

Investigation of Replication Logic in the Behavior of Mobile Information Technology Gadgets: Case of Zimbabwe

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Abstract— *The behavior of mobile IT gadgets users is arguably similar, because the devices are tools intended for the same purposes of transmitting information: communications, file sharing, e-commerce, e-banking, e-health and money transfers. This paper seeks to investigate the sources of similarities that manifest amongst such users in Zimbabwe, and advise mobile IT network providers and other providers of these devices on the most suitable factors to apply. This will make an important contribution in the provision of the right gadgets, saving in the use of the scarce national forex coffers. A structured questionnaire with close-ended questions was used to gather primary data on the experiences of 125 respondents among the largest users of mobile IT gadgets: students, traders and workers. The study established that all the studied independent variables: user drivers, satisfiers and device usability lead to common behaviors in mobile IT gadgets users. However, user satisfiers is the most significant variable that is most replicated in the behavior of mobile IT gadgets users in Zimbabwe. These results are expected to help in directing resource allocation amongst service providers for the benefit to themselves, their clients, academia and the national economy.*

Keywords— *Mobile IT gadgets, replication logic, behavior.*

I. INTRODUCTION

Mobile Information Technology (IT) gadgets are the terminals used by customers of mobile IT networks for accessing the various services offered. Their use of unfixed network infrastructures make them readily available for roaming locations in real time. [25] defines a mobile or web gadget as a miniature web application that distributes web assets beyond your own site. Examples of these gadgets are cellular phones, tablets and personal digital assistants. Their behavior or the way their users operate (make use of them) is possibly similar, considering the fact that they are all intended for the purpose of transmitting similar services: communications, file sharing, e-commerce, e-banking and money transfers. This points to possible application of replication logic in the determination of the behaviors of these terminals. Replication logic means that each case serves as a distinct experiment that stands on its own as an analytic unit [9]. It helps in the building and/or confirmation of a theory or behavior observed in multiple cases, such as the use of multiple individual mobile gadgets. [8] agree with the notion, saying that multiple cases permit replication logic where each case is viewed as an independent research study which may confirm, reject or extend the theoretical background through new insights.

II. BACKGROUND

The phone penetration ratio in Zimbabwe is 95.4% at end 2015 from 90.4% in December 2014 [18], available at <http://www.techzim.co.zw/2016/03/latest-potraz-report-shows-increase-zimbabwes-mobile-internet-penetration/>). This phenomenal increase is attributed to the emergence of mobile networks, which expanded the services that customers found themselves able to access. Mobile IT gadgets usage has gone beyond mere telephoning tools as they started to participate in commerce, banking, health and other areas of civilization. They attract and involve the previously largely unbanked populations, expanding their influence, contributions and human behaviors in the national economy.

The usage of these abundant gadgets is individualistic, depending on individual customers' needs, social status and many other factors. In Kuwaiti and the Arab World, [1] establishes that the usage of smart phone devices relate more towards social and cultural motivations. Comparatively, in a study on the inclusion of a camera-mobile phone as a regular part of people's everyday life in Kuwaiti, [21] reveal that the contribution of social norms on the intention to use is weak and less than that of usefulness. Such findings seem to validate the notion that a 'one size fit all' assumption does not work, so authentic results may only be obtained after the accomplishment of some thorough investigation in a particular area under consideration. The actual reasons behind the use of mobile IT gadgets in Zimbabwe and like countries too cannot be known in detail and with certainty, before such a research is conducted.

This study will attempt to establish any replication in the use or behavior of mobile IT devices in the country. It will focus on the wide spectrum of mobile IT customers in three sectors: students, traders and workers, mainly due to their perceived widespread use of the mentioned gadgets.

A. Problem Statement

Available literature shows that social, cultural and economic factors have a positive bearing on the behavior of mobile IT gadgets users, albeit in the Asian and developed world (e.g. [1]; [21]). Very little to none has been documented about Sub-Saharan Africa (SSA), including Zimbabwe, despite the noted gigantic increase in the adoption of these gadgets lately. If the status quo remains, mobile IT network operators will remain uninformed on the important determinants behind mobile IT gadgets adoption.

