provide such public services to disenfranchised segment of citizens. This research illustrates how government steps in this market failure and provides alternative payment service using money order from the task-technology fit standpoint.

2.2 Niche of Mobile Payment Services

Mobile financial services include mobile payment (mobile money, mobile wallet, or mobile money transfer) and mobile banking (Mallat, Rossi, & Tuunainen, 2004, pp. 43-45). Mobile payment enables mobile device users to transfer money from one person to the other or pay for goods and services (e.g., ticketing and paying tax), while mobile banking allows them to check their bank account information, transfer money from one account to the other, or conduct other financial services like stock trading. Mobile phone-based payment (m-payment), which appears after online payment systems like PayPal, often employs short message service (SMS), wireless application protocol (WAP), and/or proximity-based near field communication (NFC) method that requires merchant’s point-of-sale terminals to read signals from mobile handset (Pope et al., 2011, pp. 88-90). These mobile payment and banking have security and convenience advantages over computer-based online transactions that require account-holder authentication (Herzberg, 2003, pp. 53-54).

Going mobile is a viable option in developing regions like Africa with poor infrastructure, low computer/Internet use, but high mobile penetration rate (Hellström, 2011, pp. 161-162). Mobile payment finds its niche in areas where banking services are limited and mobile penetration is high, and where low-value and high-frequency transactions are necessary (Hughes & Lonie, 2007; Jack, Suri, & Townsend, 2010). Hughes and Lonie (2007, pp. 65 & 69) describe this niche segment as, “[W]here the infrastructure is poorly developed and where very few people have or even want bank accounts. … We were specifically targeting the unbanked.” and Jack et al. (2010, p. 85) put, “[W]here networks of both fixed line communication and physical transportation infrastructure are often inadequate, unreliable, and dilapidated. While mobile phone calling rates remain high by world standards, …” Similarly, Pope et al. (2011, p. 97) state, “[T]he market potential associated with India’s vast unbanked population who do not have access to traditional financial services. However, a majority of the unbanked does rely heavily on mobile phone.”

2.3 M-PESA in Kenya

The most successful mobile financial service is known to be Kenya’s M-PESA (“Mobile-Cash”) that is a joint product of the public-private partnership. The U.K. Department for International Development provided the Financial Deepening Challenge Fund (FDCF); Vodafone Group develops, hosts, and owns the M-PESA system; local mobile operator Safaricom runs the M-PESA; and central
and commercial banks contribute to float balancing or liquidity management (Hughes & Lonie, 2007; Jact et al., 2010; Mas & Ng’weno, 2010). This SMS-based mobile banking and payment system enables individuals not only to deposit, withdraw, and send money using their mobile handsets, but also to pay for goods and services as well (Hughes & Lonie, 2007, p. 78).

M-PESA introduced a concept of “e-money” that mirrors or exactly matches the real money in a bank account (Hughes & Lonie, 2007, pp. 69-70). A customer first needs to visit a Safaricom agent and then open his or her M-PESA account. When a customer deposits cash, an agent deposits the cash into M-PESA’s bank account and buy “e-money float”; M-PESA (Safaricom) transfers the e-money to customer’s M-PESA account that is linked to his or her mobile phone; Then the customer transfers his or her e-money to recipient’s account using his or her mobile phone; M-PESA transfers the e-money from recipient’s account to the designated agent’s one; The recipient visits the designated agent and requests withdrawal of cash; the agent withdraws cash from M-PESA’s bank account and pays to the recipient; and then the agent reduce its e-money float (Hughes & Lonie, 2007, pp. 71 & 75). M-PESA accounts are free to use, but senders (not recipient) pay transaction fee depending on the type of transaction and the amount of money to be transferred when e-money is cashed out (Hughes & Lonie, 2007, p. 77; Jack et al., 2007, p. 86).

