



Information Systems (IS) Division, Faculty of Commerce, Law and Management (CLM), School of Economic and Business Sciences (SEBS)

Predicting Intention to Participate in Mobile Crowdsourcing Initiatives: A Study of Local Kenyan Communities

A research report submitted in fulfilment of the requirements of the degree of Master of Commerce (by research).

Ethics protocol number: **H110703**

Candidate name: Maradona Gatara

Student Number: 494525

Supervisor: Jean-Marie Bancilhon

January 26th 2012

Dedication

To God Almighty, for his many blessings throughout a challenging and exciting academic year.

To my parents, for their endless love, support, inspiration, and enduring wisdom.

To Juliana Kibatta, for her love, encouragement, and all-round support.

Acknowledgments

I extend my gratitude to my supervisor, Jean-Marie Bancilhon, for his consistent advice, guidance, and support. His dynamic approach to supervision and attention to detail was invaluable.

I would also like to convey my gratitude to my previous supervisor, Dr. Rennie Naidoo for helping initiate the research process, and for his advice and encouragement.

I would like to thank Professor Judy Backhouse for her consistent encouragement and support.

I would like to thank Professor Jason Cohen, for his statistical advice and useful technical insights.

Many thanks to Professor Joel West for his wisdom, support, and sound practical insights.

In addition, I would like to thank the National Youth Coordinator for the Presbyterian Church of East Africa (PCEA), Reverend Simon Githiora Njuguna, for helping facilitate data collection. His encouragement, enthusiasm, and logistical support was commendable.

To Mr. David Ndirangu for his additional logistical support throughout the data collection phase.

To the youth research volunteers for their technical support, effectiveness and efficiency, during the data collection phase.

Last but not least, to the many respondents who willingly participated in this study, and for providing reliable statistical data. Their passion for and belief in this study was refreshing.

Declaration



I declare that this dissertation is my own unassisted work, except only where acknowledgements and references have been made in the text. I have read and fully understood the school Senate Policy on Plagiarism. I am well aware that plagiarism constitutes presentation of the ideas of others as one's own, and failure to give credit where it is due.

This dissertation has not been submitted before, to any other institution, for award of any degree or examination.

M.C.Gatara

Date: January 26th 2012

Abstract

Crowdsourcing is the outsourcing of a job or task to a large group of individuals. Crowdsourcing has emerged from the concepts of Outsourcing, Open Source Software (OSS) Collaboration, Open Innovation, and User Innovation. While Crowdsourcing has provided an innovative way in which work can be outsourced to a large group of people, the advent of Mobile Telephony in Africa has provided a whole new dimension. This is the merging of the concepts of Crowdsourcing and Mobile Telephony, to form Mobile Crowdsourcing. Mobile Crowdsourcing has the potential to contribute significantly to the use of Information Technology (IT) in developing countries by providing a platform that would enable people such as those in peri-urban Kenyan communities, to utilise their mobile handsets to perform a set of mobile-based tasks. Payment for these tasks is made possible through mobile money platforms such as “M-Pesa”. Such innovation could provide a means for social empowerment for many of these unemployed technology users.

This study sets forth to examine a set of factors that are likely to predict the “participation intention” of peri-urban Kenyan youths in Mobile Crowdsourcing. Motivational Theory, and the Theory of Reasoned Action (TRA) form the core of the theoretical framework used for this study. The McKnight Model is used as a supporting theory, to examine “trusting beliefs”. In addition, the constructs “perceived credibility”, “social influence” and “community identification” are derived from prior studies that use Socio Cognitive Theory and an extended version of the Technology Acceptance Model (TAM). These also play a supporting role. Using a survey instrument, data was collected from peri-urban youths in four peri-urban communities, and 279 usable responses were obtained for this study.

Findings show that “self-development”, “integrity”, and “reputation” are the most significant predictors of “participation intention”. These three variables account for 17% of the variance in “participation intention”. Contrary to suggestions made in prior literature on Crowdsourcing, “monetary compensation” was not found to be a key motivator. This finding will no doubt spark future debate as to the role money plays in Crowdsourcing, especially in Africa. Additional findings show that “attitude” was found to be a strong mediator of the relationship between “technology anxiety” and “participation intention”. Moreover, “community identification” was found to be a full moderator of the relationship between “social influence” and “participation intention”. Findings made uncovered new insights about the perceptions and attitudes of mobile phone users in developing countries. Contributions made to theory and practice are also discussed.

Keywords: Crowdsourcing, mobile telephony, Mobile Crowdsourcing, Txteagle, M-Pesa, peri-urban communities, Kenya, Africa, Developing Countries

Table of Contents

List of tables	viii
List of Figures	x
Chapter 1: Introduction and Background.....	1
1.1 Context of this study	2
1.2 Problem definition	5
1.3 Aim and objective of study	5
1.4 Research questions	6
1.5 Importance and contributions of this study	6
1.6 Organisation of research report	7
1.7 Summary	8
Chapter 2: Literature review.....	9
2.1 Introduction	9
Section I.....	9
2.2 Origins of Crowdsourcing	9
2.2.1. Outsourcing.....	9
2.2.2 OSS Collaboration	10
2.2.3 Open Innovation.....	11
2.2.4 User Innovation	12
2.2.5 Crowd Wisdom.....	13
2.3 Crowdsourcing.....	14
2.3.1 The Internet and Crowdsourcing	14
2.3.2 The Crowdsourcing mechanism	17
2.3.3 Crowdsourcing for Africa: Social empowerment platforms	21
Section II	23
2.4 Developing country context.....	23
2.4.1 Literacy levels and technology adoption.....	23
2.4.2 The role of mobile telephony.....	24
2.4.3 Socio-economic benefits of mobile telephony.....	26
2.5 Summary	28
Chapter 3: Kenya	29
3.1 Introduction	29
3.2 Overview	29
3.3 Historical background	31
3.4 Geographical background	31
3.5 Economic background	31
3.6 Demographic background	32
3.6.1 Education.....	33
3.6.2 Gender	33
3.7 Mobile money.....	35
3.7.1 “M-Pesa”: The success story of mobile money in Kenya.....	35
3.7.2 The M-Pesa mechanism.....	36
3.8 Mobile Crowdsourcing.....	37
3.8.1 Txteagle (JANA)	37
3.9 Mobile-based tasks	38
3.9.1 Transcription	38
3.9.2 Software localisation	39
3.9.3 Citizen journalism.....	39
3.9.4 News translation and sentiment analysis.....	39
3.9.5 Surveys and market research	39

3.9.6 Future tasks.....	40
3.9.7 System design.....	40
3.9.8 Improving Task Accuracy Through Repetition	41
3.9.9 Deployment	41
3.10 Summary	42
Chapter 4: Model development	43
4.1 Introduction	43
4.2 Theoretical framework	43
4.2.1 Motivational theory.....	43
4.2.2 Intrinsic and extrinsic motivation.....	44
4.2.3 Self-Determination Theory (SDT).....	46
4.2.4 Possible shortcomings of motivation theory.....	46
4.2.5 The Theory of Reasoned Action (TRA)	47
4.2.6 Possible shortcomings of the TRA	49
4.2.7 The McKnight Model.....	49
4.2.8 Socio Cognitive Theory (SCT)	51
4.2.9 Extended Technology Acceptance Model (TAM).....	51
4.3 Research model.....	53
4.3.1 Introduction	53
4.3.2 Participation intention.....	55
4.4 Proposed hypotheses	56
4.4.1 Self-development	56
4.4.2 Reputation	57
4.4.3 Monetary compensation	58
4.4.4 Social influence	59
4.4.5 Trusting beliefs	60
4.4.6 Competence.....	60
4.4.7 Integrity	61
4.4.8 Perceived credibility.....	61
4.4.9 Technology anxiety	63
4.4.10 Attitude.....	63
4.4.11 Community identification.....	64
4.5 Demographic variables	65
4.5.1 Age.....	65
4.5.2 Gender	66
4.5.3 Education level.....	66
4.5.4 Income	66
4.6 Summary	66
Chapter 5: Research methodology	67
5.1 Introduction	67
5.2 Research design	67
5.2.1 Approach	67
5.2.3 Unit of analysis.....	68
5.2.4 Instrumentation	69
5.3 Sample background	73
5.4 Pre-test and pilot study	74
5.5 Sampling phase.....	74
5.5.1 Sampling considerations.....	75
5.5.2 Sampling approach.....	76
5.6 Data collection	81
5.6.1. Structure of questionnaire	81
5.6.2 Ethics clearance protocol.....	82
5.7 Data analysis strategy	82

5.8 Limitations and delimitations.....	87
5.9 Summary.....	87
Chapter 6: Data analysis	89
6.1 Introduction	89
6.2 Sample demographics.....	89
6.3 Cross-tabulations.....	94
6.4 Frequency distributions and descriptive statistics for survey items.....	97
6.5 Data screening	97
6.5.1 Missing values	98
6.5.2 Outlier detection and removal.....	98
6.5.3 Testing for normality.....	98
6.6 Preparation for factor analysis.....	99
6.7 Factor analysis.....	99
6.8 Initial validity and reliability	103
6.9 Descriptive statistics for composites	105
6.10 Hypothesis testing	106
6.10.1 Correlation analysis.....	106
6.10.2 Regression analysis	107
6.10.3 Regression techniques	107
6.10.4 Stepwise estimation method	108
6.10.5 Alternate regression: Confirmatory approach (enter method).....	111
6.10.6 Assumptions of the regression variate.....	112
6.10.7 Test for multicollinearity	113
6.10.8 Testing for mediation	113
6.10.9 Testing for moderation.....	116
6.11 Conclusion	119
Chapter 7: Discussion of results.....	122
7.1 Introduction	122
7.1.1 Participation Intention (dependent variable).....	122
7.2 Motivational factors.....	123
7.2.1 Self-Development.....	123
7.2.2 Reputation	125
7.2.3 Monetary compensation	126
7.3 Trusting beliefs.....	127
7.3.1 Competence.....	127
7.3.2 Integrity	128
7.3.3 Perceived credibility.....	129
7.4 Socio-cognitive factors.....	130
7.4.1 Social influence	131
7.4.2 Community identification.....	132
7.4.3 Technology anxiety	133
7.4.4 Attitude	134
7.5 Conclusion	135
8. Conclusion.....	137
8.1 Introduction	137
8.2 Summary of key findings	137
8.3 Contribution to practice.....	138
8.4 Contribution to theory.....	140
8.5 Limitations of the study.....	140
8.6 Future research opportunities	141
8.7 Conclusion.....	142