Such a situation will deprive these entities of the necessary strategies for properly addressing their clientele, as far as the provision of the right mobile IT devices is concerned. This will obviously retard the highly publicized mobile IT gadgets adoption, which can easily negatively affect information dissemination and other accrued benefits (e-banking, e-commerce, money transfers, e-health, etc). These are important tenets that drive the national economy and so their absence will likely be detrimental to the economic growth and/or sustainability. This study will attempt to establish any similarities in the behaviors of mobile IT gadgets in the country, to enlighten any intentions in the proper provision of the devices.

B. Research Objectives and Hypothesis

The major objective of this study is to establish some replication logic in the behaviors of mobile IT gadgets in Zimbabwe. Following are the derived specific objectives:

- To determine the common driving forces behind the use of mobile IT devices in the country.
- To establish what generally satisfy customers in their use of mobile IT gadgets in Zimbabwe.
- To find out what widely make mobile IT gadgets easily usable in the country.
- To recommend on the replicated behaviors of mobile IT gadgets in the country.

The null hypothesis for this research is that there are no common driving forces in the use of mobile IT devices; nothing generally satisfy customers in their use of mobile IT gadgets; and nothing widely make mobile IT gadgets easily usable in the country.

The results from this study will benefit mobile IT operators by providing an informed position to properly strategize their deployment of mobile devices and services; and academia with an improved body of knowledge concerning the use of mobile IT gadgets in the country.

III. LITERATURE REVIEW

A. The Driving Force Behind the Use of Mobile IT Devices

According to [6], there is a clear diffusion gap of mobile technology between the developed and developing regions of the world, as developing economies lag in both the extent of diffusion and the type of technology in use. One may argue that the regional diversity gap has no effect on the behavior of the users of mobile IT gadgets. In contrast, [1] establishes that Kuwaiti people do not consider the smart phone device to be useful in their professional and working environment, but are more laying towards social and cultural motivations as major forces behind using such complicated gadgets compared to other societies such as the Western ones. [4] findings reveal that there is positive influence between the relationship of perceived usefulness, ease of use, entertainment value, attitude and behavioral intention. Such accessions support the necessity of a closer analysis on the actual compelling reasons behind the use of mobile IT gadgets in this or any other specific part of the globe.

B. Customer Satisfaction in the Use of Mobile IT Gadgets

[12] Suggest that text messages could make customers satisfied and at the same time increase customer delight. The notion is supported by [7] who say that despite of the major contributions of Unified Theory of Acceptance and Use of Technology (UTAUT) towards the understanding of different aspects of the user attitude and behavior there still exists areas where UTAUT cannot be superimposed as it is and therefore, there is a need to understand some possible solutions. [16] also concur, saying that companies should (a) strive to build an emotional relationship with their customers by the use of mobile channel addition usage, (b) strive to be an important part of the customers' daily lives, and (c) strive to make their customers use their added services frequently. According to [16], social norms and intrinsic motives such as enjoyment are important determinants of intention to use mobile IT gadgets among female users, whereas extrinsic motives such as usefulness and – somewhat surprisingly – expressiveness are key drivers among men.

These suggestions highlight suggestions that there are various factors that trigger the interest of various mobile IT users. Some of these are social, academic, economic status and gender. The magnitude of the variants bring into focus the need to make a spirited investigation, if one is going to be able to come with a determinant result for the particular society or population under study.

C. Usability of Mobile IT Gadgets

There are various factors that determine the user friendliness of mobile IT gadgets. Irrespective of the technological design of the devices, this section attempts to look at the devices' response to human needs, desires and capabilities. It relates to key interaction designs, accessibility and responsiveness – the drivers and inhibitors for end-consumer user of the mobile Internet, [11]. [13] reveals that interaction styles applied in contemporary mobile telephones are designed around menu navigation, and that they implement the three primary operations – Select, Back and Menu access – with dedicated hard keys, context-sensitive soft keys, or using special control devices like joysticks or jog dials. [2] says that most studies show that while mobile devices are becoming increasingly popular with the younger generations, users still prefer to use desktops for e-commerce and other transactions due to certain limitations of those devices. [23] sum up the importance of mobile gadgets usability by saying that it leads to one conclusion: the current status of practice in mobile systems is more prone to “giving users what we have, not asking users what they want”, a suggestion that triggers a change of approach as the reverse will most likely increase the supply of more user friendly mobile IT gadgets.