M-PESA needed many retail outlets across Kenya where customers deposit cash into or withdraw from their M-PESA account. M-PESA uses broad and dense network of Safaricom’s Airtime resellers or dealers as its agents (Hughes & Lonie, 2007, p. 70; Jact et al., 2007, p. 84). These M-PESA agents receive commission from Safaricom through master agents (i.e., head office and aggregators). Each agent, who is required to operate in at least three locations, is coordinated by a head office, agent aggregator, or super agent (bank branche) who manages cash and e-money balance or makes such transactions (Jact et al., 2007, pp. 91-95; Mas & Ng’weno, 2010, 8-14). The number of M-PESA agents has increased from 355 in April 2007 to 10 thousands in 2009 and 28 thousands in 2011, respectively, as the number of customers has jumped from 53 thousands to 6.5 millions and 14 millions during the same period.

As of November 2009, M-PESA has 8.6 million registered customers who can cash in and cash out from 14,800 agents (Mas & Ng’weno, 2010, p. 3). USD 650 millions were deposits and withdrawn per month and USD 320 millions or 10 percent of Kenyan GDP were transferred among individuals (person-to-person transfer) per month (Ibid). Safaricom earned USD 7 millions of monthly revenue. Mas and Ng’weno (2010) attribute M-PESA’s success to building trust through branding, building an extensive channel of agents to achieve network effects, and building favorable customer pricing and agent commission structure. Interesting is that M-PESA was not built on a cutting-edge technology but on quite basic (“certainly not the sexiest”) mobile technology (i.e., SMS) to meet customers’ demands (Huges & Lonie, 2007, p. 66).

3 MOBILE PAYMENT SERVICES IN BANGLADESH

This section introduces use context or mobile environment in Bangladesh, and ordinary money orders and electronic money transfer system in Bangladesh Post Office.

3.1 Mobile Use Context in Bangladesh

Most Bangladesh citizens are living in rural areas where bank services are limited. Bangladesh administrative units include 7 divisions (Barisal, Chittagong, Dhaka, Khulna, Rajshahi, Sylhet, and Rangpur), 64 districts (zilas), 6 city corporations, 309 municipalities and 483 sub-districts (upazilas) as of 2010 (Bangladesh Bureau of Statistics 2011:31). The estimated population was 139.3 millions and the 81 percent of them (112. 5 millions) live in rural areas in 2011; The estimated number of households was 31.7 millions and the 80 percent (25.5 millions) are rural households (BBS, 2012, p.
19). Most industrial facilities are located in urban areas. According to Bangladesh Bank, there are 8,387 branch offices of 53 banks and 57.2 percent of them (4,800) are located in rural areas as of April 2013. However, many rural communities still do not receive bank services and have difficulty remitting money from family members working in urban areas.

Bangladesh has remained far behind in the Internet and e-government (Bhuiyan, 2011, pp. 57-58), being ranked 113th in World Economic Forum’s Networked Readiness Index and 150th in United Nations’ E-government Development Index in 2012. The Internet penetration rate stayed below 1 percent before 2006 but showed a sharp increase from 1 percent in 2006 to 3.1, 3.7, 5.0, and 6.3 in 2009-2012 respectively (ITU, n.d.a). There are 1.5 million Internet users (5% of Internet penetration) and one third of them (.5 millions) live in rural areas; only .45 percent of rural residents and 3.88 percent of urban citizens used the Internet (BBS, 2012, p. 26). These figures indicate that ordinary citizens, in particular rural residents, are difficult to access the Internet and use Web-based online banking services. However, mobile phone subscribers increased from 1.4 millions in 2003 to 19 millions in 2006 and 51, 68, 84, and 97 millions in 2009-2012 respectively (60% of the total population in 2011) and the number of mobile subscribers per 100 inhabitants increased from 1 to 13, 34, 45, 55, and 63 respectively during the same period (ITU, n.d.b). The 55 percent of urban households and 25 percent of rural counterparts owned mobile phones in 2007 (National Institute of Population Research and Training et al., 2009, p.18) and mobile penetration rate was roughly estimated to be 86 percent in metropolitan areas and 30 in rural areas in 2010. Despite a very low Internet penetration rate, a relatively higher mobile rate even in “unbanked” rural communities implies a favorable niche for mobile remittance business in Bangladesh.

