Available online at www.elixirpublishers.com (Elixir International Journal)

Organizational Behaviour

Elixir Org. Behaviour 113 (2017) 49395-49402

ISSN: 2229-712X

Factors Influencing Time of Adoption of Technology: Testing Moore's 'Chasm' Framework using Kenya's M-Pesa Innovation

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ARTICLE INFO

Article history:

Received: 11 November 2017;

Received in revised form:

20 December 2017;

Accepted: 30 December 2017;

Keywords

Chasm,

Safaricom,

M-Pesa,

Moore'sFramework,

MoneyTransfer,

Technology Adoption.

ABSTRACT

Safaricom launched its M-Pesa product in 2007 and marketed it as a money transfer platform that would allow the Kenyan population to conveniently transfer money from urban areas to their rural hometowns using mobile phones. Safaricom's key marketing strategy has received little research attention. The purpose of this study was to investigate the relationship between Safaricom's M-Pesa Technology Adoption Life Cycle psychographic factors, as well as three key marketing success attributes as offered in a framework developed by Moore (1991), and time of adoption of technology. The sample size was 358. A hard copy questionnaire was administered to 236 respondents drawn from adult Kenyans living in Nairobi, Mombasa and Kisumu. An online copy was sent to 122 respondents in other locations. Descriptive and inferential statistics were used to analyze data. Whereas the relationship between Income and Time of Adoption was statistically significant (χ^2=36.647, *df*=8, *p*=.000), the relationship between Main Reason for Adoption and Time of Adoption was not statistically significant at α=.05 (χ^2=12.794, *df*=12, *p*=.384). Further, the results indicated no statistically significant relationship between Technology Perception and Time of Adoption (χ^2=19.641, *df*=16, *p*=.237). Niche Function and Time of Adoption, on the other hand, exhibited a statistically significant relationship (χ^2=40.986, *df*=16, *p*=.001). Thus, organizations should seek a core Niche Function to target the majority market. There was no statistically significant relationship between the Product Continuum and Time of Adoption (χ^2=10.748, *p*=.825). Finally, the study established a statistically significant relationship between Niche Communication and Time of Adoption (χ^2=31.539, *p*=.011), suggesting that organizations should explicitly and assertively communicate the selected Niche Function to the consumers.

Introduction

Background

Product innovation is characterized by the creation of new products as a result of an organization that supports creativity and experimentation to solve problems. However, it transcends just product creation, encompassing the commercialization, implementation and modification of existing products, systems and resources which enables an organization to differentiate itself from its competitors (Scheepers, et al., 2008). While previous research draws the characteristics that define corporate entrepreneurship, various researchers (e.g. Rogers (1983) and Moore (1991)) have established specific models and frameworks that set an organization on a successful path for the launch of a novel entrepreneurial product. Moore (1991) identified an ineffective strategy, the Chasm, as a factor that contributes to entrepreneurial failures and offers a revised Technology Adoption Life Cycle (TALC) model to understand the organizational failures and a framework to successfully circumvent those failures to transition a product from the segments of the Early Adopters to the Early Majority segment in a revised TALC model, what he terms "Crossing the Chasm" (Moore, 1991).

While Moore's introduction of the Chasm terminology in technology environments has been accepted into technology product lexicon with various product introductions being described within the construct of Moore's tailored model (Ambler, 2006; Vernon, 1997; Puttre, 1998), independent empirical evidence to prove the psychographic characteristics of the consumers segments on either side of the chasm as depicted within the model and the success of the suggested framework to transition across the chasm is lacking and needs to be investigated.

The Technology Adoption Life Cycle

The standard concept and segment categorizations of the TALC that gained dominance was first presented as the Innovation Adoption Cycle in 1962. The definition of innovativeness according to the model implies no relation to the age of the product within the market but rather the point-in-time of the product's adoption by the consumer in relation to their discovery of it (Rogers, 1983). Rogers (1983) suggested that consumers are identified on the basis of unique psychographic characteristics mapped on a normal distribution resulting into five mutually exclusive segments. The characteristics of the exclusive segments from the lowest end of the normal curve are Innovators (2.5%), Early

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Adopters (13.5%), Early Majority (34%), Later Majority (34%) and Laggards (16%), in a sequential order (Rogers, 1983, p. 247).