D. Replication in the Behavior of Mobile IT Gadgets

These opinions expressed in the available literature are results of studies that combine the experiences of multitudes of respondents that have been replicated over time, an indication that replication logic does help in the determination of the behavior of mobile IT users and/or gadgets. [14] says that the very idea of context-aware artifacts is closely related

to much older ideas about intelligent machines pursued (with limited success) in the realm of classical artificial intelligence. This has made replication an important component of establishing patterns, using different sources of information gathered over time. To this end, [26] demonstrates the use of a handset based research method with five articles that cover different angles in utilizing the available questionnaire and usage-level data. [15] identifies one of the problems encountered when replicating business models as the uniqueness of markets in different regions; adding however that hard work, commitment and close international cooperation could overcome such problems.

As noted before, most of the studies performed have been undertaken in other parts of the globe (Asia and the Americas), but not in SSA. This study will endeavor to address the missing areas, looking at the situation in Zimbabwe, as a regional representative of the developing and underdeveloped world. It will be grounded in the replication logic theory, guided by the conceptual framework in Figure 1 below and the research methodology discussed in the next part.

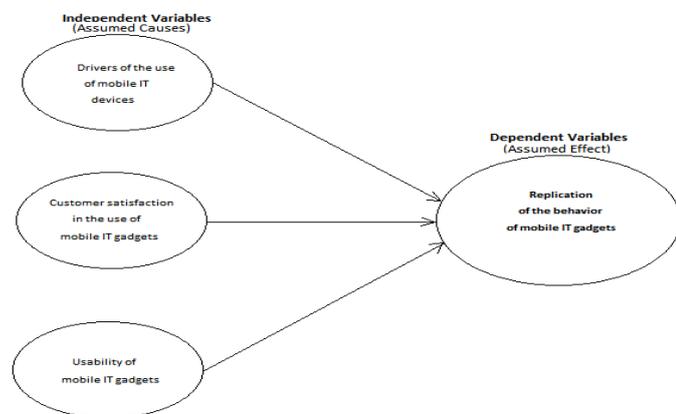


Fig. 1. Conceptual framework.

IV. METHODOLOGY

The purpose of this research was to establish the cause and effect relationship between the two groups of variables. It was seeking to derive a confirmatory relationship that will elucidate common behavior among mobile IT gadgets users, through situational searches and objective analysis of gathered information.

The previous part reviewed the relevant literature that triggered the interest for this study, demonstrating the grounding theory on which it is based. This part consist of four main parts that discussed the research design, philosophy and strategy; target population involved and sampling procedure used; data collection method applied, the instruments used and its reliability; plus the data analysis made in the study.

A. Research Design, Philosophy and Strategy

[27, p.26] says “research design is a logical plan for getting from ‘here to there’, where ‘here’ may be defined as the initial set of questions to be answered, and ‘there’ is some set of conclusion (answers) about these questions”. It essentially

provided a roadmap in establishing the outcome of the study. Such an explanatory study required a quantitative approach because it needed to establish objective figures and numbers that explicitly determine the relationships being sort after, for the conclusiveness of the study. Studies that establish causal relationships between variables may be termed explanatory research (Saunders et al, 2009), whose emphasis is on studying a situation or a problem in order to explain the relationships between variables.

A quantitative research is best achievable by using a positivist approach, because of the requirement for quantifiable observations that bring out figures and numbers in their raw state to explain the determined levels. Such a paradigm made the findings become objective by minimizing and/or eliminating subjective influences of any particular respondent(s). In contrast, a qualitative paradigm with its interpretive approach would involve the feelings of respondents, which make its findings very subjective and inappropriate for such a conclusive objective study.

