

# Applying Utaut and Innovation Diffusion Theory to Understand the Rapid Adoption of M-PESA

Caroline Kinuthia  
PhD School of Informatics  
Vienna University of  
Technology  
Vienna, Austria

**Abstract:** M-PESA, the world-leading mobile money system has transformed lives and livelihoods in Kenya and beyond. Financial inclusion for the marginalized in emerging markets is now feasible and achievable. Mobile money promises a more scalable and cheaper alternative to the large unbanked populace than conventional banking. In the recent years, Sub-Saharan Africa has rolled out a number of practical technology-driven innovative products leading to more and more cashless transactions. One such product is M-PESA; a mobile-based financial innovation that has achieved unprecedented growth since its inception in March 2007 by the mobile network operator, Safaricom. In spite of its tantalizing potential, one major challenge is how to optimally capture the market. This paper analyses the M-PESA ecosystem, by building theoretical linkages between two main theories; i) Innovation Diffusion Theory and ii) Unified Theory of Acceptance and Use of Technology. The questions the author is addressing are: Which factors are responsible for M-PESA's rapid adoption? How does Safaricom maintain its strong grip as a Mobile Network Operator in the financial sector?

**Keywords:** e-float; financial inclusion; knowledge economy; value proposition; performance expectancy; effort expectancy; unified theory of acceptance and use of technology (UTAUT); innovation diffusion theory (IDT)

## 1. INTRODUCTION

The cost of accessing a bank is the biggest challenge facing most people in emerging economies. Mobile payment systems as described in [6], [7], [11] and [12] are breaking down numerous barriers caused by distance and access thus improving banking activities in these countries. M-PESA is processing more money transactions in Kenya, than what Western Union transacts globally hence providing mobile banking services to Kenya's 70 percent adult population according to [4], [5] and [9].

The numerous financial innovations mushrooming in the developing countries has brought about a knowledge economy. This emphasizes the role of knowledge in implementing technology. More than in the past, there is emergence of technological start-ups that are tailored around finding solutions to everyday problems using technology. The growing ubiquity of mobile phones experienced in developing countries has revolutionized the financial infrastructure and led to these nations to leapfrog the developed countries.

Data was collected by administering a questionnaire on 482 respondents across both rural and urban settings. Statistical Package for the Social Sciences (SPSS) was used to statistically analyze data.

The author explored various parameters that promote intentions to use M-PESA. The unified theory of acceptance and use of technology (UTAUT) model by [15] was integrated with the innovation diffusion theory (IDT) [3]. The two theories were used to assess customer acceptance of M-PESA's novel innovation and ease of use. Based on these facts, the study aims to focus on two objectives:

- To determine factors responsible for M-PESA's rapid adoption.
- To understand Safaricom's strategy of maintaining customers under stiff competition.

The paper is organized as follows. In Section 2, we will look briefly at the M-PESA system. The next Section discusses the

methodology administered. Section 4 explains the results,. Finally we will present our conclusion in section 5.

## 2. M-PESA IN A NUTSHELL

### 2.1 How does it work?

M-PESA is a phone based money-transfer scheme as explained in [2]. It requires a subscriber to sign-up. The subscriber is then able to pay cash money into the system by visiting any of Safaricom's 90,000 agents (usually a small business premise). The agent then credits the money to the subscriber's M-PESA account (e-float) as mentioned in [8]. The subscriber may withdraw money by visiting any authorized agent, who determines if the subscriber has sufficient funds before debiting subscriber's account and giving out cash. The subscriber can also transfer money to others (P2P) using the phone's menu. It is therefore a safer method of transferring cash, rather than using the traditional physical method which is more risky [14]. One factor that has propelled M-PESA's prosperity is the Kenyan culture of 'giving'. Most of the working populations in urban areas support their families who live in rural villages financially. Figure 1 below illustrates M-PESA transactions (deposits, withdrawals and P2P transfers) for the last 6 years as illustrated in [10].