References	144
Appendices	156
Appendix A: Types of Crowdsourcing.....	156
Appendix B: Crowdsourcing for social empowerment	158
Appendix C: Advantages and disadvantages of Crowdsourcing mechanism	159
Appendix D: Payment continuum for Crowdsourcing.....	159
Appendix E: M-Pesa mechanism.....	160
Appendix F: The Self-Determination Continuum: A detailed overview	161
Appendix G: Theoretical framework: Detailed overview	164
Appendix H: Research approaches.....	165
Appendix I: Additional demographics.....	165
Appendix J: Survey instrument.....	166
Cover letter	166
Appendix K: Mixed methods sampling.....	172
Appendix L: Instrument items	174
Appendix M: Ethical clearance certificate	176
Appendix N: Letter of permission from National Youth Coordinator (PCEA).....	177
Appendix O: Photographs of sample sites	178
Appendix P: Statistical results	182

List of tables

Table 3. 1: Kenya Facts And Figures.....	34
Table 5. 1: Sampling Techniques	80
Table 5. 2: Baron And Kenny (1986): Four Step Approach	84
Table 5. 3: Sobel Products Of Coefficients Approach	85
Table 6. 1: Response Rate Summary.....	89
Table 6. 2: Age Group Profile	90
Table 6. 3: Gender Profile	90
Table 6. 4: Highest Education Level Obtained.....	91
Table 6. 5: Employment Profile	91
Table 6. 6: Mobile Phone Owners.....	92
Table 6. 7: Estimated Daily Income	92
Table 6. 8: Mobile Based Tasks (Preference).....	93
Table 6. 9: Preferred Mobile-Based Tasks	93
Table 6. 10: Highest Education Level Obtained-Gender Cross-Tabulation.....	94
Table 6. 11: Employment-Gender Cross-Tabulation	94
Table 6. 12: Mobile Phone Ownership-Gender Cross-Tabulation	95
Table 6. 13: Estimated Daily Income-Gender Cross-Tabulation	95
Table 6. 14: Education Level -Mobile Phone Ownership Cross-Tabulation	96
Table 6. 15: Employment-Mobile Phone Ownership Cross-Tabulation	96
Table 6. 16: Estimated Daily Income-Mobile Phone Ownership Cross-Tabulation	96
Table 6. 17: Items Excluded After PCFA	101
Table 6. 18: PCFA Solution For Independent Variables	102
Table 6. 19: Instrument Validities And Reliabilities	104
Table 6. 20: Descriptive Statistics For Composites	105
Table 6. 21: Correlation Matrix.....	106
Table 6. 22: Inter-Correlations (Independent Variables).....	107
Table 6. 23: Stepwise Estimation: First Model.....	108
Table 6. 24: Stepwise Estimation: Second Model	109
Table 6. 25: Stepwise Estimation: Third Model.....	110
Table 6. 26: Enter Method: First And Only Model.....	112
Table 6. 27: Four Step Approach.....	114
Table 6. 28: Four Step Regression (Test For Mediation)	115
Table 6. 29: Sobel Test For Mediation	116
Table 6. 30: Testing For Moderation	117
Table 6. 31: Results Of Proposed Moderated Relationship.....	117

Table 6. 32: Mean Split Correlations.....	119
Table 6. 33: Summary Of Findings	121
Table A 1: Examples Of Integrative Crowdsourcing	156
Table A 2: Examples Of Selective Crowdsourcing	157
Table A 3: Examples Of Creative Crowdsourcing.....	157
Table H 1: Characteristics Of Different Research Approaches	165
Table I 1: Instrument constructs.....	174
Table I 2: Constructs and hypotheses.....	175
Table K 1: Mixed Methods Sampling	172
Table L 1: Instrument Constructs.....	174
Table L 2: Constructs And Hypotheses	175
Table P 1:Frequency Distribution Per Item (Independent Variables)	182
Table P 2: Frequency Distribution Per Item (Mediator Variable)	183
Table P 3:Frequency Distribution Per Item (Moderator Variable).....	183
Table P 4: Frequency Distribution Per Item (Dependent Variable)	183
Table P 5: Missing Values Per Construct	184
Table P 6: Descriptive Statistics Per Item (Independent Variable)	185
Table P 7: Descriptive Statistics Per Item (Mediator Variable)	186
Table P 8: Descriptive Statistics Per Item (Moderator Variable).....	186
Table P 9: Descriptive Statistics Per Item (Dependent Variable)	186

List of Figures

Figure 2. 1: Firm And User Centred Innovation	13
Figure 2. 2: Conceptual Difference Between Outsourcing And Crowdsourcing	18
Figure 2. 3: Crowdsourcing Amazon Mechanical Turk.	20
Figure 2. 4: Points Of Intersection.	22
 Figure 3. 1: Map Of Kenya	 30
 Figure 4. 1: Theory Of Reasoned Action (TRA).....	 48
Figure 4. 2: The Mcknight Model	50
Figure 4. 3: Theoretical Framework For Current Study	52
Figure 4. 4: Conceptual Model For Study.	54
 Figure 5. 1: Proposed Mediated Relationship.....	 84
Figure 5. 2: Proposed Moderated Relationship.	86
Figure 5. 3: Research Methodology Steps.....	88
 Figure 6. 1: Significant Standardised Regression Coefficients.....	 111
Figure 6. 2: Proposed Mediated Relationship.....	114
Figure 6. 3: Tested Moderated Relationship.....	117
Figure 6. 4: Plotted Effect Of Tested Moderated Relationship	118
 Figure 7. 1: Proposed Conceptual Model For Future Research	 136
 Figure D 1: Payment Continuum For Crowdsourcing	 159
 Figure E 1: M-Pesa Mechanism.....	 160
 Figure F 1:The Self-Determination Continuum.	 162
 Figure G 1: Theoretical Framework (With Variables For Each Theory).....	 164
 Figure O 1: Peri-Urban Area: Dagoretti Sample Site.....	 178
Figure O 2: Peri-Urban Youth: Youth Leader In Dagoretti Area.	179
Figure O 3: Peri-Urban Area: Kikuyu Sample Site.....	180
Figure O 4: Peri-Urban Area: Kayole Sample Site.	181

Figure P 1: Normal Probability Plot - Integrity.....	187
Figure P 2: Scatterplot – Integrity	187
Figure P 3: Normal Probability Plot – Self-Development	188
Figure P 4: Scatterplot – Self-Development.....	188
Figure P 5: Normal Probability Plot – Reputation	189
Figure P 6: Scatterplot – Reputation.....	189
Figure P 7: Normal Probability Plot – Technology Anxiety	190
Figure P 8: Scatterplot – Technology Anxiety.....	190
Figure P 9: Normal Probability Plot – Attitude.....	191
Figure P 10: Scatterplot - Attitude.....	191
Figure P 11: Normal Probability Plot – Social Influence	192
Figure P 12: Scatterplot – Social Influence.....	192
Figure P 13: Normal Probability Plot – Community Identification	193
Figure P 14: Scatterplot – Community Identification.....	193
Figure P 15: Normal Probability Plot – Participation Intention	194
Figure P 16: Standardised Residual – Normal Probability Plot	194
Figure P 17: Standardised Residual: Histogram.....	195
Figure P 18: Partial Regression Plot: Integrity.....	196
Figure P 19: Partial Regression Plot: Self-Development	196
Figure P 20: Partial Regression Plot: Reputation	197

Chapter 1: Introduction and Background

Crowdsourcing¹ is defined as the act of taking a job traditionally performed by a designated agent (such as an employee), and outsourcing it to an undefined, generally large group of people in the form of an open call (Howe, 2006).

Crowdsourcing was originally an online distributed problem solving and production model, which harnesses the collective intelligence of a crowd of web users via an open call (Brabham, 2010). Crowdsourcing has potential for government and non-profit use. To explore new applications of Crowdsourcing, there must be a better understanding of why crowds participate in Crowdsourcing as a process. According to Schenk and Guittard (2009), Crowdsourcing is made up of the words “Crowd” and Outsourcing, and can take the form of peer production (where the job is performed collaboratively), but is also undertaken by sole individuals (Howe, 2006). A crucial requirement is the wide network of potential workers. Crowdsourcing borrows from principles of Open Source Software (OSS) Collaboration, but is not restricted solely to software development (Howe, 2006).

While Crowdsourcing has its roots in the more conventional Outsourcing, and subsequently OSS Collaboration, Open Innovation, and User Innovation, it has since evolved into Mobile Crowdsourcing, which merges the concepts of Mobile Telephony and Crowdsourcing. This is potentially a novel technology platform, especially in developing countries in Africa.