3.2 Money Order in the Bangladesh Post Office

Bangladesh Post Office (BPO) is the largest government organization that has 37 thousands employees working in 9,886 post offices: 4 general post offices, 78 head offices, 945 sub offices (9.6%), 399 upazila post offices (4.0%), 322 extra departmental sub offices (EDSO) (3.3%), and 8,138 extra departmental branch offices (EDBO) (82.3%). In general, EDSO and EDBO (85.6%) are located in rural areas. This disproportional distribution of post offices implies their potential role in public service delivery especially in disenfranchised rural communities.

Post office’s money order service enables citizens to transfer money. This payment service has played an important role especially in rural areas where bank branches are not available. According to Bangladesh Bank, 57 percent (4,426) of 7,772 bank branches of 47 banks are scattered over rural areas. Many urban workers come from rural areas to look for a job and want to send their salaries to family members living in their home towns. However, majority of rural residents do not have any bank account due to difficulty to access bank branches. Hence, money order becomes a popular and important remittance method for rural communities.

In order to send money using the ordinary money order, (1) a customer visits a post office and fills out a money order form requiring information about sender, receiver, and amount of money; (2) a operator receives money and send the money order form to the designated post office by mail, which takes 2-7 days to reach; (3) the cash post office passes the form over to a disburse post office; and (4) a postman in the disburse post office delivers the money to the recipient (Islam, 2012, pp. 9-10). This remittance, although popular in rural communities, has suffered from two chronic problems (pp.11-12). First, it takes a long time to complete transaction largely due to time spent for money order form to reach the cash post office. Second, ordinary money order does not have a systematic way to keep records and monitor transactions. Some employees were punished for withdrawing money with fake money order they issued and misappropriating money to be delivered to recipients. In some cases, a money order was paid more than once. In order to figure out these problems BPO introduced electronic money order systems.

1 According to Bangladesh Garment Manufacturer and Exporters Association, for instance, the garment accounts for 12 percent of GDP during 2010-2011 and 98.3 percent of the total 4,324 garment companies are located in metropolitan areas.
3.3 **Electronic Money Transfer System**

The Electronic Money Transfer System (EMTS) is a mobile-- short message service-- and Web based remittance support system that enables mobile phone users to send money (electronic money order) up to BDT 50,000 at post offices without relying on formal banking systems. This mobile payment system was developed by the public-private partnership of Bangladesh Post Office, software consultants, and a private mobile phone operator (Banglalink). Post office and private consultants jointly built the system, while Banglalink provided 500 mobile phone sets to all employees in post offices including EDSO and EDBO. Post office staffers were trained to feel comfortable working with the EMTS and a support team of engineers, programmers, system analysts, and others at the call center helped customers use EMTS smoothly (Islam, 2012, pp. 13-14).

Prime Minister inaugurated the EMTS on March 2010 that was opened to the public two months later. The EMTS started its’ service in 100 post offices in urban areas on May 2010 and expended service areas to 2,747 post offices (27.8% of the total 9,886) as of September 2013. Although more demanded in rural areas, EMTS began with metropolitan areas and started providing services to rural communities in 2011. EMTS won the mBillionth Award South Asia in m-business and commerce/banking in 2011 (http://mbillionth.in/).

In order to send money using the EMTS, (1) a customer visits a post office with EMTS available and provides sender and receiver’s names, mobile phone numbers, addresses, amount of money to be sent in the money order form; (2) the customer pay money to the operator (cash in); (3) an operator issues an electronic money order using the EMTS phone or Web; (3) the EMTS server sends back a SMS message with a serial number of the money order to the post office (EMTS mobile phone) and another message with the PIN to sender (mobile phone) to confirm the issuance of the money order; (5) the sender informs the recipient of the amount of money to be transferred and associated PIN using voice call or SMS; (6) the recipient visits a nearest EMTS post office and fills out a payment form using the PIN received; (7) a post office operator and the EMTS server validate the PIN to make sure that the applicant (receiver) is the right recipient; (8) the operator verifies recipient’s phone number provided by the applicant by comparing it with the corresponding number the EMTS server shows. (9) the operator pays money to the recipient and then marks the money order paid; 10) Finally, the EMTS server sends a SMS message of confirming successful disbursement to the sender and the operator (Islam, 2012, pp. 15-17).