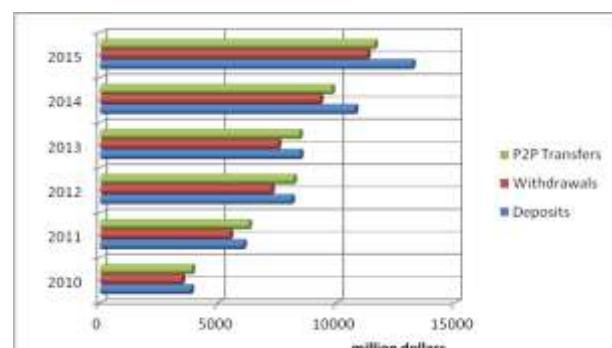


Figure 1: M-PESA transactions in figures. Source Safaricom statistics

## 2.2 M-PESA's influence on the international mobile ecosystem

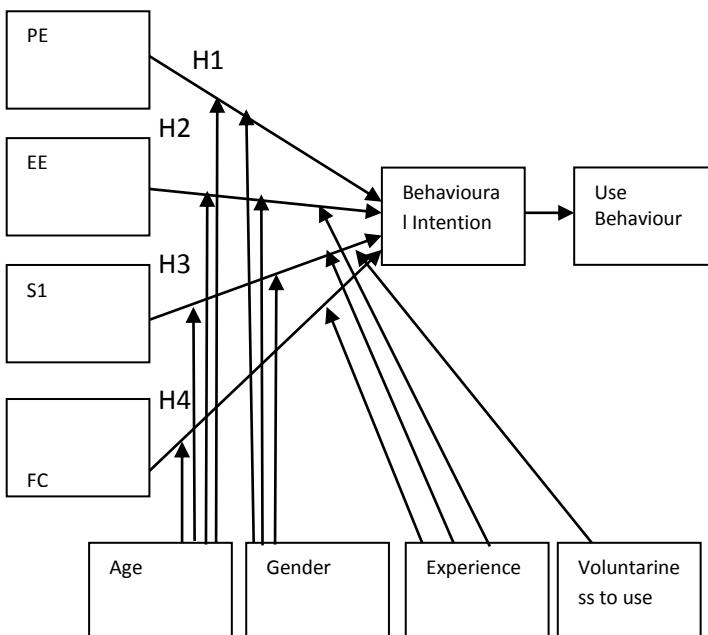
The business model and value proposition used by M-PESA is based on transacting high volumes of low value. Developing countries can leverage on this model to gain economic growth. Safaricom is collaborating with other mobile money operators (MNOs) in Africa and beyond to provide mobile-based money services. These services include sending money, withdrawals, P2P transfers, purchase of airtime, paying for

## 3. METHODOLOGY

This research investigates questionnaire responses from 482 M-PESA customers in Kenya using the random sampling method. Out of these, 36 questionnaires were discarded. The respondents comprise 285 males and 161 females. 55 percent of the respondents reside in urban neighbourhoods while 45 percent live in the rural areas. The process was carried out in a span of six months cumulatively. The sample was thereafter statistically analyzed. To ensure more grounded findings, the author has also consulted literature and statistics from various authoritative sources

### 3.1 Research Model

In this study, the author uses UTAUT [15] to study acceptance and use of M-PESA by Safaricom's customers in Kenya. According to UTAUT, there are four factors that influence use of M-PESA: performance expectancy (PE), effort expectancy (EE), social influence (SI) and facilitating conditions (FC). The author incorporated the following parameters: gender, age, experience, voluntariness to use and location of respondent (rural or urban) to the study. In addition, Innovation Diffusion Theory (IDT) [3] was also incorporated to answer the research questions. Core constructs checked the following parameters: ease of use, voluntariness of use, consistency, simplicity, interactivity and responsiveness.



goods and services, savings and loans as described by the authors [1] and [13]. Safaricom has partnered with Tanzania's Vodacom, Rwanda's and Uganda's MTN. MTN and Safaricom have already planned to roll out the same services in Afghanistan, Botswana, Cyprus, Benin, Cameroon, Ghana, Ivory Coast, Guinea, Republic of Congo, Iran, Liberia, Sudan, South Africa, Syria, Yemen, Swaziland and Zambia. Most notable countries where M-PESA system has been mirrored is in Mozambique, India and Romania. Traditional banks that had initially written Safaricom off, are now strategizing on inventing more innovative solutions in order to cash-in on the profits.

Figure 2: Theoretical framework of hypothesis. UTAUT with human and social variables incorporated. Source Venkatesh et al. 2003

### 3.2 Research Hypotheses

The UTAUT model suits the context of this study well. It is a solid theory that was developed by consolidating constructs of eight earlier models (including innovation diffusion theory) which research previously used to describe information systems usage behavior. Effort expectancy is expected to be the most essential construct at the initial stages of behavioural intention to use M-PESA. It is also expected that simplicity and ease of use of M-PESA will also increase the behavioural intention to use M-PESA. It is apparent that young users would tend to adapt M-PESA more easily than the older population. Family and friends are most likely to influence adoption of M-PESA by most individuals. Based on these, the author has developed the following hypotheses:

- I. *Hypothesis 1:* Performance expectancy positively influences behavioural intention to use M-PESA by customers.
- II. *Hypothesis 2:* Effort expectancy positively influences behavioural intention to use M-PESA by customers.
- III. *Hypothesis 3:* Social influence positively influences customers' behavioural intention to use M-PESA.
- IV. *Hypothesis 4:* Facilitating conditions positively influences customer's behavioural intention to use Safaricom's M-PESA.

## 4. RESULTS

Data in this study was found to be reliable. According to the Statistical Package for Social Science (SPSS), the composite reliabilities ranged from 0.74 to 0.93 which exceeds the recommended value of 0.70. Regression analysis investigates the influence of PE, EE and SE on intention to use. Results indicate that PE, EE and SE significantly affect behavioural intention to use. Further, table 1 below confirms that hypotheses H1, H2, H3, H4 are supported.

