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Mobile Payment in Developing Countries: Drivers, Impact, Opportunities and Challenges

Yousef Hasan[a]* and Elantheraiyan Perumal[b]

[a,b]Department of Management Studies, Vel Tech Rangarajan Dr. Saguntala R&D Institute of Science and Technology, Chennai, India

Abstract:

The increasing complexity of global businesses along with the technology revolution the world witnessed in the last decade, future of payment is crystal clear going to be mobile payment (MP). This study investigates the drivers of mobile payment adoption, its challenges and Benefits in developing countries. In addition to a case study on Paytm as an online Payment app in India, with a comparison between three mobile payment apps M-Pesa (Kenya), Paytm (India), and EcoCash (Zimbabwe). The results of the study indicate that more mobile penetration along with higher level of digital literacy resulted in higher adoption of mobile payment, also similarly about government support through regulations and digital infrastructure. Additionally, mobile payment adoption enhances the financial inclusion especially in developed countries where many people were unbanked.

1. INTRODUCTION:

Online payment systems emerged as an influential player in the finance industries of developing countries. In areas where typical banking infrastructure is constrained, smartphone-based payment methods have surpassed traditional financial services, offering millions with access to online banking services. This innovation employs the wide acceptance of mobile phones to provide convenient, economical, and easily accessed financial services to communities that were before underserved or totally unbanked. Additionally, the extent of the change is extraordinary. Based on data from (Storchi et al., 2023) the Global System for Mobile Communications Association (GSMA) 2023 Report by end of 2022, there were more than 1.6 billion enrolled mobile payment accounts globally, most of them in developing countries. South Africa itself contains almost 50% of these accounts, indicating the area's rapid adopt of this technology. The case of countries such as Kenya, mobile money trades have grown to an amount equivalent to almost 50% of the country's GDP, demonstrating the vital function these systems serve in economic growth.

According to (Tun, 2020) The significance of mobile payments in developing countries may not be exaggerated. These systems are not just an easy replacement to cash; they indicate an essential change in the way individuals perform financial transactions, preserve money, and engage in the formal economy. From small-scale traders in small towns to cities professionals, mobile payments are transforming economic relationships and establishing up new opportunities for financial inclusion. The World Bank states that mobile money services have been essential for boosting financial inclusion, with the number individuals in developing economies having a mobile money account rising from 4% in 2014 to 14% in 2021.

Furthermore, the COVID-19 pandemic has contributed to the adoption of mobile payments. As stated by (Hasyim & Ali, 2022) in the year 2020 the number of enrolled mobile money accounts increased by 12.7% worldwide, with about 136 million accounts added in a single year. This explosive growth highlights the resilience and flexibility of mobile payment systems in periods of crisis.

As illustrated by (Himel et al., 2021) study of suggests that mobile payments are having an essential part in converting financial landscapes in developing countries, fostering financial inclusion, and guiding economic growth. By studying the drivers behind their fast adoption, evaluating key case studies, and investigating both the benefits and obstacles of these systems, this paper show how mobile payment systems have become a cornerstone of economic development in a variety of emerging economies through lowering the cost of money transfers to enabling micro-loans and deposits, mobile payments are not only transforming how money travels but also they're modifying lives and economies. As we dive deeper through the subject matter, we will investigate how various nations are implementing these systems, the varying degrees of success they've achieved, and the lessons that can be drawn for future development. This study attempts to deliver a comprehensive knowledge of the present status and future opportunities for mobile payments in developing countries.

1.1 Background:

Mobile payments in general, indicate money transfers executed using a mobile device such as a smartphone. These sorts of transactions may include transfers between individuals, payments for bills, vendor payments, as well as accessibility to credit and savings options. The concept developed around 2000s and has since grown quickly, especially in developing countries where traditional banking facilities may be insufficient.

The evolution of mobile payments in developing countries could be tracked back into the Philippines in 2001, when Smart Communications introduced Smart Money, which was one of the world's first mobile payment systems. Nevertheless, according to (Omwansa et al., 2015) it was the introduction of M-Pesa in Kenya by Safaricom in 2007 that truly initiated the mobile payment innovation in the developing countries. Also, M-Pesa's success showed the enormous potential of mobile payments to revolutionize financial services in under-banked markets. Through the past twenty years, mobile payment systems have grown from basic text-based interfaces to advanced smartphone apps. According to (Kandpal & Mehrotra, 2019) findings they've further broadened the variety of services, proceeding above fundamental money transfers to offer savings accounts, loans, insurance, and even investment options. This transformation has been caused by developments in technology, evolving regulatory environments, and an increasing awareness of the possibilities of mobile payments for fostering financial inclusion.