Some money orders may not be delivered, in particular, when (1) a money order is abnormally issued due to operator’s mistake and others, disburse the money, (2) a sender loses the PIN or fails to sent it to the recipient correctly, (3) the recipient does not want to get the money order disbursed, (4) the money order is not disbursed within 14 days after the issuance and thus is automatically locked by the EMTS server.

Agents (i.e., extra departmental sub post master and extra department agent) in EDSO and EDBO get commission up to 10,000 Taka for issuing and disbursing electronic money order depending on amount of money transferred. This incentive structure, grounded on the Circular Number 120 in 2011 and Ministry of Finance’s order, motivates non-government employees in EDSO and EDBO to work more than four hours even after their office hour. After receiving a SMS message from the sender, for example, a recipient may visit agent’s resident (as opposed to his office) any time and then ask him disbursement; The agent is eager to help his customer get the money disbursed.

4 **DATA**

This research analyzes the electronic money order transaction data extracted from BPO’s EMTS server from May 2010 through September 2013. EMTS data include such attributes (variables) as sender’s and receiver’s cellular phone numbers, amount of money to be sent, date and time when an electronic money order is issued and delivered, six digits of post office code where a money order was issued and disbursed (delivered), amount of commission incurred, and delivery status (delivered, in process, and canceled). The six digit codes classify post offices into urban and rural areas. Phone
numbers were used to differentiate personal remittance (unique or repeated money order) from bulk or volume money orders used by universities and army. Service delivery time (service completion time) is calculated from dates and times when an electronic money order was issued and delivered. Some money orders have minus delivery times probably due to technical problems and were accordingly excluded when calculating the average service completion time.

Post offices are grouped into urban and rural areas. BPO classifies their offices into metropolitan, district, sub-district, and rural areas largely on the basis of its branch codes, but its classification scheme is not clearly defined and does not match exactly administrative units. Accordingly, this research groups post offices into urban (mostly metropolitan, district, sub-district) and rural areas as Bangladesh Bureau of Statistics (BBS) does. There are 1,347 post offices that provide EMTS services in rural areas and 1,400 post offices in the urban areas as of 2013. The 98.2 percent of urban post offices and only 15.9 percent of rural post offices support EMTS. This lopsided distribution of EMTS post offices implies, although this implementation strategy is cost-effective, that the EMTS service targets largely urban areas rather than rural “unbanked” communities.

This research also distinguishes bulk money orders from others (unique and repeated transactions) using sender’s cellular phone number. The delivery time of money orders in bulk tends to be longer than that of personal counterparts and thus the overall service completion time is likely to be exaggerated. If a sender uses EMTS once in a month, this electronic money order is coded a “unique” money order, otherwise repeated one (2-5 times and more than 5 times). The last group is bulk or volume money order. Starting in March 2011, EMTS has remitted monthly salaries of Bangladesh Army officers and soldiers who are serving under the UN Peace Keeping Forces (coded as 10000, 20000, … , and 90000) and those of private employees of some companies (coded as 11111, 22222, 44444, 50000, and 77777). BPO also receives admission fees for several universities (coded as 1000, 2222, 3333, 5555, 6666, 7777, and 9999) and salaries from customers of Network for Universal Services & Rural Advancement (coded as 1212).

More than 11 million electronic money orders were issued to remit 55 billion Takas until September 2013 with its peak of 5 millions of issuance and 26 billion Takas in 2012. The overall money order delivery time was 21.8 hours, but EMTS remitted money orders on average in 14-15 hours after 2011 (mature stage). Most electronic money orders were issued in urban areas (10.5 millions or 94.9%) and 92.0 percent (10.1 millions) of money orders were issued in and delivered to urban areas; similarly, 94.2 percent of the amount of money orders was issued in urban areas and 91.9 percent (50 billion Takas) was transferred within urban areas. There are only 5.1 percent (6.6 millions) in number and 2.5 percent (1.4 billion Takas) in amount of money orders respectively were issued in and delivered to rural areas. Unique money orders (used once per month) accounted for 56.1 percent of issuance and delivery (52% in amount). When combined with lightly repeated money orders, its proportion reached 94.8 percent (10.5 millions) in number and 92.4 percent (50.6 billions) in amount of money orders. By contrast heavily, repeated and bulk remittance respectively held only 4.5 and 0.6 percent of the total issuance and delivery. As expected, service completion time was 20 hours for unique or lightly repeated money orders and about 50 hours for heavily repeated or bulk counterparts.