Table 1: Path Coefficients(E) for direct factors on customer's acceptance of M-PESA. Testing hypothesis and result for H1, H2, H3, H4.

Dependent variable	Path	Direct Factor	E	p	Statistical result
Behavioural Intention(BI)	←	Performance Expectancy (PE)	.138	*	Supported
Behavioural Intention(BI)	←	Effort Expectancy (EE)	.102	***	Supported
Behavioural Intention(BI)	←	Social Influence (SI)	.318	***	Supported
Behavioural Intention(BI)	←	Facilitating Conditions (FC)	.077	**	Supported

\*p<.01 \*\*p<.05 \*\*\*p<.000

## 5. CONCLUSION

It is evident that several salient factors are responsible for the success of the mobile money innovation, M-PESA. Customers have found the mobile payment interface user friendly, responsive, interactive, simple, consistent and easy to use. Safaricom on the other hand has made mobile payment services cost effective, accessible round the clock and considerably secure. The transactional speeds are very impressive and the service is easily available by ensuring there is a wide agent network across the country. Moreover, M-PESA has already expanded its network across several countries with unequalled success. It is also cashing in on international remittances (money transfer) by partnering with moneygram proving that it is still expanding new lines of conducting business.

## 6. ACKNOWLEDGMENTS

The author would like to especially thank her PhD supervisors, Prof. Gerti Kappel and Prof. Christian Huemer for their support. This research was made possible by funding from the City of Vienna through the Vienna University of Technology. A special appreciation to Dr. Andrew Kahonge and the University of Nairobi, School of Computing and Informatics, University of Nairobi for their resourcefulness and guidance. Finally, the author would like to gratefully acknowledge all the M-PESA agents who participated in this research for their invaluable contribution.

## 7. REFERENCES

- [1] B. Ngugi, M. Pelowski and J. G. Ogembo, "M-Pesa: A Case Study of the Critical Early Adopters' Role in the Rapid Adoption of Mobile Money Banking in Kenya," *The electronic Journal of Information Systems in Developing countries*, vol 43, pp. 1-16, 2010.
- [2] C. Kinuthia and A. Kahonge, "Economic Value Exchanges in Multi-party Collaborations: using e3value to Analyse the m-pesa Ecosystem," at *The 14<sup>th</sup> International Conference on Informatics and Economy*, Bucharest, April 2015.
- [3] E. Rogers, "Diffusion of Innovations," *New York: Free Press*, 1995
- [4] FSD Kenya. FinAccess National Survey 2013: Profiling Developments in Financial Access and Usage in Kenya [Online]. Available: <http://fsdkenya.org/publication/finaccess-national-survey-2013-profiling-developments-in-financial-access-and-usage-in-kenya/>. [Accessed 24 April 2016].
- [5] GSMA The Mobile Economy 2016. [Online]. Available: <http://www.gsmamobileeconomy.com/>. [Accessed 21 April 2016].
- [6] J.C. Aker and I. M. Mbiti, "Mobile phones and Economic Development in Africa" *Jounal of economic perspective*, vol 24, no.3, pp. 207-232, 2010.
- [7] K. P. Donovan, "Mobile Money, More Freedom? The impact of M-PESA's network Power on Development as Freedom." *International Journal of Communication*, vol. 6 pp. 2647-2669, 2012.
- [8] M. Okuttah, "Safaricom changes method of recruiting M-pesa agents." *Nation Business Daily*, 23 December 2009.
- [9] N. Hughes and S. Lonie, "M-PESA: Mobile Money for the "Unbanked" Turning Cell Phones into 24-Hour Tellers in Kenya" *Innovations: Technology, Governance, Globalization*, vol 2, pp. 63-81, 2007.
- [10] Safaricom. [Online]. Available: <http://www.safaricom.co.ke/>. [Accessed 15 April 2016].
- [11] S. Muwanguzi and G.W. Musambira, "The Transformation of East Africa's Economy Using Mobile Phone Money Transfer Services: A Comparative Analysis of Kenya and Uganda's Experiences," *Journal of Creative Communications* vol 4 pp. 131-146, July 2009.
- [12] O. Morawczynski and M. Pickens, "Poor People Using Mobile Financial Services: Observations on Customer Usage and Impact from M-PESA," *CGAP Brief*, Washington, DC: CGAP, August 2009
- [13] W. Jack and T. Suri, "Mobile Money: the Economics of M-PESA," *Unpublished paper*, October, 2009
- [14] W. Jack and T. Suri, "The Risk Sharing Benefits of Mobile Money," *MIT Working paper*, 2010.
- [15] Venkatesh et al. "User Acceptance of Information Technology: Toward a Unified View", *MIS Quarterly* vol. 27(3), pp. 425–478, 2003