While Rogers (1983) depicts a smooth Bell Curve implying that each segment grows from the previous one within the TALC, Geoffrey Moore (1991) revised the model in 1991 by introducing a pronounced gap between the lower 15-pecentile and the higher 85-percentile market population in his revised model, what he terms the "Chasm" (1991, p. 15), as depicted in Figure 1.

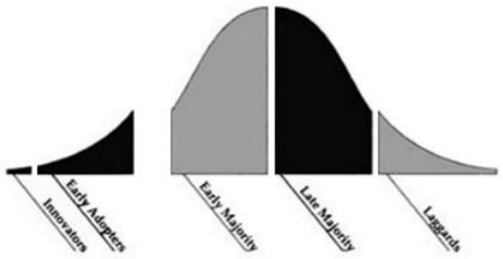

Figure 1: Technology Adoption Life Cycle (Moore, 1991, p. 13).

The Chasm concept in the revised model is introduced on the premise that peer-to-peer referencing differs in the transition between consumers in Early Majority and Early Adopters. While Moore's model acknowledges the part played by the Early Adopters as visible opinion leaders within the market, it also infers that the Early Majority segment do not respond to referencing from the former segment, and may be in fact repulsed by it. More specifically, the Early Majority segment requires influence essentially from their own peers with whom they share homogeneous requirements, thereby introducing the notion of a "Chasm" (Moore, 1991).

The M-Pesa Context

M-Pesa is a mobile phone money transfer service that was launched in Kenya in 2007 by Safaricom, a limited liability company. As at 2007, Safaricom was the country's leading mobile phone operator (International Finance Cooperation, 2010, p. 2). M-Pesa has gone on to secure major financial success for the company, contributing approximately USD 28 million to the revenue in 2009 (Safaricom Company Limited., 2009, p. 21), and rising to approximately USD 403 million in 2016 (Safaricom Company Limited., 2016, p. 8). By 2016, M-Pesa users grew to 29,500,000, making it the most successful mobile money market at the time (Safaricom Company Limited., 2017b).

Safaricom initially marketed M-Pesa as a money transfer platform that allowed the population to conveniently transfer money from urban areas to their rural hometowns under the 'Send Money Home' slogan (Foster & Heeks, 2013, p. 302). This marketing approach was justified (and in line with Moore's suggestion to select a most highly ranked niche) in an independent survey conducted in 2008 that revealed this as the top function of the platform, with 60% of M-Pesa users identifying this as its core utility. However other features were provided within the M-Pesa platform too (FSD Kenya, 2009, p. 5) , albeit not as strongly, landing credence to a multi-niche approach.

Despite efforts by other developing nations to launch Mobile money platforms before Safaricom (The Guardian, 2007), M-Pesa has grown to be considered the benchmark to be followed in mobile money transfers for replication across the developing world (Jack, et al., 2010, p. 83). It has secured numerous international innovation awards over the years (Safaricom Company Limited., 2016b). While Safaricom initially developed the product around the specific function to transfer funds from person to person, from 2008, Safaricom began developing various partnerships to integrate the system with the retail, utilities and banking sector (Safaricom Company Limited., 2016b).

Given the maturity of the market, M-Pesa provides a strong representative case to study the TALC model for a product that is in the Late Majority segment of the TALC. In that respect, the case provides strong justification for consideration to validate existing notions on the psychographic categorizations thus posited by previous research. In addition, the isolated success of M-Pesa in comparison to other mobile money launches in the world, provides a strong justification for testing Moore's Framework for success within this limited context.

One of the major factors that has been suggested to have contributed to the exponential growth of M-Pesa in the market was not the technology behind the platform, but rather the accessibility that was created by Safaricom's use of its existing independent sales agents across the country to serve as M-Pesa agents (Foster & Heeks, 2013, p. 306). This approach provided M-Pesa with 6104 access-points compared to the Post-Office money transfer service, who was the closest rival with 1025 access-points in 2009. Respective major banks in the country provided access-points through their branches and ATMs that numbered under 500 each (FSD Kenya, 2009, p. 2). As at 2016, the agent base had developed into a structured hierarchy which grew to approximately 100,744 agents across the country (Safaricom Company Limited., 2016, p. 15). It is therefore important to test Moore's Framework using a successful innovation like Safaricom's M-Pesa mobile phone platform for money transfer with Time of Adoption of M-Pesa as an outcome variable.