From the various strategies used in research (e.g. interviews, experiments, case studies, questionnaires, observations, etc), this study adopted a multiple-case study strategy. Case-study design is appropriate for the investigation of highly-contextualized phenomena that occur within the social world [3] and is considered a pragmatic approach that permits employment of multiple methods and data sources in order to attain a rich understanding of the phenomenon under investigation.

Multiple-case technique was necessary for providing different sectorial respondents the opportunity to participate on an equal footing for cross case comparisons, in order to obtain a single set of conclusions. Any other strategy would not have been able to adequately satisfy these requirements.

B. Population and Sampling Procedure

The massive penetration ratio of mobile IT devices (95.4% at the end of 2015), encompassing a diverse spectrum of users, influenced the researcher into the involvement of respondents from different sectors: students, traders and workers. These sectors were considered to be highly informative due to their wide application of mobile IT gadgets. Their members were therefore selected to comprise the target population for the study.

In order to attain a good representation of the target population, it was deemed necessary to apply judgmental sampling method in selecting a suitable sample for the required minimum of 30 participants. Purposive or judgmental sampling is an improvement on convenience sampling in that the researcher applies his/her experience to select cases which are, in the researcher’s judgment, representative or typical of the relevant population, [5]. In judgmental sampling, the researcher actively selects the most productive sample to answer the research questions, [10]. From the large target population, the researchers applied their knowledge (on the basis of individual social status in their localities) in selecting those that were deemed most responsive to qualify for participating in the study, in order to ensure reliability on the information provided.

C. Data Collection, Research Instruments and Reliability

There are various methods available for gathering research information, examples being observations, interviews, recordings, surveys, etc. They possess different pros and cones that determine their suitability in one or the other study. This study opted for the questionnaire method for collecting primary data, mainly due to the method’s ability to avoid convenient responses from informants by the absence of the researcher during the respondents’ completion of the provided questionnaires. The researchers dispatched the pre-prepared research instruments to the identified respondents individually and later collected the completed questionnaires by appointment after a period of three days. The questionnaires composed of close-ended questions, as required in such a quantitative study.

To ensure obtaining findings that would be of high value, the researchers dissociated the influence of their own opinions onto the gathered responses. This was achieved by absenting themselves from the respondents during their completion of the provided questionnaires, in order to secure their independence from ‘convenient responses’.

Instrument suitability was enhanced by the involvement of a few experts in ICT issues and replication statistics. It was piloted before use, by the calculation of Cronbach’s Alpha coefficient, whose threshold of 0.7 was deemed to ascertain internal consistency amongst the variables under test. Separate respondents from those targeted for the research were approached for instrument pilot testing, to avoid influencing the eventual responses for the study.

D. Data analysis

For data analysis, SPSS 16.0 statistical package was applied. Descriptive statistics were performed to establish the frequency distribution of the respondents. Correlation analysis showed the direction, statistical significance and magnitude of the relationship of the pairs of variables; while regression analysis developed the established model summary and its significance, plus determining the predictive power of the constructs onto the dependent variable.

V. PRESENTATION AND DISCUSSION OF RESULTS

A. Demography

Table 1 below shows that out of the 125 respondents that participated, 65 were male and 55 female. It is an indication that the researchers made a deliberate effort to avoid any sexual inclination on the obtained study results, since the subject under investigation is not sexually related.

TABLE 1. Frequency distribution for gender.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	65	52.0	54.2	54.2
	Female	55	44.0	45.8	100.0
	Total	120	96.0	100.0	
Missing	System	5	4.0		
Total		125	100.0		

The following table 2 shows the frequency distribution of the ages of the respondents. The results demonstrate that the

majority (93 out of 125) respondents were in the 19-28 year age group, followed by the 29-38 year age group with a count of 10. This suggests that the greatest number of respondents came from school going age group, students. It agrees with [2] that mobile devices are becoming increasingly popular with the younger generations, an indication that the research attracted the biggest users of mobile IT gadgets. This goes on to validate whatever results that were obtained.