Developing countries make up 75% of the world’s population and yet only make use of 16% of the world’s products (Sahay and Avgerou, 2002). Information and Communication Technologies (ICTs) have the potential to contribute to the enhancement of socio-economic conditions in developing countries (Sahay, 2001; Walsham, Robey and Sahay, 2007). The concept of development, toward which such innovation is intended to contribute (Avgerou, 2010), has been appreciated.

Developing countries are somewhat disadvantaged, in relation to technology innovation, with emphasis on the limited technology and skills available in these regions (Avgerou, 2008). However, the innovative use of mobile technology may disprove this notion, due to the probable impact of mobile telephony. In Africa, for example, mobile phone innovation is

¹ The word “crowd” refers to a large group of people, and the word “sourcing” stems from the concept of outsourcing. Therefore Crowdsourcing may be viewed as the sourcing of crowds. In addition, Crowdsourcing is an activity or process, and not a technology platform.

known to be thriving. The rapid adoption of mobile phones as affordable, versatile and portable tools by millions of Africans, has led to increased subscription rates on the continent (Etzo and Collender, 2010).

In recent times, mobile phones in developing economies have played a similarly crucial role to fixed telephony in the developed world, throughout the 1970s and 1980s. (Chabossou, Stork, Stork and Zahongo, 2008). Mobile telephony has been rapidly adopted by millions of Africans. Its versatility and relatively low cost form the hallmarks of a successful technology tool, defined as matching the context, affordability and environment in which it exists (Etzo and Collender, 2010). Current estimates show that one in ten Africans have access to mobile phones, with countries such as Kenya having a higher ratio (Djiofack-Zabaze and Keck, 2009; ITU, 2009).

According to recent figures from the International Telecommunications Union (ITU, 2009), 90% of all telephone subscribers on the African continent are mobile phone users. In a country such as Kenya, with a population of 38.5 million people, there has been an increase in mobile subscription rates from 200,000 subscribers at the turn of the millennium, growing to 17.5 million as of 2009 (Livingston, 2011). This figure has since risen to nearly 20 million subscribers (CCK, 2010), and continues to rise. Impoverished African communities appear to have benefitted from this expansion (Ngugi, et al., 2010). With unemployment levels rising to almost 50%, there are millions of mobile phone subscribers unable to find work (Eagle, 2009). One unique group of potential participants in Mobile Crowdsourcing are people in peri-urban communities.

1.1 Context of this study

According to the Oxford English Dictionary (2005), the term peri-urban has been defined as follows:

“A peri-urban community is defined as an area immediately adjoining an urban area. This refers to an area between the suburbs and the countryside. Peri-urban communities have both rural and urban characteristics.”

This study targets Kenyans that reside in peri-urban communities and examines their intention to participate in Mobile Crowdsourcing initiatives. Rural Kenyans are believed to have moved closer to big cities and have acquired part urban characteristics. This constitutes

a unique group of mobile phone users who could potentially engage in Mobile Crowdsourcing.

Due to increasing mobile subscription relative to other Africa countries, Kenya provides a classical example of mobile technology adoption on the continent. This study examines the relative perceived impact of Mobile Crowdsourcing within this context. Mobile Crowdsourcing brings about a scenario in which a dedicated workforce prepared to contribute diverse skills using mobile telephony, is readily available. Corporations outsource numerous tasks that human beings can better perform, and this is made possible through cheap communication networks to allow organisations to distribute these tasks through Mobile Crowdsourcing. Brabham (2010) suggests that despite being initially online-based and mostly commercial, Crowdsourcing has since become a problem-solving platform with the potential to address a number of societal problems², especially in developing countries. This reinforces the belief that Crowdsourcing may be beneficial to African communities.

Mobile Crowdsourcing allows Kenyans to expand their social networks by using technology to cater to their basic human needs. This provides a boost to communities, which previously had little or no infrastructure with which to facilitate socio-economic development. For this reason, it was important to examine the participation intention of peri-urban mobile phone users in Kenya, as this explains the phenomenon that is Mobile Crowdsourcing. Moreover, the penetration of mobile phones in Kenyan communities, may pave the way for future employment opportunities through Mobile Crowdsourcing.

Previously, Crowdsourcing was geared primarily towards sharing of ideas, resources and knowledge. With the advent of mobile technology within the context of developing African countries, social empowerment provides an additional dimension to Crowdsourcing. This brings into focus two prominent platforms, which have become increasingly influential in Kenya, and in a number of developing African countries.

The first example is Txteagle (JANA), a system that enables people to earn small amounts of money by completing simple mobile phone tasks for organisations that then pay them either in mobile “airtime” or through mobile money platforms such as “M-Pesa”. For Kenyans, this provides an additional source of supplementary income. This service was launched in 2009 in Kenya and Rwanda. Additionally, a decrease in the price of mobile handsets has allowed

² Mobile Crowdsourcing may help increase employment opportunities. This may in turn contribute to poverty alleviation in the long run.

an increase in the number of individuals relying on this form of technology for labour (Eagle, 2009).

From a social empowerment perspective, Mobile Crowdsourcing platforms such as “Txteagle”, can contribute to the facilitation of mobile commerce as a means for compensating labourers (using services such as “M-Pesa”) (Eagle, 2005). Technology can be used to empower communities, allowing them to harness it to enhance their everyday lives (Human Development Report, 2011). A second example of an increasingly prominent platform for Mobile Crowdsourcing is Samasource, a platform based on the “micro-task” business model, whereby small, routine, non-scientific tasks that can be completed in a short time-span, are performed. In addition to facilitating computer-based tasks, this system is beneficial to mobile phone users. By performing a set of micro-tasks, mobile workers are able to generate income. This also leads to a significant increase in a potential pool of problem solvers and knowledge workers. In Kenya, a question arises as to how workers would be compensated for mobile work. This suggests a mobile money service would play an important role.

An example of such a search service is “M-Pesa”, a service comprising money transfer from person to person, in addition to payment of bills and salaries, and purchase of goods, all while bypassing traditional banking conventions (GSMA, 2010). Local technology success stories such as “M-Pesa” have the potential to help create employment for rural to peri-urban Kenyans. This service provides an efficient payment platform, which enables them to receive payment through their mobile handsets (Ngugi, Pelowski and Ogembo, 2010). In essence, the use of “M-Pesa” as a key component means that Mobile Crowdsourcing addresses both job creation and compensation. A platform such as Txteagle works very much in this fashion.

This study exploited a unique opportunity to examine factors that were likely to lead to the potential participation of peri-urban Kenyans in Mobile Crowdsourcing. While the advent of Mobile Crowdsourcing could present potential benefits, the intentions of peri-urban Kenyans to engage with this platform needed to be examined beforehand. By studying the “participation intention” of peri-urban Kenyans, the perceived value of mobile telephony for social empowerment was explained. The intention of Kenyans to participate in Mobile Crowdsourcing initiatives was addressed in this study. Kenya has recently experienced rapid growth in mobile phone use (Ngugi, Pelowski and Ogembo, 2010). As a result, Mobile Crowdsourcing may be feasible within this context. This is because the mobile phone is

prevalent as a technology tool in Kenyan society, and therefore Mobile Crowdsourcing should take advantage of this. To better understand how Mobile Crowdsourcing may have an impact on Kenyan communities, an apparent knowledge gap was filled.

1.2 Problem definition

There appeared to be a lack of knowledge on the perception and attitudes of peri-urban Kenyans with regard to their intention to participate in Mobile Crowdsourcing initiatives. This was perhaps due to the novelty of the Crowdsourcing phenomenon. A research gap was made evident by the apparent lack of sufficient literature on mobile telephony and Crowdsourcing, and how it is shaped by socio-economic and technological components. This study sought to contribute to this research gap, within a developing country context.

The mobile phone is now instrumental to a large number of Africans. While mobile telephony was originally devised for the developed world, the vast majority of mobile phone subscribers today live in the developing world. One way in which mobile phones are being used is through Mobile Crowdsourcing. This study examined the “participation intention” of peri-urban Kenyans in Mobile Crowdsourcing. A theoretical framework, based on theories drawn from prior literature informs this study.

1.3 Aim and objective of study

The aim of this study was to contribute to the following notion proposed by Walsham and Sahay (2006), who stated that:

“There had been some debate as to whether Information and Communication Technologies (ICTs) were relevant to developing countries, but this debate has been resolved with a clear yes answer. The question has become not whether, but how ICTs can be beneficial.”

ICTs are believed to have high potential value, from public and private enterprises to health delivery in rural villages (Walsham, Robey and Sahay, 2007). This is an indicator of the relevance of ICTs to developing countries.

As a pioneering effort, the objective of this study was to examine the effect of a set of factors on the “participation intention” of peri-urban Kenyans in Mobile Crowdsourcing, while explaining what would influence their participation. This provides insights on the potential participation of peri-urban Kenyans, as mobile phone users, in Mobile Crowdsourcing. This

presents an African context, in which technology use can be appreciated. More specifically, this study aimed to address the following questions:

1.4 Research questions

- 1. What factors are suggested in extant literature as the most likely to influence the “participation intention” of peri-urban Kenyans in Mobile Crowdsourcing?**
- 2. To what extent do these factors affect the “participation intention” of peri-urban Kenyans in Mobile Crowdsourcing?**

To answer the first research question, a comprehensive review of extant literature was undertaken. Literature around the fields of OSS Collaboration, Outsourcing, Open Innovation, User Innovation, Crowdsourcing, Information and Communication Technology for Development (ICT4D), Mobile Commerce, Computing Behaviour, Information Systems and Social Behaviour, was examined.