Factors Influencing the Time of Adoption of Technology

Moore (1991) identified four factors which are likely to influence time of adoption of technology. These are Psychographic Characteristics, Niche Function, Product-service Continuum and Niche Communication. These concepts are discussed below.

Psychographic Characteristics. Both Rogers (1983) and Moore (1991) infer a possible relationship between Psychographic Characteristics and Time of Adoption of technology. For example, they noted that Income is related to the Time of Adoption by users. In particular, they observed that Innovators and Early Adopters are more likely to be inclined to originate from higher income groups. Other Psychographic Characteristic include Main Reason for Adoption and Technology Perception.

Niche Function. Moore (1991) suggested an approach for the successful launch of a product from the Early Adopters to the Majority that entails the purposeful identification of a niche market that an organization can dominate to build its reputation adequately to the majority. More specifically, service consumers are likely to opt for a specific function to determine when they choose to adopt the service.

Product-Service Continuum. Moore (1991) suggested the approach of focusing not just on the product alone. Rather, it is also important to lay emphasis on the entire service chain that ensures the consumer receives the "whole product" comprised of the product and all the services required to ease adoption, use and support for the product.

Niche Communication. Communication is an important aspect in enabling consumers to adopt technology, which in turn is likely to lead to success. Moore (1991) suggests the need for an organization not only to select a niche to operate within, but to provide clear communications of their advantage and imminent dominance within the niche.

Limitations of the Study

A concern during the design of the study was that given the significant lapse in time since the introduction of M-Pesa, there was a strong possibility that some users may not have accurately recalled their M-Pesa registration date.

In addition, with an estimated 29.5 million users of M-Pesa registered as at 2016, the 358 respondents targeted for this study represented a significantly small sample size. Further, the use of convenience sampling could lead to bias.

Purpose of the Study

The purpose of this study was to establish the psychographic trait differences between the various TALC segments, and to determine the nature of relationship between various attributes of the framework suggested by Moore (1991) and the time of adoption of Safaricom's M-Pesa mobile phone money transfer service.

Objectives of the Study

The following are the objectives for the study:

i. To determine the nature of relationship between Psychographic Characteristics and Time of Adoption.
ii. To determine the nature of relationship between Niche Function and Time of Adoption.
iii. To determine the nature of relationship between Product-service Continuum and Time of Adoption.
iv. To determine the nature of relationship between Niche Communication and the Time of Adoption.

METHODOLOGY

Research Design

Kothari (2004) explains that research design is a conceptual structure within which research would be conducted. It helps research to be efficient in order to provide relevant information with minimal expenditure of effort, time and money. In this study, the purpose was to offer an accurate description of a situation and an association between variables. Thus, descriptive research design was preferred because it minimizes bias and maximizes the reliability of the data collected and analyzed.

In addition to the above, the study made use of correlation design. This was necessitated by the fact that there was need to establish the relationship between variables.

Sample Size and Sampling Procedure

The sample size for the study was 358. The sample was conveniently drawn from all adult Kenyans living in Nairobi, Mombasa and Kisumu who were registered as M-Pesa users at the time of conducting this study. Nairobi is Kenya's capital and the largest city, followed by Mombasa and Kisumu, respectively.

Instrument for Data Collection

A questionnaire was used to collect data. The specific independent variables measured by the questionnaire were psychographic characteristics, niche function, product-service continuum and niche communication. The tool also measured time of adoption as the dependent variable. Face validity was used to validate the instrument. Test-retest procedure was used to estimate reliability which gave rise to r=0.84, an indication that the instrument was reliable. All ethical considerations for research involving humans were adhered to.

Procedure for Data Collection

A hybrid approach involving administration of on-line and hard copy survey tool was adopted. Whereas the on-line tool was administered randomly, the hard copy survey tool was conveniently administered. Existing data from Safaricom was obtained from its website. Data for the adoption cycle was from the inception of M-Pesa on 3 March 2007 up to 31 December 2016.

Methods of Data Analysis

Completed surveys were first mapped to the M-Pesa timeline to provide a first level timeline categorization. Each of the TALC segments were nominally coded to represent the dependent variable.

Further analysis involved psychographic profiling of TALC segments to validate the major gap between the Early Adopter and Early Majority Segments as suggested by Moore (1991). To facilitate the comparison, a psychographic chart was created based on existing literature to provide a point of reference for data collected from the survey.