TABLE 2. Frequency distribution for age.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18 & below	7	5.6	5.8	5.8
	19-28	93	74.4	77.5	83.3
	29-38	10	8.0	8.3	91.7
	39-48	2	1.6	1.7	93.3
	49 & above	8	6.4	6.7	100.0
Total		120	96.0	100.0	
Missing	System	5	4.0		
Total		125	100.0		

Following is table 3 that shows the frequency distribution of the positions of the respondents, confirming the earlier narration for table 2 that the largest group (85%) was of students.

TABLE 3. Frequency distribution for position.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Student	102	81.6	85.0	85.0
	Trader	2	1.6	1.7	86.7
	Worker	10	8.0	8.3	95.0
	Other	6	4.8	5.0	100.0
	Total	120	96.0	100.0	
Missing	System	5	4.0		
Total		125	100.0		

Concerning the duration in their indicated positions, Table 4 below displays the respondents’ frequency distribution. It shows that most of the respondents were largely (80%) in the 0-5 years period which again is typical for students.

TABLE 4. Frequency distribution for position_duration.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-5 Yrs	96	76.8	80.0	80.0
	6-10 Yrs	12	9.6	10.0	90.0
	11-15 Yrs	4	3.2	3.3	93.3
	>16 Yrs	8	6.4	6.7	100.0
	Total	120	96.0	100.0	
Missing	System	5	4.0		
Total		125	100.0		

Following is table 5 that shows the frequency distribution of the number of devices owned by the respondents. It shows that most of them (55%) possessed two gadgets, followed by 29% that owned one device and 14% that owned more than two. This means that the participants were well informed in the subject under study because they had confirmed experience in the acquisition and use of the said devices.

Figure 2 below displays the same information, but in a clearer way.

TABLE 5. Frequency distribution for devices_owned.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None	1	.8	.8	.8
	One	35	28.0	29.2	30.0
	Two	66	52.8	55.0	85.0
	>Two	17	13.6	14.2	99.2
	5	1	.8	.8	100.0
	Total	120	96.0	100.0	
Missing	System	5	4.0		
	Total	125	100.0		

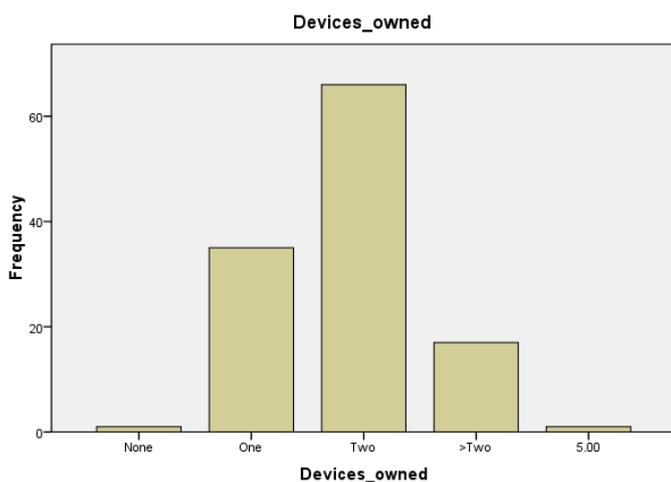


Fig. 2. Frequency distribution for devices owned.

B. Variables

Table 6 below is the correlation matrix that shows the direction and strengths of the relationship amongst the independent and dependent variables. The drivers of the use of mobile IT gadgets and their satisfying factors are positively correlated to the replication in the behavior of the users of these gadgets, while their usability is negatively correlated. However, only the satisfiers of the users was found to be statistically significantly correlated (sig. = 0.000 > 0.05) at the 0.01 level. This is probably because mobile gadgets are like any other tools, whose user satisfaction issues are always at play, especially when users are given the chance to choose. Common drivers and usability were found to be statistically insignificant. This is possibly an indication that users are normally very unique in their likes and widely vary in their choices, while usability is not an issue since most of these gadgets are now very well standardized.