Once the relevant literature had been reviewed and key factors identified, a conceptual research model was derived from the literature identified in research question 1, developed and presented. To answer the second research question, three key steps were followed. Firstly, hypotheses were proposed, and were used to predict the “participation intention” of peri-urban Kenyans in Mobile Crowdsourcing. Secondly, specific peri-urban communities in Kenya were identified and a research instrument was devised and used to collect data from respondents. Thirdly, the data collected was then analysed and subsequent results reported.

1.5 Importance and contributions of this study

This study focuses on mobile phone use for Crowdsourcing, with “participation intention” being the key component. It appeared that insufficient research on Mobile Crowdsourcing had been conducted, and this presented an opportunity to address the emergent research gap. Part of Mobile Crowdsourcing involves the usage of mobile money platforms such as “M-Pesa”, which is easy to use, cheap, and widely accepted. This service is potentially a key component of Mobile Crowdsourcing as an enabler of meaningful employment. This study sought to make a two-pronged contribution. In order to fully contribute to practice, this study sought to make a contribution to a domestic economy, namely Kenya. This was a “local” contribution. In addition, this study sought to make a contribution to the global community. This was achievable by demonstrating that Mobile Crowdsourcing is feasible not just in Kenya, but in other developing economies as well, thereby making a “global” contribution.

From a theoretical standpoint, this study sought to make an “academic” contribution by augmenting the existing body of knowledge around fields such as Crowdsourcing, Mobile Telephony, Mobile Commerce, and Mobile Technology Adoption. Additionally, this study sought to make a “methodological” contribution by demonstrating the use of empirical quantitative methodology to conduct research on Mobile Crowdsourcing. Finally, a “contextual” contribution was made, since Mobile Crowdsourcing within peri-urban Kenyan communities, formed part of the crux of this research. The next section provides a summary of how the remainder of this research report proceeds.

1.6 Organisation of research report

Chapter 2: Literature review

This chapter attempts to clarify the relationship between this study and prior findings on Crowdsourcing, especially within the context of developing countries.

Chapter 3: Kenya

This chapter provides a background on Kenya, which will form the backdrop for the study, while also discussing mobile money (M-Pesa), and Mobile Crowdsourcing (Txteagle).

Chapter 4: Model Development

This chapter discusses the theoretical framework which informs this study, and proposes and develops a conceptual model to test hypotheses.

Chapter 5: Research methodology

The research design and techniques used for this study are discussed in this chapter. Additionally, instrument validity and reliability are discussed in addition to analysis techniques used for this study.

Chapter 6: Data analysis

Findings from this study are analysed using a number of empirical quantitative techniques. Subsequently, proposed hypotheses are then either accepted or rejected.

Chapter 7: Discussion

Research findings of this study are discussed and interpreted with consequences and implications stated explicitly. Additionally, findings in prior literature are called upon to explain the significance of results.

Chapter 8: Conclusion

This chapter presents a review of the entire study. Limitations of the study are pointed out, and future recommendations are made. In addition, contributions of the study to theory, and practice are discussed.

1.7 Summary

This section has given a brief overview of technology use within a developing country context, while highlighting Kenya as an illustration of this scenario. In addition, the concepts of Mobile Telephony, Mobile Crowdsourcing, and “M-Pesa” have been discussed, and their relevance to a developing country context has been justified. Additionally, the aim of this study, the research problem and research questions have been pointed out. The following section discusses a review of literature pertinent to this study.

Chapter 2: Literature review

2.1 Introduction

This chapter discusses the concept of Crowdsourcing, and related concepts. More specifically, the origins of Crowdsourcing, from Outsourcing to User Innovation are discussed. Additionally, the concepts of Mobile Telephony in developing countries and Mobile Crowdsourcing are introduced.

This chapter is divided into two sections. Section 1 provides the contextual background to Crowdsourcing, whereas Section 2 discusses technology use in developing African countries, and Mobile Telephony.

Section I

2.2 Origins of Crowdsourcing

Crowdsourcing emerges from the more conventional Outsourcing, while incorporating features of OSS Collaboration, Open innovation and User Innovation, all predecessors of Crowdsourcing. The following section discusses Outsourcing, OSS Collaboration, Open Innovation, User Innovation and Crowdsourcing. A clear distinction is made between these five concepts.

2.2.1. Outsourcing

Outsourcing is defined as a decision taken by an organisation to contract-out its Information Technology (IT) assets, people and activities to a third party vendor; who in exchange provides and manages these assets and services for monetary gain over an agreed period of time (Loh and Venkatraman, 1992; Kern, 1997).

There has been widespread acknowledgment that IT drives modern day organisations (Dibbern, Goles, Hirscheim and Jayatilaka, 2004). Outsourcing reflects the use of external agents to perform a number of organisational activities (such as purchase of goods and services).

Business Process Outsourcing (BPO) is defined as an outsourcing relationship whereby a third party provider is responsible for performing an entire business function for a client or organisation (Dibbern et al, 2004). A number of organisations outsource their business

processes. ICT deployment has resulted in the decentralisation of the industrial and service industries in developed economies. This has been the catalyst for outsourcing of business to developing countries where wages are low. As a result, IT and knowledge are becoming key drivers for socio-economic development globally (Gillwald and Esselaar, 2005; Vodafone, 2005).

While Outsourcing involves monetary compensation, its successor OSS Collaboration is influenced by personal motivation. This initially formed the basis for the motivational aspect of what would later be known as Crowdsourcing. The next section introduces OSS Collaboration, in relation to Crowdsourcing.

2.2.2 OSS Collaboration

OSS Collaboration is a mechanism by which software is developed by a community of programmers (Internet based). Participation is voluntary and participants are not directly compensated for their work (Hars and Ou, 2001). In addition to this, full source code for any software created is made publicly available.

In OSS Collaboration, limited financial rewards exist. Additionally, community influenced marketing exercises are expensive (Krishnamurthy, 2005). OSS Collaboration is more “open” than Outsourcing. Relative to Outsourcing, Crowdsourcing is not as “open” as OSS Collaboration or Open Innovation for that matter. The concept of openness is at play when for instance, Crowdsourcing firms usually make traditional use of Intellectual Property Rights (IPR) by patenting their innovations. Moreover, Crowdsourcing, as opposed to OSS Collaboration, is not limited to the development of software (Brabham, 2008a; Brabham 2008b).

The extent to which principles of OSS Collaboration can be applied in other industries still remains an area of continued research (Raasch et al., 2009). Participation in OSS Collaboration stems from a number of motivational factors, such as interest in technology and to a lesser extent, financial reward, with evidence relating this assertion to the more dynamic Crowdsourcing (Schenk and Guittard, 2010). Despite Open Source Software Collaboration and Crowdsourcing sharing similarities, these concepts are very different in a number of ways. Outsourcing is an application of the production element of Crowdsourcing, whereas Open Source Software Collaboration borrows from the User Innovation paradigm (von Hippel and Von Krogh, 2003) and can be called Open-Sourcing, which is arguably the

preferred terminology to the more familiar OSS production model (Agerfalk and Fitzgerald, 2008).

Despite OSS Collaboration being a public good, it was developed for free by highly qualified, young, motivated individuals and evolved rapidly (Bizer, Schrettl and Shroeder, 2007). Lerner and Tirole (2005), state that a body of original material is made publicly available to others for use, under specified conditions. In a number of cases, anybody who makes use of this material must agree to make all necessary enhancements to the original material under the same conditions. Additionally, the majority of OSS contributors are unpaid, which means that the motivation to contribute to OSS development is more intrinsic in nature than what would later constitute Crowdsourcing. Despite this, in recent times large corporations such as IBM have accrued over \$500 million in Open Source and Crowdsourcing projects (Mchrzak, Cherbakov and Ives, 2009). This is a sign of the future commercial appeal that OSS Collaboration and Crowdsourcing could have.

As opposed to its successor Crowdsourcing, which usually incorporates an element of payment, Hars and Ou (2001) suggest that OSS Collaboration is influenced by personal motivation. Crowdsourcing platforms make use of technology to create jobs for which a designated group of workers are paid.

To explain why individuals work without pay, it is important to appreciate elements such as “personal enjoyment”, “individualism”, and “community identification” relative to money. Besides money, extrinsic motives for participation include “market signalling”, “development of personal skill”, and “enhancement of individual reputation” (Lakhani and Panetta, 2007). In the case of OSS collaboration, continuous development and contribution of “high quality code”, by programmers helps “reputation building”. This is a form of recognition within a community. In addition to this, future rewards are also expected.

2.2.3 Open Innovation

Chesbrough (2003, 2006) developed the concept of Open Innovation, based on a study of multinational corporations³. The core idea behind this concept is that in a world of distributed knowledge, firms should not be solely reliant on internal Research and Development (R and D) mechanisms via Intellectual Property Rights purchases from other firms. Internal processes and knowledge can generate revenue streams through patents, joint ventures or new

³ Examples include “IBM” and “Proctor and Gamble”.

entities. This is a particularly conservative approach for companies that are traditionally in favour of a closed innovation model based on processes that constrain the use of internal knowledge within a firm, while utilising limited external knowledge (Schenk and Guittard, 2009, p.9.). Furthermore, patents are instrumental for knowledge procurement, and help derive business value⁴ from it (Penin, 2008).

Open Innovation and Crowdsourcing exist within the same space, in that knowledge is distributed and the “opening up” of the Research and Development process of a firm, can be a source of competitive gain. Open Innovation is distinct from Crowdsourcing, because unlike Crowdsourcing, it focuses purely on information processes. Additionally, Open Innovation is based on interaction between firms and other firms, whereas Crowdsourcing involves linkages between a firm and a large group of individuals or a “crowd”. Lastly, Open Innovation, is arguably a form of Outsourcing, but is an independent enough concept on its own because unlike Outsourcing⁵, it is a two-way process which involves both the selling and acquisition of knowledge and information processes (Schenk and Guittard, 2009, p.9).