5 METHOD

This study analyzes the use of electronic money orders to obtain EMTS’s performance indicators, such as the number of money orders issued and delivered, the amount of money order delivered, money order deliver rate, service completion (money order delivery) time, and the amount of commission incurred. It also conducts a partial cohort analysis and compares electronic money orders and manual ordinary counterparts. Due to the lack of tracking systems, only 2012 ordinary money order data were used to compare the number and amount of money orders issued and delivered. The average delivery time of ordinary money order was roughly estimated from a convenient sample (N=301) that was issued from the Sylhet head office (urban area) during July 2011.
6 FINDINGS

The analysis results suggest that electronic money order outnumbers ordinary money order in number and amount. More importantly, EMTS shortens money order delivery time significantly and brings a substantial growth in commission earning to BPO. However, EMTS appears to have a limited impact on “unbanked” rural communities.

6.1 Number of Money Orders Issued and Delivered

Both numbers of electronic money orders issued and delivered showed a bell-shaped pattern (Figure 1). This similarity reflects that almost all money orders (99.96% in 2011 and 2012) were actually delivered. Monthly issuance grew from 2.4 thousands in May 2010 to 123.2 in December 2010 and 380.5 in December 2011, hit its peak 514.1 in April 2012, and then has declined to 339.3 in December 2012 and 97.7 in August 2013. Similarly, the number of money orders delivered has also grown with some fluctuations until April 2012 and then dropped afterward. This substantial decline in the use of EMTS appears to reflect the advent of commercial competitors in the mobile payment market.

Electronic money order outnumbered ordinary money order. Citizens sent 5.3 million electronic money orders (446 thousands per month) and .9 million ordinary money orders (75 thousands per month) in 2012. The number of money orders delivered was 5.3 millions for EMTS and 1.0 for the traditional money order system. Citizens used EMTS about 5-6 times more than its ordinary counterpart during the same period.

Figure 1 suggests that most electronic money orders were issued from and delivered to urban areas. The portion of money orders within urban areas was 97.3 percent (3.1 millions) in 2011 and 89.3 (4.8 millions) in 2012. Money orders from urban and to rural areas hold less than 1 percent (31 thousands) and 3.9 (209 thousands) during the same period. Money order within rural areas held a tiny proportion of .1-.4 percent. One reason is that EMTS started its service in rural areas early 2011. This result is the opposite to a common expectation that mobile payment is more effectively and frequently used by “unbanked” rural residents who need to receive money from their family members living in urban areas (transactions from urban to rural).

Figure 2 illustrates that almost all money orders were unique or lightly repeated (less than five times) and grew until the middle of 2012 and then decreased afterward. For instance, unique remittance accounted for 56.3 percent (1.8 millions) in 2011 and 55.9 (3.0 millions) in 2012, and lightly repeated one held 39.0 and 39.2 percent during the same period. Bulk money orders for Bangladesh army and universities accounted for less than .2 percent and accordingly did not influence money order issuance and delivery significantly. Bulk and heavily repeated money orders, unlike unique and lightly repeated counterparts, showed a relatively stable pattern over time without big fluctuation.
6.2 Amount of Money Orders Delivered

Like the numbers of money orders issued and delivered, the monthly amount of money orders remitted increased from 8 million Takas in May 2010 to its peak 2.7 billions in October 2012, and then declined afterward (Figure 3). Citizens remitted 2.6 billion Takas of the ordinary money orders and 26.3 billions (about 10 times) through EMTS in 2012.

The remittance within urban areas dominates the total amount of money orders. The portion of urban to urban was 97.6 percent (13.8 billion Takas) in 2011 and 89.5 (23.5 billions) in 2012, while the amount of remittance from urban to rural areas was only .8 percent (111 millions) and 3.0 percent (796 millions) of the total during the same period. The amount of money orders by repetition type showed a quite similar pattern as issuance depicted in Figure 2. Unique and lightly repeated (2-5 times) money orders held 94.0 percent of the total amount in 2011 and 92.0 in 2012, while the portion of bulk remittance remained less than .1 percent in 2011 and 1.1 in 2012.