Subsequent to the above, data were further analyzed to draw relationships between independent variables in relation to the actual point-in-time of the user's adoption as the dependent variable.

FINDINGS AND DISCUSSION

M-Pesa Timeline

Safaricom's volumetric users' data was used to create the M-Pesa timeline as provided in Table 1. The Table also includes the eligible population of Kenya to provide the

Table 1: M-Pesa Actual Population Percentage Adoption Timeline.

Point-In-Time	No. of M-Pesa Registered Users	Population Size[1]	Eligible Population (50%)[1]	M-Pesa uptake (%)
03/03/2007	0	37,250,540	18,625,270	0.0
16/04/2007	19,670	37,250,540	18,625,270	0.1
01/11/2007	1,040,520	37,250,540	18,625,270	5.6
30/03/2008	2,000,000	38,244,442	19,122,221	10.5
30/06/2008	3,000,000	38,244,442	19,122,221	15.7
01/09/2008	4,143,040	38,244,442	19,122,221	21.7
01/12/2008	5,000,000	38,244,442	19,122,221	26.2
28/02/2009	6,500,000	39,269,988	19,634,994	33.1
30/06/2010	10,232,800	40,328,313	20,164,157	50.8
06/03/2011	13,798,690	41,419,954	20,709,977	66.6
01/03/2012	14,652,590	42,542,978	21,271,489	68.9
01/04/2012	15,000,000	42,542,978	21,271,489	70.5
01/03/2013	17,000,000	43,692,881	21,846,441	77.8
31/03/2014	19,340,000	44,863,583	22,431,792	86.2
31/03/2015	20,630,000	46,050,302	23,025,151	89.60
31/12/2016	29,500,000	47,251,449	23,625,725	-

population uptake running percentage for the year in consideration.

The projection revealed an anomaly with regards to the number of registered users reported by M-Pesa at a point-in-time vis-à-vis the total eligible population in the final year (31/12/2016), with registered users exceeding the eligible population. This projection should however be considered in light of the potentially significant limitations of the secondary data used in its calculation. Firstly, this may be due to lack of accurate volumetric information of potential users comprising the population of eighteen years and over. As a result, the coincidental available information of the median age of nineteen years in each of the years of consideration (Worldometers, 2017) was employed to estimate approximately fifty percent of the population as eligible for adoption of the service in each of the years considered. Secondly, the total number of registered users' information provided by Safaricom did not state whether duplicate registrations by the same citizens had been eliminated from their count. Further, the Safaricom statistics did not factor out the registration by foreigners. Both limitations introduce unquantifiable assumptions into the study. None-the-less, the study proceeded to create a projection graph based on existing data of the M-Pesa TALC as presented in Figure 1.

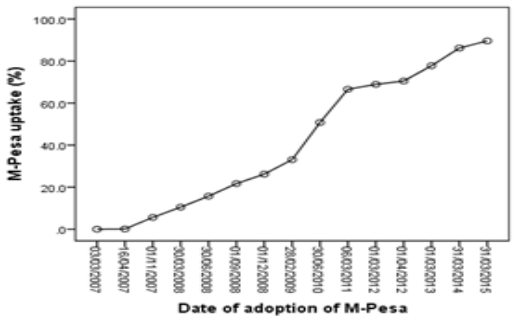

Fig. 1: M-Pesa Adoption Trend.

It is evident from Fig. 2 that M-Pesa adoption increased monotonically right from its inception. However, the steepest increase occurred between February 28th 2009 and June 3rd 2011.

Following the M-Pesa timeline projection and based on Roger's (1983) original TALC, the study proceeded to project the five segment partitions as presented in Table 2. As expected, the time taken by Laggards was the longest and the time taken by Innovators the lowest. In other words, Innovators took the shortest time to adopt M-Pesa technology (≈ 0.25 years) while Laggards took the longest time to adopt the technology (≈ 3.20 years).

Psychographic Chart

Psychographic profiling on the basis of innovative behavioral differentiation along the categories of socioeconomic, personality and communication identifies five generic segments within the TALC (Rogers, 1983, p. 251). While it may be plausible for a consumer to identify with traits from either category, these five categorizations serve as conceptual ideal types to guide empirical research (Rogers, 1983, p. 248). These traits have been further evolved beyond the efforts of Rogers (1983) by Moore (1991).