International patterns in mobile payment adoption indicate an obvious split between developed and developing economies. Whereas developed countries have seen constant rise in mobile payments, usually building on already established card-based systems. However, developing countries have witnessed unprecedented expansion, often jumping ahead of traditional financial systems completely according to (Kwabena et al., 2019). The technologies behind mobile payments has also varied. While several promptly systems utilized SMS or USSD standards, becoming accessible even on simple feature phones, modern ones make use of smartphone apps, QR codes, and near-field communication (NFC) technology. This advancement in technology has allowed for more sophisticated services but also unveils challenges in terms of availability to people with no smartphones or consistent access to the internet.

According to (Bianchi et al., 2023) regulation strategies with regard to mobile payments differed widely among different countries, substantially influencing their adoption and growth. In some nations, like Kenya, followed a "test and learn" approach, enabling innovation to thrive before applying comprehensive regulations. Many others followed a more cautious approach, possibly reducing adoption but also providing higher consumer protections. As we move further into the digital age, mobile payments are increasingly becoming combined with other digital services, from online shopping sites to governmental services. This integration brings with it new opportunities and challenges, shaping the future of financial services in developing countries.

2. DRIVERS OF MOBILE PAYMENT ADOPTION IN DEVELOPING COUNTRIES:

A number of primary variables have driven the quick growth of mobile payments in developing countries. As illustrated in Table 1. These drivers differ in their effect throughout various parts of the world, expressing their specific circumstances and requirements.

Table 1. Factors effecting mobile payment adoption in different developing countries

Factor	**Country/Percentage**	**Effect**	**Country/Percentage**	**Effect**
Banked adults	South Africa 34%	More	Latin America 73%	Less
Mobile phone penetration rates	Kenya 112%	More	India 78%	Less
Need for financial inclusion	Bangladesh 50% of adults were unbanked in 2017	More	Malaysia only 15% unbanked	Less
Convenience and cost-effectiveness	Philippines Domestic transactions	Less	China Integrated into social media	More

Regulatory environment	Kenya's "test and learn" approach	Positive	Nigeria, initial strict regulations	Negative
Economic instability and currency volatility	Zimbabwe hyperinflation	More	Botswana Stable economy	Less
Government support and digitization initiatives	India's demonetization in 2016	Positive	Rawanda 2020 promoting a cashless economy	Positive

3.1 Limited traditional banking infrastructure:
At numerous developing economies, traditional financial services are limited specifically in rural areas. The absence of traditional bank branches and ATMs has led to a major chance for mobile payment systems as stated by (Naruetharadhol et al., 2021).

3.2 High mobile phone penetration rates:
Zhou et al. (2021) results indicated that the increasing use of smartphones, even among regions where people not having additional facilities, has offered an accessible platform for mobile payment services.

3.3 Need for financial inclusion:
Mobile payment systems provide an alternative to financial services for underbanked and unbanked individuals.

3.4 Convenience and cost-effectiveness:
Mobile payments frequently provide a more useful and affordable substitute to traditional financial services, particularly for payments and small-scale transactions as mentioned in (Victor et al., 2021).

3.5 Supportive regulatory environment:
As stated in (Leong et al., 2021) economies with rules promoting mobile payment innovation have witnessed quicker rates of adoption.

3.6 Economic instability and currency volatility:
Regarding certain countries, economic volatility has caused individuals to adopt mobile payments as an increasingly secure and available method for payment according to (Storchi et al., 2023).

3.7 Government support and digitization initiatives:
A number of governments have worked to promote mobile payments as an element of larger digitization efforts as stated by (Zhao et al., 2024).

The significance of each of these key factors differs across countries, expressing differences in economic circumstances, advances in technology, regulating environments, and cultural variables. For example, while limited banking infrastructure has served as the main influence in most of Africa however in Southeast Asian countries such as Indonesia, the importance of convenience and substantial smartphone penetration have been more important. Recognizing these differences is essential in foreseeing and promoting mobile payment adoption in various developing country environments.

3. CASE STUDY: PAYTM IN INDIA:

Paytm, short for "Pay Through Mobile," has emerged as one of India's leading mobile payment platforms, playing a pivotal role in the country's digital payment revolution. Launched in 2010 by One97 Communications, Paytm has evolved from a simple mobile recharge platform to a comprehensive financial services provider.