2.2.4 User Innovation

Crowdsourcing, by its design, gives a key role to individuals and communities who are not legally bound, to which firms can outsource a number of their functions. Von Hippel (1998) suggests that innovation originates within a company, firm or organisation, and is therefore manufacturer-oriented whereas in the case of User Innovation, innovation is more user-oriented⁶. This demonstrates a significant departure of User Innovation from traditional innovation of a firm. User Innovation and Crowdsourcing involve people external to a professional setting. These two models take advantage of the Internet and ICT tools, and provide access to networks of individuals, without the need for formalised organisational structures (Schenk and Guittard, 2009, p.9). There are three main differences between User Innovation and Crowdsourcing. The first is that User Innovation refers to user driven initiatives, whereas a company, firm or organisation initiates Crowdsourcing. The second is that Crowdsourcing is not restricted to issues that revolve around innovation. Lastly, in the case of User Innovation, innovation stems from the users of a final product whereas in Crowdsourcing, anybody can be involved in a particular process (Schenk and Guittard,

⁴ Such knowledge cannot be utilised internally (Penin, 2008).

⁵ Outsourcing is a “one-way” process.

⁶ The user is a direct source of innovation.

2009). Figure 2.1 shows the difference between “firm” and “user” centred forms of innovation.

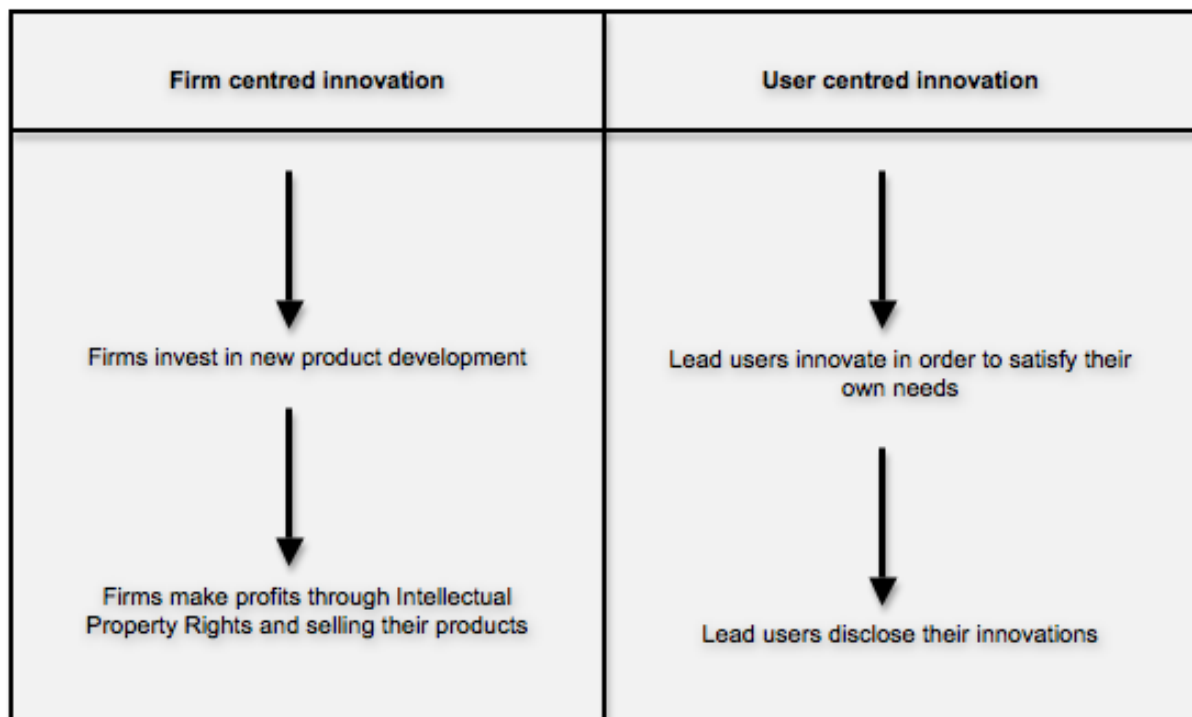


Figure 2. 1: Firm and user centred innovation (adapted from Schenk and Guittard, 2009)

2.2.5 Crowd Wisdom

Surowiecki, (2004), suggests that Crowd Wisdom involves the aggregation of information according to groups, resulting in superior decision making than could have been made possible by any given individual within a particular group. It is divided into three dimensions namely cognition, coordination and cooperation. Cognition is based on fast, reliable judgement, and is influenced less by political bias than experts or expert committees. Coordination is based on the interaction of crowds, whereby constituent individuals do not interfere with each other. In this case, these individuals can then make astute judgements in relation to the reaction of others. Cooperation is based on formation of networks that hinge upon trust, without the presence of a controlling mechanism, which may influence behaviour. According to the Theory of Wise Crowds (Surowiecki, 2004), ideas gathered from a large number of ordinary people are at least as good as or even better than expert solutions. This may be an indicator of the versatility of Crowdsourcing.

Crowd Wisdom has been described as being distinct from the behaviour of irrational crowds based on four key elements (Surowiecki, 2004). The first and second elements are diversity of opinion and independence, while the third and fourth elements are decentralisation and aggregation. Diversity of opinion entails the interpretation of facts according to a particular individual, whereas independence involves personal initiative, not necessarily influenced by the opinions of others. Decentralisation involves specialisation, which leads to a situation whereby an individual benefits from local knowledge. The last component, aggregation, is a mechanism by which personal judgement is transformed into a collective decision. If all four elements are optimised, then the configuration of a so called “wise-crowd” becomes a possibility (Surowiecki, 2004). This theory helps explain the people-driven concept of Crowdsourcing, which has its roots in online communities. The following section further elaborates on the concept of Crowdsourcing.

2.3 Crowdsourcing

This section discusses the concept of Crowdsourcing, or the Outsourcing of a set of tasks to a community. It begins by describing the emergence of Crowdsourcing on the Internet, and by identifying the different types of Crowdsourcing that exist.

2.3.1 The Internet and Crowdsourcing

Crowdsourcing was initially an online, distributed platform for problem solving in addition to being a production model utilised by businesses such as “Threadless⁷”, “iStockphoto⁸” and “Innocentive.com⁹” (Brabham, 2010). An organisation posts a specific problem online, and a large number of individuals comprising a “crowd¹⁰” offer numerous solutions. The winning ideas receive a token. The organisation then mass-produces these ideas, for profit (Brabham, 2008a). This business model is already being implemented in non-profit, government projects (Brabham, 2010). In order to continue applying Crowdsourcing to non-profit contexts, an integrated set of conditions for what constitutes a successful Crowdsourcing framework is necessary. This involves an appreciation for what motivates “crowds” to participate in creative problem solving tasks. Crowdsourcing projects are more than just online imitations

⁷ www.threadless.com: Crowdsources t-shirt design and production.

⁸ www.istockphoto.com: Crowdsources stock photographs, taken by amateur photographers (who are compensated).

⁹ www.innocentive.com: Crowdsources solutions to scientific research problems. Contributors are also compensated.

¹⁰ A “crowd” refers to a group of individuals who perform a task or a set of tasks, or volunteer to solve a given problem.

of traditional methods of participation. Organisations therefore need to allow “crowds” to truly support the problem-solving potential of Crowdsourcing for public benefit (Brabham, 2010, p.1123.).

Prior studies on Crowdsourcing suggest that there has been limited information on reasons for “crowd” participation. Furthermore, the role “money” plays as a motivator, has not been sufficiently explored (Lakhani, Jeppesen, Lohse and Panetta, 2007; Brabham, 2008b). Crowdsourcing generally involves three key components. Firstly, individuals must constitute the “crowd” that perform one or more tasks. Secondly, companies that benefit directly from “crowds” input are defined as client companies. Thirdly, a platform or intermediary (enabler¹¹) that provides a linkage between the crowd and client companies is required (Schenk and Guittard, 2009). This intermediary would serve as an enabler (facilitator) of Crowdsourcing and is instrumental to its success.

Creativity is said to occur within independent groupings of individuals, and is made profitable within three defined layers. These layers are described as the “lower”, “middle”, and “upper” grounds (Cohendet and Simon, 2008). The lower ground is made up of “crowds” or independent groupings of individuals that perform specific tasks or provide a number of solutions to designated problems. Additionally, Cohendet and Simon (2008) further indicate that the “upper-ground” is the level at which Crowdsourcing is said to be made profitable. However, for Crowdsourcing to be enabled, there has to be an intermediary or interface between these two extremes, which is described as the “middle-ground”. In conventional or online-based Crowdsourcing, the intermediary’s role is virtual, because the Internet plays a facilitating role. For Mobile Crowdsourcing, a facilitator that makes up for a lack of Internet penetration plays the role of an intermediary and provides the necessary linkage between the “upper” and “lower” grounds.

The World Wide Web forms one of the most important building blocks on which mass collaboration and knowledge sharing thrive (Benkler, 2006; Howe, 2008). Mass collaboration entails bringing together a large number of individuals around a common platform that facilitates knowledge sharing (Surowiecki, 2004; Tapscott and Williams, 2006; Majchrzak et al, 2009). This medium through which originally, problems were broadcast with the intention of finding viable solutions, has been adopted by various organisations. Examples include “Wikipedia”, “CrowdFlower”, “Innocentive”, “Idea Bounty” and “iStockphoto”. Due to

¹¹ Also known as a “facilitator”.

widespread Internet penetration (Jain, 2010), the Internet facilitates Crowdsourcing that is cheaper and more efficient (Economist, 2008). Crowdsourcing is based on harnessing the collective intelligence of a community to solve a number of problems or perform designated tasks, with a view to accomplishing a set of goals or solving one or more problems (Howe, 2008).