Previous research on the M-Pesa adoption cycle revealed certain traits in-line with existing literature of the Early Adopters of M-Pesa. The research identified this segment as literate, educated and wealthier individuals. However, no further research has been carried as the platform continues to mature. To that extent, information in Table 4 highlights the various conceptualizations of the five categories as specified from the two core literature sources of this study, in order to test relevance within the M-Pesa context. The findings for M-Pesa appear to be consistent with the frameworks developed by Rogers in 1983 and Moore in 1991.

Demographics

A total of 358 responses were received, with 47 (13.1%) having been completed manually and 311 (86.9%) having been submitted on-line. Eight of the manual forms were rejected due to incomplete response on some of the questions. Of the remaining 350, 18 were removed as they were respondents who did not have a registered M-Pesa line. Finally, 71 respondents were removed as they were illegible to adopt M-Pesa at the time of its introduction in 2007 (valid respondents had to be 28 years old or over to be eligible for the study). The final dataset came from 261 respondents.

Table 2: M-Pesa Technology Adoption Life Cycle Categorization.

Segment	Percentile Cut-off	Date	Approximate no. of years
Innovators	2.5th Percentile	03/03/2007 - 01/06/2007	0.25
Early Adopters	15th Percentile	02/06/2007 - 01/06/2008	1.00
Early Majority	49th Percentile	02/06/2008 – 15/06/2010	2.00
Late Majority	83rd Percentile	16/06/2010 - 01/11/2013	3.00
Laggards	100th Percentile	02/11/2013 – 31/12/2016	3.20

Table 3: Psychographic Chart

Segment	Traits	Source
Innovators	Strong technical knowledge	Moore (1991, p. 23)
	Strong financial capacity	Rogers (1983, p. 249)
	Strong appetite 0-for failure	Rogers (1983, p. 249)
Early Adopters	Opinion leaders who take risks and set the pace	Rogers (1983, p. 249)
	Strong financial capacity – willing to pay a premium for value	Moore (1991, p. 28)
	Open to change and science	Rogers (1983, p. 258); Moore (1991, p. 14)
Early Majority	Do not take risk, instead waits for significant social proof of an innovation's benefits	Moore (1991, p. 9)
	Seek out opinion leaders to determine the decision to adopt	Rogers (1983, p. 249)
	Perceive Early Adopters as reckless risk-takers	Moore (1991, p. 42)
Late Majority	Do not succumb to social pressure as the Early Majority	Moore (1991, p. 34)
	Most price sensitive – expect value based pricing	Moore (1991, p. 39)
Laggards	Repulsed by technology – perceive it as detrimental non-value adding factor to their lives	Moore (1991, p. 40)
	Severely financially constrained	Rogers (1983, p. 250)

The demographic characteristics of the 261 respondents is presented below.

Gender distribution. The gender distribution of respondents is presented in Table 4. The majority were males.

Table 4: Gender distribution

Gender Classification	Frequency	Percent
Female	94	36.0
Male	167	64.0
Total	261	100.0

Generational age brackets. The generational age brackets of the respondents is summarized in Table 5. The majority of respondents were Millennials (75.9%). This may be attributed to the fact that this generation has a high affinity for use of technology (Sachs, 2017). The least represented generational age bracket was that of Boomers (4.6%).

Table 5: Generational age brackets

Generational age bracket*	Frequency	Percent
Baby Boomer (born 1946 – 1964)	12	4.6
Gen X (born 1965-1976)	51	19.5
Millennial (born 1977- 1995)	198	75.9
Total	261	100.0

* Age brackets are as defined by Center for Generational Kinetics (2017).

Location. The location of respondents is provided in Table 6. Nine respondents (3.4%) did not indicate their location. The highest proportion of respondents came from Nairobi (67.0%). This was followed by Kisumu (12.3%) and Mombasa (11.1%), respectively. It is noteworthy that Kenyan's living abroad were also registered to use the M-Pesa service, constituting a paltry 1.5% of the respondents were from the diaspora, 1.1% from Nakuru and 3.4% from Eldoret.