Market Penetration and Growth:
As stated by (Pal et al., 2020) Paytm's market share expanded from 100 million in 2016 to more than 350 million by 2021. This quick expansion became especially noticeable after India's demonetization in 2016, which experienced Paytm's transactions per day an increase from 2.5 million to 7 million within days. Similarly, the mentioned study stated that Paytm's gross merchandise value (GMV) went up from $1 billion in 2016 to $42 billion in 2021, indicating a compound annual growth rate (CAGR) of 111.4% over the course of five years. This accelerating growth highlights Paytm's substantial effect on India's digital payment environment.

Service Diversification:
Paytm's success can be linked mostly to its various number of services. According to (Paytm, 2024) in their annual report for financial year 2023, outline Paytm's expansion beyond basic mobile payments:

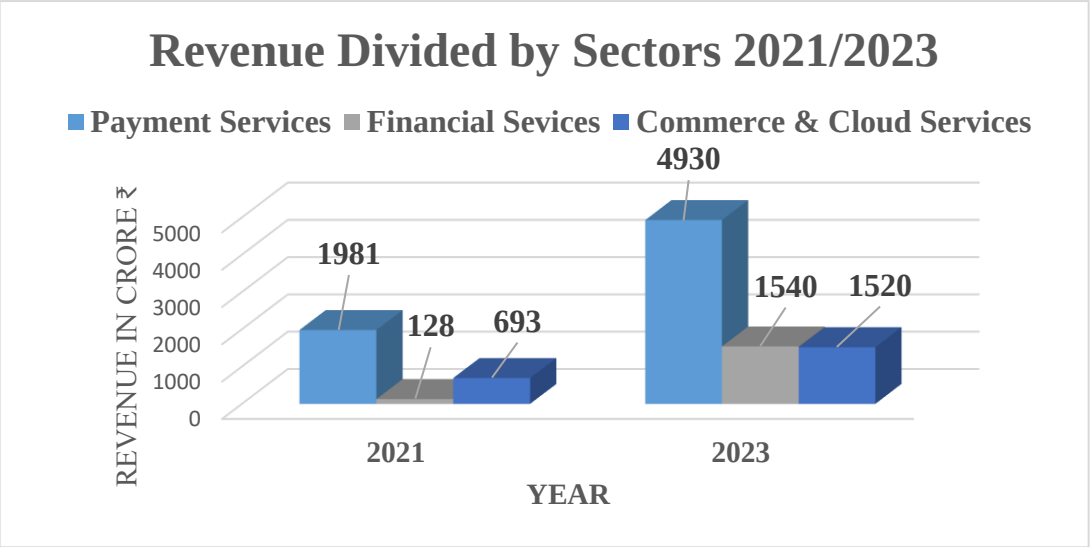

Figure 1. **Revenue of Paytm in 2021 & 2023**

- Paytm Revenue: As Figure 1. Shows over 7.99 Crore of total revenue in 2023 comparing to 2.8 Crore in 2021, Where financial services revenue was only 5% (128 Crore) of total revenue in 2021 became 19% (1540 Crore)of total revenue, while Payment services and Commerce &cloud services had 71% (1981 Crore) and 25% (693 Crore) respectively in 2021 and became 62% (4930 Crore) and 19% (1520 Crore) respectively in 2023
- Paytm Services: Reached 8.2 Crore transacting users per month by 2023.
- Paytm Merchant Network: Grown over 6.8 million merchants in 2023.
- Paytm Money: including mutual funds and stock trading.
- Paytm Loans: 35.37 Crore value of distributed loans in 2023.

This variety has enabled Paytm to cater to an extensive spectrum of financial needs, contributing to its broad adoption.

Impact on Financial Inclusion:
An essential component of Paytm's success has been its involvement in financial inclusion in India. According to (Neelam & Bhattacharya, 2023) revealed that Paytm had a major influence on financial inclusion, particularly within rural and semi-urban regions. Their survey of 1,200 Paytm users indicated:

- 68% of participants from rural areas indicated first time utilizing official financial services via Paytm.
- 72% of consumers from lower-income populations (who earned less than $200 monthly) mentioned that Paytm was their initial method of performing financial transactions.
- 85% of consumers stated a raise in their savings habits after adopting Paytm.