Despite initially being an online business model, Crowdsourcing now applies to a social empowerment context (Shah, Dhanesha and Seetharam, 2009). Commercially, Crowdsourcing applications include branding, content creation, and advertising. Crowdsourcing platforms can also be used to solve a number of societal and environmental problems (Brabham, 2008a, 2008b, 2010). In an African context, the dimension of socio-economic development has become increasingly important, where for instance employment through Crowdsourcing has been facilitated (Aker and Mbiti, 2010). Crowdsourcing is aimed at mobilising the competence and ability of individuals dispersed among the “crowd”. It covers a relatively diverse set of practices.

While addressing a “crowd”, a company identifies expertise from a vast number of anonymous contributors, via an open call¹². Thus, potential contributors are not selected beforehand. However, in some cases there is no selection at all. Instead an aggregation of contributions is pooled (Schenk and Guittard, 2009). On the one hand, Crowdsourcing¹³ provides access to multiple information sources, such as geographical data. This is known as “integrative” Crowdsourcing, which is based on pooling collective input from a network of individuals. This input may have minimal value, but due to the sheer amount of contributions, a Crowdsourcing firm is able derive value. On the other hand, Crowdsourcing gives access to individuals’ problem solving capabilities. This is known as “selective” Crowdsourcing, whereby the client firm is led to choose an input from a set of solutions provided by a “crowd” (Schenk and Guittard, 2009; Howe, 2008).

In relation to a client firms’ needs, Crowdsourcing is usable for routine tasks such as data collection and text message transcription. Alternatively, Crowdsourcing can be implemented for the performance of more sophisticated tasks¹⁴. This is commonplace within innovation projects. In between “integrative” and “selective” forms of Crowdsourcing, there exists a

¹² An open-call refers to a situation whereby a company broadcasts a problem or task to a “crowd”. Individuals within the crowd then motivate to solve a problem (or set of problems) or perform a task (or set of tasks).

¹³ See Appendix A for comprehensive list of various Crowdsourcing platforms.

¹⁴ These demand problem-solving skills from a “specified crowd”.

third category, which is the more “creative” aspect of Crowdsourcing. This involves artistic design, photography and related areas of interest (Brabham, 2008b). Crowdsourcing is a process of organisation of labour, whereby firms distribute work to a given community (traditionally online), while paying anyone within a particular crowd who completes a designated task.

The outsourcing of work to a crowd, as opposed to performing of tasks internally, means that firms have access to a potentially large workforce, comprising individuals who have diverse skill sets and competencies, and are readily available to complete tasks within a short-time span. This is a more cost effective approach than the performance of tasks within the confines of a firm (Howe, 2006). The mechanics behind Crowdsourcing are discussed next.

2.3.2 The Crowdsourcing mechanism

A firm identifies a particular task or set of tasks, currently being performed internally. Instead of performing these activities “in-house”, the tasks are dispersed to a “crowd” of individuals reached (via an open-call) to perform a task or tasks on behalf of the firm (client), for an agreed fee¹⁵. Anybody who is interested in performing a task submits their response upon completion, or the task may be confined to a designated community that is deemed as having some form of task knowledge or ability. A combined approach can also be used whereby an open call is released to a community¹⁶, with restrictions on who is allowed to perform specific tasks (Whitla, 2009, p.16.).

An individual in a particular community then motivates to undertake a task, and a specified time frame is set for the task. Upon task completion, the individual submits the task to the organisation. The organisation then assesses the quality of the task performed, and pays the individual accordingly. There are a number of variations of this mechanism, in existence. In some instances, various individuals can complete a single task, with each user being paid for successful completion. Alternatively, multiple individuals work on a single task, and the best solution is rewarded by the client organisation (or firm). A more effective means of accessing the “crowd” is possibly through online websites or Crowdsourcing enablers, who play the role of markets for customers to interact with “crowds” (Tapscott and Williams, 2008). Crowdsourcing websites may have access to “task specific crowds” represented as online communities, or they may gather a more generalised group of individuals who then select

¹⁵ See Appendix D for illustration of payment continuum for Crowdsourcing.

¹⁶ Which in this case, is typically a non-specified community, despite identification of specific individuals.

which tasks they would like to perform and complete. Task performers may be anonymous¹⁷, and do not have to familiarise themselves with the client firm.

Figure 2.2 provides an illustration of this mechanism, and highlights the conceptual differences between Outsourcing and Crowdsourcing.

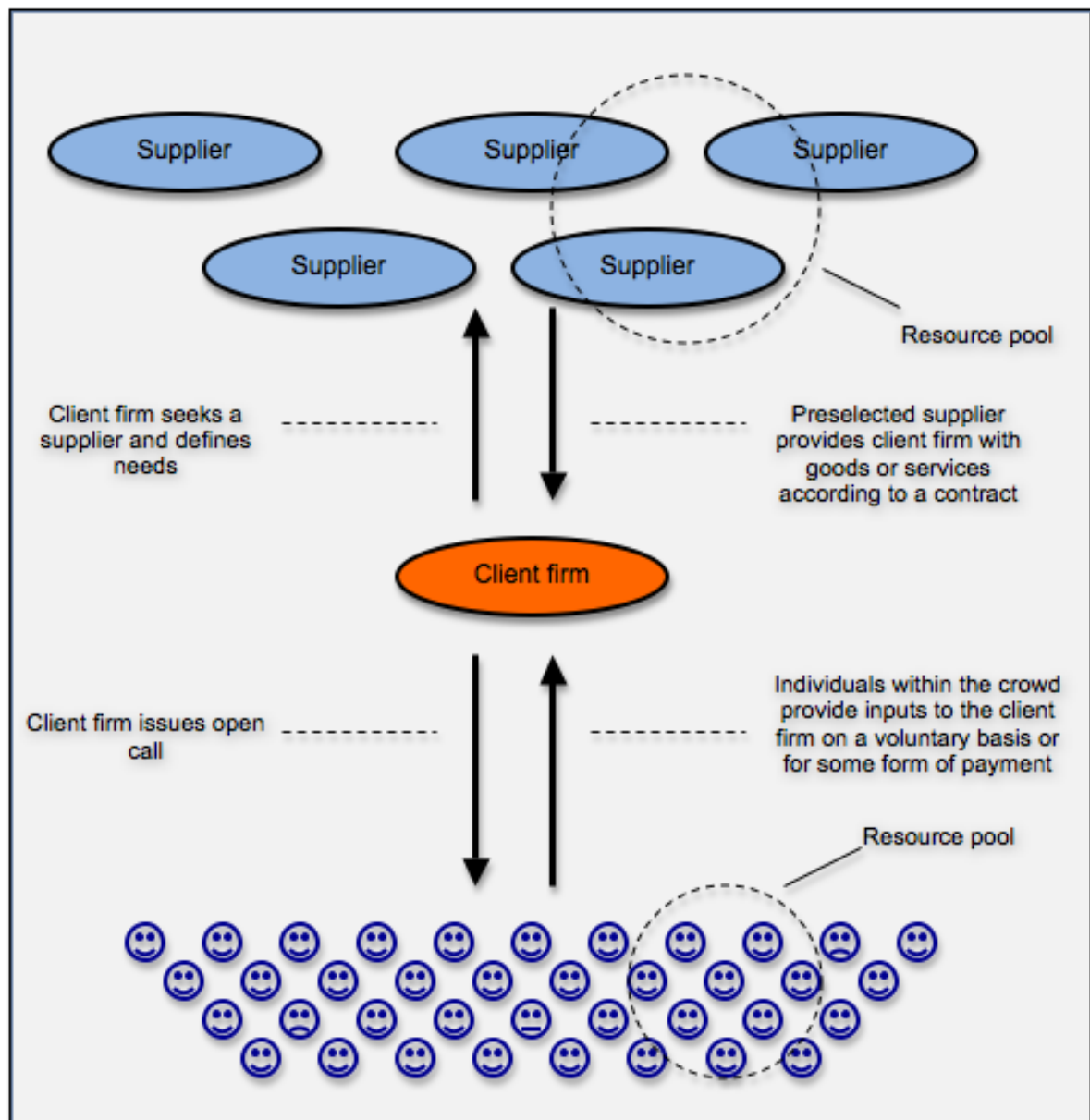


Figure 2. 2: Conceptual difference between Outsourcing and Crowdsourcing (Adapted from Schenk and Guittard, 2009). For Outsourcing, the resource pool consists of suppliers (upper portion), whereas for Crowdsourcing, the resource pool is defined by the “crowd” (lower portion).

¹⁷ In this case, task performers or “crowdsourcers” are not necessarily known to client firms.

An example of a typical Crowdsourcing intermediary is Amazon's "Mechanical Turk", a website which has been widely publicised and plays host to a large number of what is described as Human Intelligence Tasks (HITs). Pay is minimal (usually less than US\$1) for each HIT performed. Anyone can sign up to perform and complete a number of listed tasks. "Mechanical Turk" essentially provides these tasks, performed by a network of individuals with a computer connected to the Internet, who in turn get paid for their work. This task-based principle has been applied to Mobile Crowdsourcing (see section 2.7), a mobile phone-based system that takes these tasks away from Personal Computers (PCs) and offers them to the world's billions of mobile phone subscribers (who may not have Internet access), and provides rural and low-income communities in the developing world with an avenue for income generation (Eagle, 2009). Figure 2.3 illustrates the "Mechanical Turk" mechanism.