Table 6: Location of respondents

Location	Frequency	Percent
Diaspora	4	1.5
Eldoret	9	3.4
Kisumu	32	12.3
Mombasa	29	11.1
Nairobi	175	67.0
Nakuru	3	1.1
Other	9	3.4
Total	261	100.0

Level of education. The level of education of respondents is presented in Table 7. The highest proportion had a Bachelor's degree (35.6%). This was closely followed by those with Diploma/Certificate (34.9 %). A meagre 1.5% never had high school education.

Table 7: Level of education of respondents

Level of education	Frequency	Percent
Bachelor's Degree	93	35.6
Diploma/ Certificate	91	34.9
High-School	38	14.6
No High-School	4	1.5
Post Graduate	35	13.4
Total	261	100.0

Relationship between Psychographic Characteristics and Time of Adoption

The relationship between psychographic characteristics and time of adoption of M-Pesa service is presented in this section. Psychographic characteristics considered in this study are income level, reason for adoption and technology perception of M-Pesa users.

Income and Time of Adoption. Table 8 is a cross tabulation of income level of M-Pesa users by time of adoption of M-Pesa service.

Table 8: Income level and time of adoption cross tabulation

	Level of income (KSh.)							
	0 - <23,500		23,500 - <120,000		Over 120,000		Total	
Time of Adoption	*f*	*(%)*	*f*	*(%)*	*f*	*(%)*	*f*	*(%)*
5.Innovators	26	(10.0)	19	(7.3)	9	(3.4)	54	(20.7)
4.Early Adopters	38	(14.6)	32	(12.3)	10	(3.8)	80	(30.7)
3.Early Majority	37	(14.2)	20	(7.7)	8	(3.1)	65	(24.9)
2.Late Majority	6	(2.3)	13	(5.0)	7	(2.7)	26	(10.0)
1.Laggards	5	(1.9)	13	(5.0)	18	(6.9)	36	(13.8)
Total	11	(14.2)	97	(37.2)	52	(19.9)	261	(101.0)*

*Different from 100.0 because of rounding error.

Table 9: Main reason for adoption by time of adoption cross tabulation

Main reason for adoption	Innovators		Early Adopters		Early Majority		Late Majority		Laggards		Total	
	f	*(%)*	*f*	*(%)*	*f*	*(%)*	*f*	*(%)*	*f*	*(%)*	*f*	*(%)*
I was excited with the new service and I wanted to be the first in my social circle to explore.	6	(2.3)	6	(2.3)	4	(1.5)	0	(0.0)	1	(0.4)	17	(6.5)
It had a useful purpose, although it was still not highly proven to me by then	29	(11.1)	29	(11.1)	16	(6.1)	7	(2.7)	9	(3.5)	90	(34.5)
It had a useful purpose, and was already highly proven to me by then	34	(13.0)	23	(8.8)	22	(8.4)	13	(5.0)	18	(6.9)	110	(42.1)
I felt that everyone was using it and so it must be a useful service I should also use	11	(4.2)	7	(2.7)	12	(4.6)	6	(2.3)	8	(3.1)	44	(16.9)
Total	80	(30.7)	65	(24.9)	54	(20.7)	26	(10.0)	36	(13.8)	261	(101.0)*

*Different from 100.0 because of rounding error.

It was found that the relationship between level of income and time of adoption of M-Pesa service was statistically significant at α=.05 (χ^2=36.647, *df*=8, *p*=.000). Further analysis showed that the value of Pearson's *r* was -.304. This indicates that those respondents in the lower end of Moore's hypothesized distribution (e.g. Innovators coded 5) tended to be low income earners compared to those in the upper end of the distribution (e.g. Laggards coded 1).

Main reason for Adoption and Time of Adoption. Table 9 is a cross tabulation for main reason for adoption of M-Pesa by time of adoption of M-Pesa service. The most important main reason for adoption was "it had a useful purpose, and was already highly proven to me by then". This was followed by "It had a useful purpose, although it was still not highly proven to me by then". The least important main reason for adoption was "I was excited with the new service and I wanted to be the first in my social circle to explore". Notwithstanding these outcomes, it was further found that the relationship between main reason for adoption and time of adoption of M-Pesa service was not statistically significant at α=.05 (χ^2=12.794, *df*=12, *p*=.384).