Challenges Facing Paytm:
Regardless of its success, Paytm encounters major obstacles while maintaining bright prospects for the near future. As stated by (Sall, 2018), in their Telematics and Informatics paper, point out that Paytm claims with fierce rivalry from international competitors like Google Pay and PhonePe, which collectively controlled 85% of the UPI market's share in 2022. The company is additionally subject to ongoing regulatory scrutiny, especially with regard to information security and financial stability, and has been dealing with profitability issues, expressing financial losses until 2022. Nevertheless, the study displays an optimistic future, forecasting Paytm's profits might increase at a CAGR of 35% within 2023 and 2028. This increase is expected to be fueled by growth in credit services, with mortgage disbursals developing by 401% year-on-year in Q2 2023, a greater concentration on offline payment methods with 29 million vendors enrolled by 2023, and investigation of cryptocurrency and blockchain technologies to improve security and broaden service offerings. Paytm's journey illustrates the potential for change of mobile payment systems in developing countries. By employing technology, paying attention to user needs, and constantly innovating, Paytm has not only accomplished major market

success but also played a role significantly to financial inclusion in India. As it moves through these obstacles and examines fresh possibilities, Paytm keeps shaping the future of digital payments in the biggest democracy in the world, indicating the constantly changing character of the fintech nature in developing countries.

Comparison of M-Pesa, Paytm, and EcoCash

Table 2. **Comparison between mobile payments apps: M-Pesa, Paytm, EcoCash**

	M-Pesa (Kenya)	**Paytm (India)**	**EcoCash (Zimbabwe)**
Market Penetration /User Base	Highest	Large user base / lower market penetration	High market penetration in a smaller market
Regulatory Environment	"test and learn" regulatory approach	Faced evolving regulations	faced increasing regulatory scrutiny
Technology and Infrastructure	Initially based on simple SMS technology	Started as a smartphone-based platform	started with USSD and SMS-based services
Initial Services	Money transfer and bill payment services.	Mobile recharge platform but rapidly diversified.	Initially focused on money transfers and airtime purchases.
Extended Services	Savings, loans (M-Shwari), and international remittances.	Payments, banking, investments, and insurance.	Loans, and merchant payments.
Economic Context and Impact	Significant impact on financial inclusion, with transactions equivalent to about 50% of Kenya's GDP.	Got significant improving by India's demonetization in 2016.	Faced challenges due to the country's economic volatility.

As illustrated in Table 2. **Comparison between mobile payments apps: M-Pesa, Paytm, EcoCash**. M-Pesa had the highest user base and market penetration according to (Rouse & Bátiz-Lazo, 2023), Paytm had large user base but less market penetration in rural areas, while (Johnen et al., 2022) stated that EcoCash had high penetration in a smaller market. Additionally, M-Pesa was supported with “test and learn” regulatory approach which allowed it to thrive faster, while Paytm had to face regulations such as “Know Your Customer” KYC and requirements for data localization, EcoCash started with no regulated ecosystem the countered increasing security laws. Similarly stated in Table 2. Both M-Pesa and EcoCash started with simple messaging technology as stated in (Kasapa, 2017) , while Paytm started using smartphone and new technology from the beginning. However, while Paytm started as only mobile recharge platform when M-Pesa and EcoCash both started with money transfer services, afterwards Paytm included payment, banking, investment, and insurance services, M-Pesa added loans and international money transfer, EcoCash expanded services to savings, loans, and merchant payments, but with a less variety than Paytm. Furthermore, as Table 2. Shows the M-Pesa had a substantial impact on financial inclusion with transactions value equals almost 50% of Kenya’s GDP while Paytm had massive raise with Indian’s demonetization in 2016 which increased digital payment adoption. However, EcoCash faced challenges related to the volatility of economy on the national level despite being a crucial financial tool in the market according to (Jadagu et al., 2023) .

4. Challenges and Opportunities of MP in Developing Countries:

Mobile payment platforms are growing as an effective instrument for financial inclusion and development in the economy in developing countries, providing several benefits while also encountering major obstacles in accordce to (Neelam & Bhattacharya, 2023). Among the biggest and most substantial advantages is the dramatic boost in financial inclusion. By exploiting widely used mobile phone adoption, these systems deliver access to essential financial services for millions of formerly unbanked people, especially in rural areas where traditional banking facilities is limited. For example, in Sub-Saharan Africa, mobile money accounts have turned into an essential tool for a lot of people enabling them to save, make transactions, and access credit without a traditional bank account.

The economical nature of mobile payments is an additional vital advantage. These systems substantially decrease transaction costs related to traditional banking and money transfer services, particularly useful for money transfers. Also as stated in (Ncube, 2023), the World Bank reported that mobile banking services have contributed to reducing remittance costs, permitting additional funds to reach beneficiaries. Mobile payments promote economic activity by enabling simpler and quicker transactions for goods and services. Startups and micro-entrepreneurs are able to process digital payments, extending their customer base and incorporating into the official financial system. This not only enhances their potential for earnings but also helps with the economy as a whole.