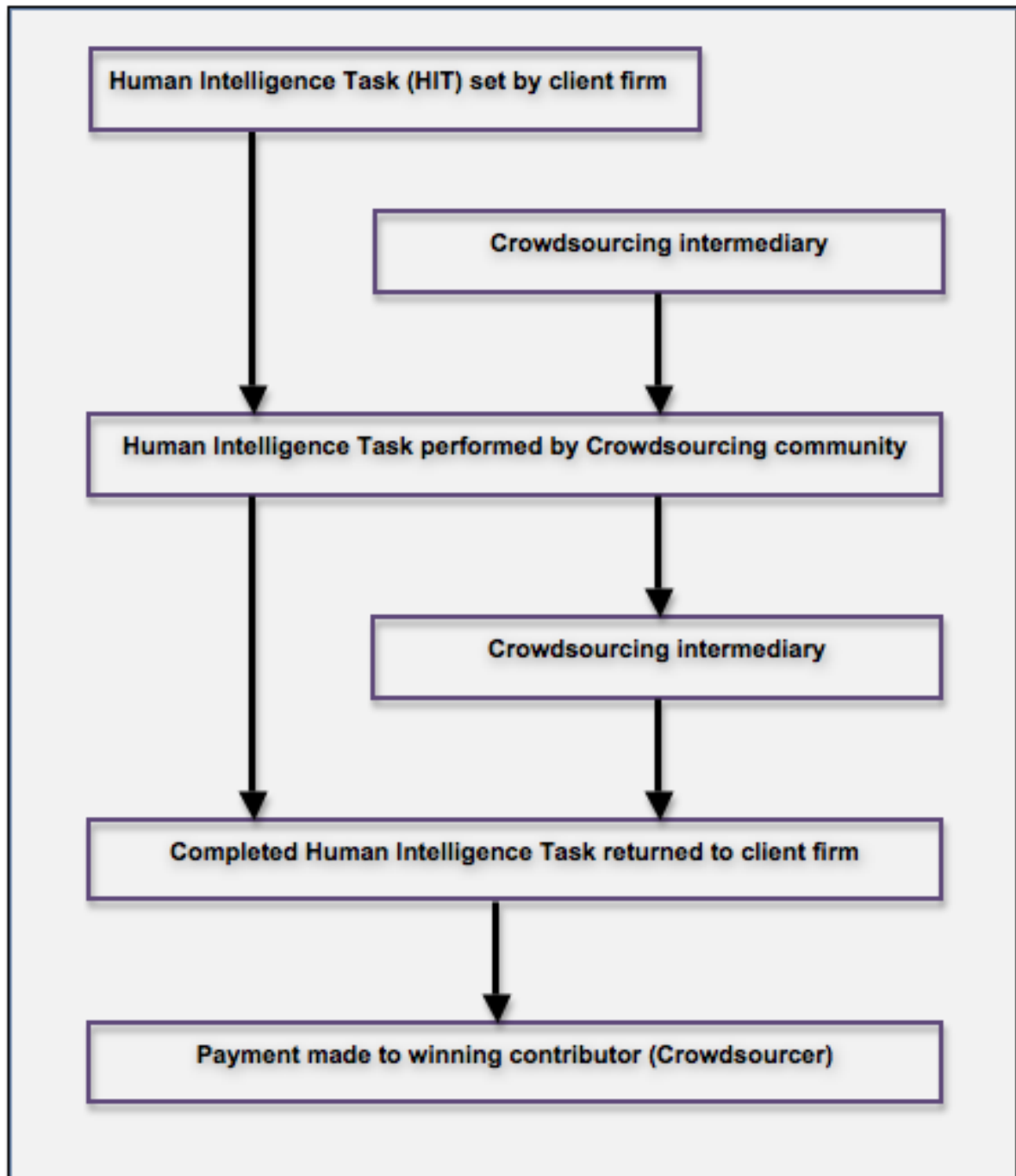


Figure 2. 3: Crowdsourcing Amazon Mechanical Turk (Adapted from Whittle, 2009).

Looking at the environment in which Crowdsourcing was devised, tasks initially introduced were computer-based. Examples of such tasks include the writing of a few lines of software code, and the debugging of various programmes. Despite the widespread availability of

computer-based tasks on various Crowdsourcing sites, firms are beginning to realise the versatility¹⁸ of Crowdsourcing.

2.3.3 Crowdsourcing for Africa: Social empowerment platforms

Facilitators such as Txteagle¹⁹ (Eagle, 2005) and Samasource²⁰ are examples of how Crowdsourcing can be prominent in an African context. These platforms make use of a pool of readily available workers able to perform mobile-based tasks. Organisations such as Samasource show how Crowdsourcing platforms can be used within a non-profit context (Shah et al., 2009), with social empowerment being a key component. Part of this framework requires an appreciation for factors that would motivate communities to participate in Crowdsourcing initiatives. Within a developing country context, mobile telephony for Business Process Outsourcing is becoming widespread, with platforms such as Txteagle and Samasource becoming increasingly influential. In various rural to peri-urban African communities, these platforms may provide an avenue for job creation and subsequently, socio-economic development.

Crowdsourcing may include anything from gathering feedback on how to solve a business problem, to looking for contractors, investors and new employees able to participate in a project (Gale, 2008). Crowdsourcing allows organisations to access innovative resources external to their unit, function or boundaries, in a cost effective manner (Walsmley, 2009). The implementation of a Crowdsourcing initiative depends on attracting, incentivising, sustaining, motivating and guiding a “crowd” so as to perform a set of tasks (Stewart, Huerta and Sader, 2009). An examination of the “participation intention” of rural to peri-urban Africans in Crowdsourcing is feasible, because of the existence of these pre-conditions. This is beneficial to African communities because an avenue for job creation opens up. This is one way in which socio-economic empowerment in the developing world is achievable. The Crowdsourcing mode of organising labour can be applied to a wide range of tasks.

Figure 2.4 shows the points at which the concepts of OSS collaboration (Open Source), Open Innovation, User Innovation, Outsourcing, and Crowdsourcing intersect.

¹⁸ Crowdsourcing is applicable to a broad spectrum of tasks.

¹⁹ Now known as JANA.

²⁰ See Appendix B for detailed description of Samasource.

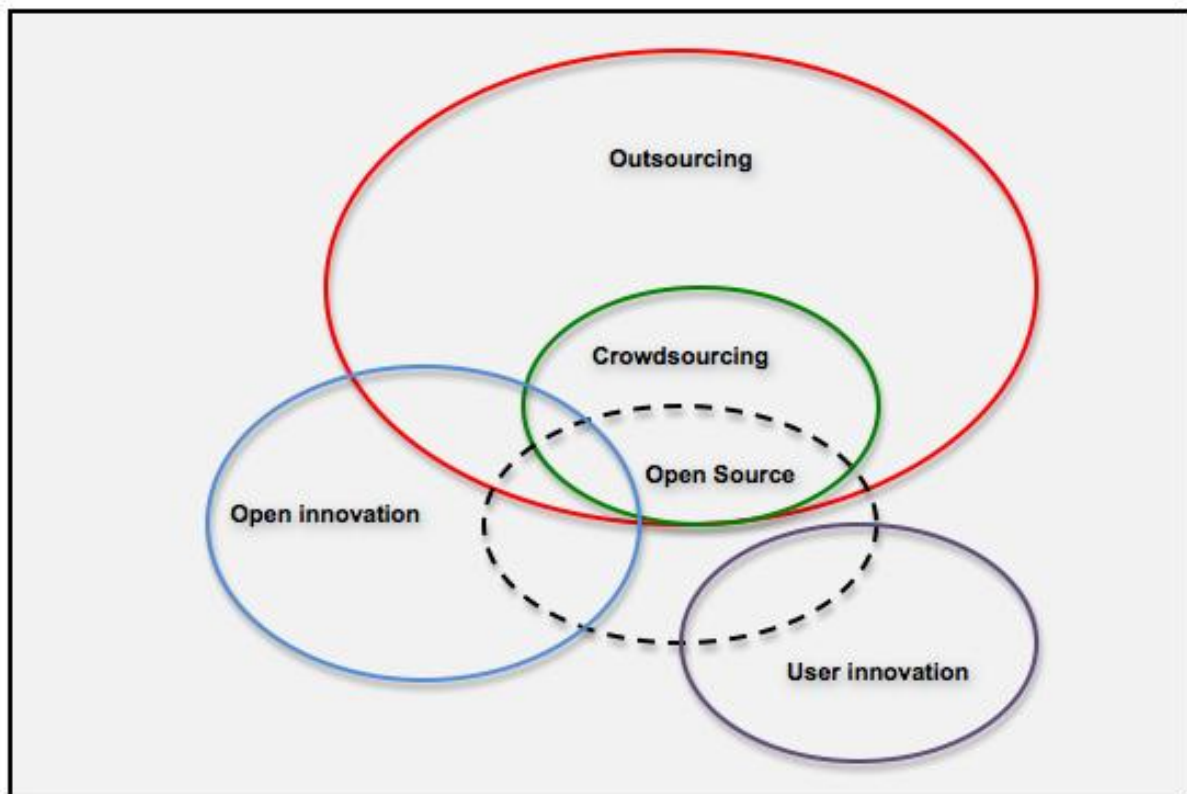


Figure 2. 4²¹: Points of intersection: Adapted from Schenk and Guittard, 2009).

²¹ “Open Source” is depicted with dotted lines, showing that it is more of an application than a concept.