The table also shows the absence of multi co linearity (correlation between all the predictors is less than 0.7) amongst the independent variables, indicating that they are all important in the determination of the replication in the use of mobile IT gadgets in the country.

Table 7 below shows the established model summary, the linear regression goodness of fit. It indicates that the model produced from the studied variables is a good predictor (R = 1.000 = 100%) of the replication of the mobile IT users behavior in the country. The standard error of the estimate in zero (Std. Error of the Estimate = .000).

TABLE 6. Correlation matrix.

			MITG_use_common_drivers	MITG_users_satisfiers	MITG_usability	MITG_use_replication
Spearman's rho	MITG_use_common_drivers	Correlation Coefficient	1.000	.029	.136	.029
		Sig. (2-tailed)	.	.751	.132	.751
		N	125	125	125	125
	MITG_users_satisfiers	Correlation Coefficient	.029	1.000	-.046	1.000**
		Sig. (2-tailed)	.751	.	.614	.
		N	125	125	125	125
	MITG_usability	Correlation Coefficient	.136	-.046	1.000	-.046
		Sig. (2-tailed)	.132	.614	.	.614
		N	125	125	125	125
	MITG_use_replication	Correlation Coefficient	.029	1.000**	-.046	1.000
		Sig. (2-tailed)	.751	.	.614	.
		N	125	125	125	125

** . Correlation is significant at the 0.01 level (2-tailed).

TABLE 7. Model summary.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	1.000 ^a	1.000	1.000	.000

a. Predictors: (Constant), MITG_usability, MITG_users_satisfiers, MITG_use_common_drivers

For statistical significance of the established model, Table 8 below shows an Anova table results. The p-value is less than 0.05 (sig. = .000), indicating that the model has statistical

significance and does a good job in predicting the outcome rather than by chance.

TABLE 8. ANOVA^a.

		Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression		76.800	3	25.600	.	.000 ^b
	Residual		.000	121	.000		
	Total		76.800	124			

a. Predictors: (Constant), MITG_usability, MITG_users_satisfiers, MITG_use_common_drivers

b. Dependent Variable: MITG_use_replication

To determine the individual contributions of the different constructs, Table 9 below shows the coefficient table. Standardized coefficient Beta values provide the same scale converted contributions. The table shows that mobile IT gadgets user satisfiers provide the largest (B = 1.000) unique significant (sig. = .000 < 0.05) contribution.

TABLE 9. Coefficients table.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1	(Constant)	.000	.000		.
	MITG_use_common_drivers	.000	.000	.000	.
	MITG_users_satisfiers	1.000	.000	1.000	.
	MITG_usability	.000	.000	.000	.

a. Dependent Variable: MITG_use_replication

VI. RECOMMENDATIONS AND CONCLUSIONS

A. Recommendations

In order to determine replication in the behavior of mobile IT gadgets users in Zimbabwe, it is important to consider all the constructs studied in this research. However, this study established that it is also important for the implementers to mainly focus on the satisfying factors of the users as it is statistically significant and most influential in achieving the intended objective. The other factors studied are not statistically significant, so should not take center stage. This makes good sense, considering the fact that customer satisfaction in business has of late become the diving line between success and failure. It supports [20] who confirm that both customer satisfaction and trust have a strong bearing on their retention; [24] who says that to be successful, organizations must look into the needs and wants of their customers; among others.

B. Conclusions

These findings reject the null hypothesis, in favor of the alternative hypothesis that there are certain general mobile IT gadgets satisfiers that are common amongst their users in Zimbabwe. Presented in a Coeb Douglas formula, the established model adopts the following equation which shows the predictive power of the independent variables onto the replicated behavior of mobile IT users in Zimbabwe:

Replicated behavior of MITG = 1.000 MITG user satisfiers.

To conclude, this study has made an important stride in the understanding of the important factors that affect the common behaviors of mobile IT gadgets in Zimbabwe. The higher the gadgets user satisfying parameters, the better the chances for achieving common behavior of the users.

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