Technology Perception and Time of Adoption. Table 10 is a cross tabulation for technology perception by time of adoption of M-Pesa service. Respondents were generally positive towards technology with 13.0% of Innovators, 11.1% of Early Adopters, 10.0% of Early Majority, 6.9% of Late Majority and 5.4% of Laggards being very positive. Thus, Innovators had the highest proportion of "Very positive perception", followed by Early Adopters, Early Majority, Late Majority and Laggards, in that order. This finding is consistent with Moor's hypothesis. Notwithstanding these outcomes, it was found that the relationship between technology perception and time of adoption of M-Pesa service was not statistically significant at α=.05 (χ^2=19.641, *df*=16, *p*=.237). Thus, there is no relationship between technology perception and time of adoption.

Niche Function and Time of Adoption

Table 11 is a cross tabulation for niche function by time of adoption of M-Pesa service. A total of 135 respondents (51.7%), the highest proportion, chose M-Pesa to send money to loved ones. This was followed by 54 respondents (20.7%) who chose M-Pesa to make or receive bill payments. A total of 30 respondents (11.6%) did not have a specific desire that appealed to them in the adoption of M-Pesa service. Innovators were the biggest proportion followed by Early Adopters.

Notwithstanding the above outcomes, it was found that the relationship between niche function and time of adoption of M-Pesa service was statistically significant at α=.05 (χ^2=40.986, *df*=16, *p*=.001). Thus, there is a relationship between niche function and time of adoption.

Product Continuum Effect

Table 12 contains findings on Product Continuum and Time of Adoption. In general, the highest proportion of respondents sought strong features. This was followed by those who sought whole product. In particular, Innovators were the strongest group that sought strong features. Chi-square test however revealed a value above the significance level of 0.05, suggesting no statistically significant relationship between product continuum and time of adoption (χ^2=10.748, *df*=16, *p*=.825).

Niche Communication Effect

Table 13 contains findings for Niche Communication and Time of Adoption. A total of 34 innovators (13.0%), the highest proportion in the sample, displayed very strong niche communication. In contrast, 20 Early Adopters (7.7%) had very strong nice communication. A total of 19 Early Majority (7.3%), 11 Late Majority (4.2%) and 11 Laggards (4.2%) had indifferent niche communication.

It was further found that the relationship between Niche Communication and Time of Adoption of M-Pesa service was statistically significant at α=.05 (χ^2=31.539, *df*=16, *p*=.011). Thus, there is a relationship between Niche Communication and Time of Adoption.

DISCUSSION

The focus of this study has been to present empirical findings on the M-Pesa case from the perspective of existing TALC literature. Psychographic factors as inferred by two major studies on the body of knowledge were tested to determine their validity in the M-Pesa Context and further

Table 10: Technology perception by time of adoption cross tabulation

Technology perception	Innovators		Early Adopters		Early Majority		Late Majority		Laggards		Total	
	f	*(%)*	*f*	*(%)*	*f*	*(%)*	*f*	*(%)*	*f*	*(%)*	*f*	*(%)*
Very negative	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	1	(0.4)	1	(0.4)
Negative	3	(1.2)	1	(0.4)	1	(0.4)	0	(0.0)	0	(0.0)	5	(1.9)
Indifferent	18	(6.9)	13	(5.0)	8	(3.1)	6	(2.3)	10	(3.8)	55	(21.1)
Positive	25	(9.6)	22	(8.4)	19	(7.3)	2	(0.8)	11	(4.2)	79	(30.3)
Very positive	34	(13.0)	29	(11.1)	26	(10.0)	18	(6.9)	14	(5.4)	121	(46.4)
Total	80	(30.7)	65	(24.9)	54	(20.7)	26	(10.0)	36	(13.8)	261	(100.1)

*Different from 100.0 because of rounding error.

Table 11: Niche function by time of adoption cross tabulation

Niche function	Innovators		Early Adopters		Early Majority		Late Majority		Laggards		Total	
	f	*(%)*	*f*	*(%)*	*f*	*(%)*	*f*	*(%)*	*f*	*(%)*	*f*	*(%)*
Buy phone credit	2	(0.8)	4	(1.5)	5	(1.9)	2	(0.8)	1	(0.4)	14	(5.4)
e-wallet for safekeeping	7	(2.7)	9	(3.5)	6	(2.3)	2	(0.8)	4	(1.5)	28	(10.7)
Make or receive bill payments	10	(3.8)	9	(3.5)	7	(2.7)	9	(3.5)	19	(7.3)	54	(20.7)
Send money to loved ones	52	(19.9)	36	(13.8)	28	(10.7)	9	(3.5)	10	(3.8)	135	(51.7)
I did not have a specific desire that appealed to me	9	(3.5)	7	(2.7)	8	(3.1)	4	(1.5)	2	(0.8)	30	(11.6)
Total	80	(30.7)	65	(24.9)	54	(20.7)	26	(10.0)	36	(13.8)	261	(100.1)

*Different from 100.0 because of rounding error.