The average amount per money order delivered was 2,583 Takas in the traditional money order system and 4,912 (about twice) in EMTS during 2012. This result shows that citizens send more money through EMTS rather than through the ordinary money order system. The overall average amount per money order has increased with some fluctuations from 3.4 thousand Takas in 2010 to 4.4 (2011), 4.9 (2012), and 6.5 (2013) thousands, indicating that citizens became more and more comfortable remitting money through EMTS. The average amount of remittance from urban to rural areas increases gradually from 3.6 thousands in 2011 to 3.8 in 2012 and 4.8 in 2013. The average amount remitted to urban areas is slightly higher than that of being transferred to rural areas. Unique and lightly repeated money orders showed slightly increasing, but stable average amount ranging from 3.2 thousands in 2010 to 5.1 in 2012. Heavily repeated and bulk money orders recorded higher average amount of remittance ranging from 5.3 thousands to 11.5 in 2011 but showed large fluctuations.

6.3 Money Order Delivery Rate and Time

EMTS successfully delivered 99.96 percent of electronic money orders issued. This delivery rate is consistent across months (years), leaving no significant difference between urban and rural areas (99.96% and 99.93%) and between unique and bulk transactions (99.95% and 99.98%). The ratio of money order delivery to issuance was .9996 in EMTS and 1.1402 in the traditional money order system in 2012. However, the actual delivery rate of ordinary money order is not available mainly due to the manual record keeping system. EMTS makes it possible to trace transactions in real-time and thus discourage such misconduct as fraudulent issuance and double-payment.
The average money order delivery time was 21.79 hours, but it was 17.36 when excluding odd transactions in 2010. The service completion time was 17.49 hours within urban areas and 13.64 from rural to urban areas, which are shorter than those of being delivered to rural counterparts (19.23 hours from urban and 23.74 within rural areas). Figure 4 reveals that the service completion time became stable and consistent regardless of origin and destination after 2011. Unique and lightly repeated (within 5 times) money orders (17.07 and 15.25 hours) were delivered faster than heavily repeated and bulk counterparts (41.55 and 48.47 hours). Unique and repeated money orders show stable and consistent average delivery time after 2010 but bulk money order’s delivery time has fluctuated somehow.

The average delivery time of ordinary money order was estimated to be 153.3 hours (longer than 6 days) in July 2011. This figure is much longer than EMTS’ 15.3 hours of the month as well as annual average of 13.8 in 2012. It is obvious that EMTS substantially shortened money order delivery time.

6.4 Amount of Commission Incurred

Like the number and amount of money orders issued shown in Figure 1, the amount of commission incurred has significantly increased until 2012 and then declined afterward. It began with .1 million Takas in May 2010, grew to 9.5 millions in January 2011 and 30.8 in January 2011, reached its peak of 37.0 in July 2012, then decreased to 25.6 in January 2013 and 13.9 in September. The total amount of commission from EMTS was 201.9 million Takas in 2011 and 360.7 millions in 2012, accounting for a dominate portion of BPO’s annual earning (Islam, 2012, pp. 33-34). Electronic money orders remitted within urban areas held 92.0 percent of the total commission incurred but fluctuated along with a bell-shaped curve. By contrast, other money orders accounted for a tiny portion but remained stable over time. Unique and lightly repeated money orders brought 93.0 percent of the total commission to BPO.

7 DISCUSSION

The analysis results raise questions about the impact of mobile payment on “unbanked” areas, e-government development models and task-technology fit, and a role (limitations) of government in the mobile payment market.