According to (George et al., 2023) online format of these systems strengthens transparency and can help minimize corruption by creating digital pathways for financial transactions. Officials can utilize mobile payment systems for more efficient and transparent repayment of social aid and collecting taxes, which could enhance public service delivery and budget control. Furthermore, mobile payments have demonstrated potential in encouraging marginalized groups, especially women and rural residents, by delivering financial independence and privacy. They additionally promote spending habits and may be used as alternative data for scoring credit, maybe activating access to formal credit for those with no traditional banking records.

Nevertheless, these platforms additionally confront major obstacles and restrictions. (Bhuiyan et al., 2024) stated that Legislation challenges provide a primary obstacle, with lawmakers struggling to balance financial innovation with protecting customers, money laundering prevention measures, and financial stability worries. Infrastructure and connectivity problems pose another significant challenge, especially in remote or underdeveloped regions where telecommunications networks may be unreliable or absent. Additionally, Security and fraud worries remain at the top of challenges. As these websites manage sensitive financial data and transactions, they become tempting targets for computer hackers. Applying durable security measures throughout diverse mobile devices and networks offers ongoing problems with technology.

Additionally (Ha & Chuah, 2023) results showed that digital literacy and concerns about trust greatly influence adoption. Many prospective customers, especially elderly people or those in rural regions, might not have the technological engagement necessary to use these services efficiently. Establishing trust in digital financial systems can be tough in cultures with an intense desire for cash transactions or a historical skepticism of traditional financial institutions. The explosive growth of mobile payments additionally brings up concerns about data privacy, particularly in countries where durable data protection regulations are still evolving. There's also a risk of developing novel forms of financial exclusion for those with no access to mobile phones or the digital literacy required to operate them.

Additional obstacles contain the dominant role of cellphone companies in the mobile payment environment, currency fluctuation risks, and problems of handling cross-border transactions as well as exchange rates. Hence, tackling these challenges demands collaborative work from policymakers, service providers, as well as other stakeholders. It includes in addition to technological solutions also policy innovations, education initiatives, and cross-sector partnerships. As mobile payments keep evolving, conquering these obstacles will be crucial in recognizing their complete potential for financial inclusion and economic growth in developing countries.

5. CONCLUSION:

Mobile payments have grown as an influential factor in the financial landscape of developing countries, providing a route to financial inclusion for millions of previously unbanked people. From the widespread adoption of M-Pesa in Kenya to the rapid growth of Paytm in India, these systems of payment have proved their potential to revolutionize how people perform financial transactions, save money, and engage in the formal economy. Additionally, the factors behind this phenomenon are complex, such as limited traditional banking infrastructure, large mobile phone penetration levels, and the pressing require for financial inclusion. The case study of Paytm in India indicates how mobile payment platforms could quickly evolve from basic transaction instruments to comprehensive financial service providers, significantly affecting financial inclusion and economic growth.

Whereas the advantages of mobile payments are significant - including increased financial inclusion, minimized transaction costs, and improved economic activity - there are also obstacles to be solved. They involve regulatory challenges, systems limitations, security concerns, and problems associated with digital literacy and trust. However, looking to the future, the inclusion of new technologies like blockchain, AI, and biometrics, along with deeper integration with other digital services, assurances to further increase the capabilities and attain of mobile payment systems.

6. Recommendations:

1. Policymakers:
    - Establish adaptive, innovation-friendly laws which integrate financial inclusion with consumer protection.

- Invest in technological facilities to enhance interaction in underserved and rural regions.
- Encourage financial and digital literacy programs to guarantee widespread adoption and ethical use.

2. Mobile Payment Providers:

- Concentrate on user satisfaction and security to promote trust and promote adoption.
- Cooperate with various other financial organizations and service providers to establish more extensive and interoperable environments.
- Invest in technological advances to improve service offerings and safety precautions.

3. NGOs and International Organizations:

- Support research on the long-term economic impacts of mobile payments.
- Facilitate knowledge sharing between different countries and regions to spread best practices.
- Advocate for inclusive policies that ensure mobile payments benefit all segments of society.

4. Researchers:
Make more long-term research studies to recognize the long-term impacts of mobile payments on financial attitudes and economic development. Additionally, examine ways to reduce possible adverse consequences such as new forms of financial exclusion or information security threats.

Mobile payments indicate an excellent chance for developing countries to overtake traditional banking systems while achieving greater financial inclusion. By addressing challenges carefully and utilizing new technologies, these networks can continue to develop, potentially becoming complete systems for an extensive spectrum of financial services. The next phase of financing in developing countries is becoming more active, and with careful execution and continued innovation, mobile payments may serve an essential part in driving economic growth and expanding the financial situation for millions of individuals.

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