Table 12: Product Continuum and Time of adoption

Product continuum	Innovators		Early Adopters		Early Majority		Late Majority		Laggards		Total	
	f	*(%)*	*f*	*(%)*	*F*	*(%)*	*f*	*(%)*	*f*	*(%)*	*f*	*(%)*
Strong features	31	(11.9)	18	(6.9)	18	(6.9)	6	(2.3)	7	(2.7)	80	(30.7)
Features	9	(3.5)	11	(4.2)	4	(1.5)	4	(1.5)	6	(2.3)	34	(13.0)
Whole product	18	(6.9)	21	(8.1)	18	(6.9)	9	(3.5)	13	(5.0)	79	(30.3)
Support	11	(4.2)	10	(3.8)	9	(3.5)	4	(1.5)	6	(2.3)	40	(15.3)
Strong support	11	(4.2)	5	(1.9)	5	(1.9)	3	(1.2)	4	(1.5)	28	(10.7)
Total	80	(30.7)	65	(24.9)	54	(20.7)	26	(9.9)	36	(13.8)	261	(100.0)

Table 13: Niche Communication and Time of adoption

Niche communication	Innov-ators		Early Adopters		Early Majority		Late Majority		Laggards		Total	
	f	*(%)*	*f*	*(%)*	*f*	*(%)*	*f*	*(%)*	*f*	*(%)*	*f*	*(%)*
Very strong	34	(13.0)	20	(7.7)	17	(6.5)	4	(1.5)	4	(1.5)	79	(30.3)
Strong	11	(4.2)	16	(6.1)	6	(2.3)	4	(1.5)	4	(1.5)	41	(15.7)
Indifferent	19	(7.3)	15	(5.7)	19	(7.3)	11	(4.2)	11	(4.2)	75	(28.7)
Weak	11	(4.2)	9	(3.5)	7	(2.7)	4	(1.5)	7	(2.7)	38	(14.6)
Very weak	5	(1.9)	5	(1.9)	5	(1.9)	3	(1.2)	10	(3.8)	28	(10.7)
Total	80	(30.7)	65	(24.9)	54	(20.7)	26	(9.9)	36	(13.8)	261	(100.0)

specific inferences of Geofrey Moore on the key concepts for launching a new product to the majority of the market were tested.

Both Rogers (1983) and Moore (1991) infer a relationship between income and the time of adoption by users, stating Innovators and Early Adopters to be more inclined to originate from the higher income groups. The study did establish such a relationship based on the M-Pesa users responses although they were negatively correlated in contrast to previous research. This may have been as a result of the perceptively low cost of the service vis-à-vis the high value of utility to be gained by the lowest level of consumers who did not hold bank accounts or other means of financial storage or transfers.

Rogers (1983) inferred that the Innovators were perceptively most positive towards new technology introductions. While the Innovators and Early Adopters within the M-Pesa study were established to be more positively inclined to new technology, overall the study was not able to establish any relationship between technology perception and time of adoption. This finding may have been due to the low risk associated with the service, perhaps negating the impact of the risk- taking attributes that previous studies may have established with segments that were more positively inclined to technology introductions.

CONCLUSION

It is concluded that niche function and communication of the niche are important factors to consider when people are expected to adopt new technology like M-PESA.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations are pertinent:

I. Psychographic factors were not within the expected boundaries inferred by previous research. In this respect, organizations should be cautious not to adopt those factors when launching new products or service but should rather seek to understand if their product may have exceptions as was the case for M-Pesa in Kenya.

II. The niche function did draw a relation to the point-in-time of M-Pesa's adoption. In this respect, organizations should select a core niche function to market their products.

III. The niche function communication did draw a relation to the point-in-time of M-Pesa's adoption. In this respect, organizations should not only select a core niche function to market their product to the Majority segments but should also explicitly and assertively communicate its advantage over alternatives to the consumers as this variable may determine consumer behavior.

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