7.1 Mobile Payment for “Unbanked” Communities?

Mobile financial services are generally expected to be a promising alternative to regular banking services in rural areas where bank branches are scarce, but mobile penetration is high enough. In Bangladesh, the majority of firms and factories are located in urban areas where many employees coming from rural areas work to support their family members in their hometown. Bangladesh rural communities appear to be a right niche of the mobile payment market in this respect. EMTS takes advantage of the fact that post offices, unlike bank branches, are relatively evenly distributed across the country; post offices play a more important role in rural areas than in metropolitan areas. Dramatically shortened delivery time from 153 hours to 15 hours (2011) attracted many citizens who remitted five times more in number and 10 times more in amount through EMTS than through ordinary money orders. EMTS was successful as a whole and won the mBillionth Award South Asia in m-business and commerce/banking in 2011 for creating new business models.

However, the impact of EMTS on Bangladesh rural communities was limited. Rural areas still held a tiny portion of money order issuance although it has increased gradually from 1.7 percent of the total issuance in 2011 to 6.8 in 2012 and 7.8 in 2013. Similarly, the portion of amount issued grew from

2 The server is supposed to lock money orders that were not disbursed within two weeks. However, EMTS data show that some money orders took very long time (e.g., 8,571 hours or about a year) or show minus service completion time and become influential odd observations.
1.6 percent to 7.5 and 8.0 during the same period. The remittance from urban to rural communities was not influential during the past three years. It accounted only 3.0 percent in issuance, 3.3 in amount, and 2.6 in commission, while remittance within urban areas held dominant 91.6 percent in all these aspects from 2011 to 2013; The average amount of money order issued in a urban area and delivered to a rural area was 4,036 Takas, which was smaller than urban’s 5,055 (within urban) and 5,700 (rural to urban); Average service completion time from urban to rural areas was 19.2 hours, which was slower than 17.5 (within urban) and 13.6 (rural to urban). Unlike Kenya’s M-PESA, Bangladesh’s EMTS has supported mainly urban communities rather than rural counterparts.

This result is counter-intuitive in general, but it reflects that EMTS started from metropolitan areas and has very slowly expended to rural areas since 2011. Almost all urban post offices (98.2%) support electronic money orders, whereas only 15.9 percent of rural offices provide the EMTS service. The majority post offices in rural communities were useless for EMTS users. This implementation strategy was cost-effective per se, but turned out unsuccessful in utilizing evenly distributed post offices across the country. Paradoxically, underdeveloped Bangladesh banking systems appeared to make EMTS more attractive to metropolitan citizens than to rural residents who do not have many alternatives. A low Internet penetration (5% in 2011) and moderate mobile penetration (60%) imply digital inequality between urban and rural areas and might negatively influence the use of EMTS in “unbanked” rural communities. The impact of “mobile inequality” in generation, gender, and urban/rural (more old and female residents in rural area) on EMTS was not examined yet and calls for further study.

7.2 Task-technology Fit of EMTS

Both M-PESA and EMTS employ relatively basic mobile technology, short message service (SMS), and provide mobile payment services to citizens especially in “unbanked” communities. Unlike M-PESA, EMTS does not provide “full-blown” financial services, but they all adopt a viable technology for notification (text messaging) as opposed to highly sophisticated one. In addition to this task-technology fit, considered are their use context or environment where transportation infrastructure and banking services are rarely adequate, computer/Internet penetration is low, but mobile penetration is relatively high, and many accessible outlets (agents or post offices) are available (Hughes & Lonie, 2007; Jack et al., 2010; Pope et al., 2011). Both services are likely to be mostly utilized in this niche segment. Conversely, M-PESA and EMTS will not be popular in a society like the U.S. and Japan where banking systems provide sufficient online and offline financial services. Both mobile payment services illustrate how task-technology fit works properly in e-government and e-commerce.

EMTS shows that existing e-government models are speculative without close linkage to empirical evidences (Coursey & Norris, 2008). The remittance using money order itself is a service in the transaction stage in Baum and Di Maio (2000). However, EMTS does not actually remit money online but helps operators keep money order records and notify senders and recipients of information about issuance and delivery of electronic money orders. This notification functionality falls into one-way interaction phase; there is no two-way interaction, integration, and transformation. Should EMTS have been integrated in order to send money orders in a transformative manner and then eventually reach an e-government nirvana?

Technological sophistication itself does not tell if an application is better than the other. A static information page (presence technology) is as valuable as online income tax filing service (transaction technology) as long as its task-technology fit results in good performance. Contrary to common expectation and belief, cutting-edge technology needs to be minimized especially in e-government in order to serve those who do not have sufficient computing resources and knowledge, and/or suffer from various disabilities. E-government needs to ask such questions as “Are online information and services what citizens want to get (necessity)?” “Are we delivering right information and services (relevancy, completeness, accuracy, and reliability) to the right audience (target) at the right time (timeliness) and in the right format (simplicity and easiness)?” “Can citizens access and use the information and services in a reasonable manner (availability, accessibility, and usability)?” and “Are the technologies used in
online applications cost-effective (e.g., security and efficiency)?” Hence, e-government should be functional and content-driven for the general public rather than just fancy and technology-driven only for tech-savvies and technocrats, who have plunged into e-government benchmark races.

7.3 Roles and Limitations of Government

Figures 1 and 3 illustrate the decline of EMTS in issuance, delivery, amount remitted, and amount of commission incurred after 2012. This ebb of electronic money orders has been directly influenced by rise of commercial competitors who provide similar mobile payment services especially in metropolitan areas. Also these rising and ebbing imply government’s role as well as its limitations. Government encourages the private sector to do business rather than does business by itself.

While M-PESA is a mobile-commerce application, EMTS is an m-government application initiated by a government unit, Bangladesh Post Office, under a public-private partnership framework. EMTS was intended to renovate existing money order service and figure out such chronic problems as delay and misconduct. It was also expected to fix the failure in the financial service market and thus provide such basic services to disenfranchised citizens in “unbanked” communities. EMTS contributed to form the mobile payment market significantly but has lost its market share as commercial payment services entered the market successfully. BPO appeared to suffer from restrictions and red tapes that slash its efficiency and competitiveness. For instance, officers in an extra departmental branch post office work only four hours per day and BPO may not advertise EMTS but rely on its partner Banglalink for advertisement (Islam, 2012, pp. 38 & 42). By contrast, commercial counterparts were relatively free from such regulations and could move quickly to optimize market’s need.

EMTS, despite its ebb after 2012, still has its potential in rural communities where the mobile payment service is not common yet. BPO has to expand its EMTS service to rural areas quickly in order to meet the demand of “unbanked” residents, who will, in turn, reward with their trust and support. EMTS may evolve into a prior stage of full-blown financial services in BPO. BPO needs to have relevant strategies to respond to changes in market need, mobile penetration, and its competitors including commercial banks in rural areas.

8 CONCLUSION

Bangladesh Post Office (BPO) introduced the Electronic Money Transfer System (EMTS) as an effort for “Vision 2021” in order to make money order payment easier and faster. This EMTS was supposed to be most useful and effective in rural areas where bank branches are rarely located, but one of three rural residents have mobile phones. The analysis shows a dramatic increase in issuance and delivery of electronic money orders, amount of money remitted, and amount commission incurred in EMTS (Figures 1 and 3). Commission earning from money order business has increased and became BPO’s major source of earning. Both the number of issuance and amount of money transferred outnumbered corresponding figures of ordinary money orders. More importantly, EMTS shortened the average money order delivery time from several days to a day (Figure 4) and reported an extremely high delivery rate of 99.96 percent; that is, EMTS has improved efficiency successfully and discouraged misconduct in money order transaction.

However, EMTS concentrated on urban areas rather than rural counterparts, in particular, on remittance within urban communities rather than from urban to rural areas as shown in Figures 1 and 3. Almost all urban post offices (98.2%) support EMTS, whereas only 15.9 percent or rural post offices can handle electronic money orders. Electronic money orders within urban communities accounted for 89.3 percent of issuance, 89.5 percent of amount, and 92.0 percent of commission in 2012. EMTS was not successful in providing mobile payment services to “unbanked” rural communities. EMTS encountered commercial competitors like Bcash who provide mobile remittance services efficiently and accordingly its money order issuance and amount of remittance have declined
since 2012. This decline implies the potential and limitations of government in the mobile payment market.

9 REFERENCES


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3 It is roughly estimated that EMTS now accounts for less than 10 percent of the total remittance in Bangladesh.