Section II

2.4 Developing country context²²

Economic development growth theories suggest that developed economies differ from developing countries by much more than their level of capital or even human capital (Hoff and Stiglitz, 2000). Furthermore, the elimination of government restrictions is intended yet it seems both unnecessary and insufficient for sustained growth. Industrialised and developing countries have different production functions, and vary in terms of organisation. Thus, development is no longer viewed as merely a process of accumulation of capital. There is concern that developing nations are not afforded the opportunity to realise economic growth and social empowerment, typically enjoyed by developed economies. This is due to the lack of ICT tools, or more specifically, a limitation in Internet penetration and connectivity (Korpela et al., 2003).

Mobile telephony, unlike other forms of technology such as computers, does not necessarily require high levels of literacy on the part of users (Kyem and LeMaire, 2006). As a result, mobile phones are accessible to a large number of rural and peri-urban communities. Furthermore, mobile telephony requires only basic literacy, and can therefore be accessed by a large proportion of the population (Rashid and Elder, 2009).

2.4.1 Literacy levels and technology adoption

It has been suggested that people in developing countries need easier and cheaper access to ICTs and require specialised skills to use technology (Chabossou et al, 2008). Piccoli, Ahmad and Ives (2001) imply that literacy levels influence technology adoption and use, and this impacts capability to use the technology in question. Evidence, however, shows that little, if at all any training (whether formal and informal) is required, especially if knowledge on use of simple mobile based technologies is pushed from one group to another through an entire population. This may address the problem of illiteracy or semi-illiteracy as a barrier to technology adoption (Ngugi et al., 2010). In developing African countries such as Kenya, it has been found that the interaction of Kenyans with mobile phones without prior formal education or specialised training has become commonplace.

²² Otherwise described as Information and Communication Technologies for Development (ICT4D).

This is particularly true in rural and peri-urban communities. Stump, Gong and Li (2008), suggest that levels of education do not necessarily correlate with mobile phone adoption and that mobile telephony use requires limited knowledge. In other words mobile phone users do not necessarily require a certain level of education or training to effectively interact with mobile handsets.

There appears to be insufficient literature on the “participation intention” of peri-urban Africans in developing countries, with regard to Mobile Crowdsourcing. Moreover, mainstream Information Systems (IS) research that focuses on developing countries, particularly in sub-Saharan Africa, is rare (Sahay and Avgerou, 2002). Crowdsourcing, in an African context requires an appreciation for the impact of Mobile Telephony in the developing world. This is because due to high mobile phone penetration rates in Africa relative to low Internet penetration rates, Mobile Crowdsourcing would be more practical than internet-based Crowdsourcing.

2.4.2 The role of mobile telephony

Research findings show that approximately two-thirds of the African continent has mobile phone access²³ (Heeks, 2010). Kyem and LeMaire (2006) suggest that the use of ICTs is changing the everyday lives of Africans, with the mobile phone being an effective and enabling tool. In addition to job creation, mobile telephony can achieve what fixed telephone lines achieved in advanced economies decades ago. This refers to the widening of markets and the creation of improved information flow. In addition, mobile telephony acts as a substitute for the costly transportation infrastructure that rural Africa lacks (Kyem and LeMaire, 2006). Subsequently, the potential of Mobile Crowdsourcing in the rural to peri-urban African context as a platform for employment may be realised.

Mobile phones have received widespread attention in Africa (Kyem and Le Maire, 2006), due to the promise that wireless technology holds for social and economic development. In a number of African economies, mobile phones substitute and do not complement fixed telephone lines (Vodafone, 2005). Consequently, the potential socio-economic returns for mobile telephony are very high in a number of these economies. Unlike previous socio-economic development tools such as landlines, whose influence spanned only urban areas

²³ As of December 2008, Africa had over 240 million mobile phone subscribers (ITU, 2009). By the year 2012, it is estimated that over 350 million marginalised Africans will enjoy mobile phone subscription (GSMA, 2011).

continent-wide, the impact of mobile phones can reach all corners of the African continent without the usual costly landline infrastructure.

On the African continent, 29% of roads are paved, and as a result, barely a quarter of the population have access to urban infrastructure. For every hundredth person, there are less than three landlines available (ITU, 2009). There are at least 10 times as many mobile handsets as there are landlines in sub-Saharan Africa (ITU, 2009). Mobile telephony therefore, brings new possibilities to the African continent. Across rural to urban and rich to poor parts of the continent, mobile phones connect people to each other, in addition to markets and services. In rural to peri-urban Africa, mobile phones have led to a decrease in communication costs, thus allowing people and organisations to send and receive economic, social, and political information in a short time and at a low cost. As telecommunications markets grow, mobile phones in Africa are transforming from basic communication tools into platforms for service delivery. This has led to a paradigm shift in development related to mobile telephony. Mobile phones are now viewed as tools that could potentially transform lives through innovative services (Aker and Mbiti, 2010).

In Africa, mobile phone subscription has substantially increased given the widespread poverty in Sub-Saharan regions, and relative cost of a mobile handset. This is helped by the fact that Africans in rural communities share mobile phone resources, and hence costs. In a country such as Kenya, mobile phone penetration is close to 50%, and continues to increase (Aker and Mbiti, 2010, p.211). The rapid adoption of mobile phones has generated heightened anticipation of its impact on socio-economic development on the African continent. Despite this, there have been major inadequacies in mobile phone coverage on the African continent, and this has prompted concerns of a digital divide (Aker and Mbiti, 2010). In 1999, most African countries did not have mobile coverage, and only Egypt, Morocco, Senegal and South Africa had coverage rates of up to 40%. By 2008 however, more than 65% of the African population had mobile phone access. Additionally, 95% of the population in Northern Africa is covered, whereas sub-Saharan Africa has a coverage rate of 60%. On the whole, mobile phone coverage is lower in Ethiopia, Somalia, and landlocked nations in Central and West Africa (Aker and Mbiti, 2010).

While the telecommunications industries in the United States, Canada, and Europe invested in landlines prior to making the switch to mobile phone networks, the mobile phone has effectively overtaken the landline in Africa. A full landline network can be restrictively

expensive, especially in countries with poor infrastructure, and low population densities. Between 2006 and 2009, the percentage of the Kenyan population with mobile phone coverage remained relatively constant, but this number of subscriptions tripled, rising to 17 million subscribers by 2009 (GSMA, 2011). Currently, based on initial projections there are approximately 20 million subscribers²⁴ in Kenya alone (CCK, 2010).

2.4.3 Socio-economic benefits of mobile telephony

There are five mechanisms through which mobile phones can provide benefits to consumers and producers in sub-Saharan Africa. Firstly, mobile phones can enhance access to and utilisation of information, thereby decreasing costs, and boosting market efficiency. Secondly, increased communication should enhance firms' productivity by enabling them to improve management of their supply chains. Thirdly, mobile phones lead to job-creation, which leads to an increase in the demand for mobile-related services. These provide income generating activities in rural to peri-urban areas. The fourth aspect stems from the fact that mobile phones facilitate communication among social networks, thus reducing households' exposure to risk. Finally, mobile phone-based development projects, sometimes described as "m-development", have the potential to facilitate the delivery of financial, agricultural, health, and educational services. In all of these cases, evidence on the impact of mobile phones in Africa is fairly recent, and so available studies focus on specific sectors, countries and examples (Aker and Mbiti, 2010.p.213).

At present there is limited quantitative research on the linkages between mobile phones and labour market outcomes in Africa (Aker and Mbiti, 2010). Job creation is an example of one of the most significant economic impacts of mobile telephony on the African continent. With an increase in the number of mobile phone companies and widespread mobile phone coverage, demand for labour within these sectors is bound to increase. Furthermore, There appears to be limited research on the impact of mobile phones on both informal and formal creation of jobs.

While job creation in various sectors is expected, many of these employment opportunities are directly related to the specific business strategies of mobile phone operators on the African continent. For instance, most Africans use pre-paid phones. This meant that mobile phone operators had to create phone credit distribution mechanisms in conjunction with both

²⁴ This figure has since been exceeded.

the informal and formal sectors. As a result, small-scale vendors who previously sold household goods now sell mobile phone units (airtime), typically in small denominations. In the early phase of mobile telephone penetration, entrepreneurs started-up businesses to rent mobile phones, particularly in rural communities. There appears to be limited research on the impact of mobile phones on both the informal and formal creation of jobs. African nations, donors, mobile phone operators and Non Governmental Organisations (NGOs) have not ignored the potential of the “mobile phone” usage as an economic development tool.

Mobile phones have also been utilised to promote good governance, mainly through education of voters and citizen based monitoring, described as forms of Crowdsourcing. This act of outsourcing of tasks to a large number of people in a particular community, has for example, allowed regular citizens to report election fraud and violence through Short Message Service (SMS) text messages or calls to a centralised server. In Kenya, such a tool was mapped via a software platform known as “Ushahidi²⁵” to enable Kenyans to report post election violence through voice and text messaging, while using Internet applications to map it, in real time, to the entire global community. However, such systems depend solely on verification by other users, which raises possible questions as to their levels of accuracy (Aker and Mbiti, 2010).

Limited quantitative evidence on the influence of mobile-based services has shown that the mobile phone can potentially serve as an empowerment tool for development in Africa. Firstly, while economic studies focus on the effects of mobile handsets in specific markets, there is scarce evidence that indicates that this directly translates into economic benefits. Secondly, while the use of mobile technology could potentially contribute significantly to economic growth, there is a tendency of development agencies and donors to jump on the technology bandwagon, without a proper prior assessment of its consequences. Finally, communications technology is not a substitute for education, and physical infrastructure such as power, road networks and water supply, especially when access to mobile telephony and related services still remains unreachable for the majority of low income citizens, particularly in rural African communities.

Research has shown that people are likely to adopt whatever medium of communication is available, in any given time period, provided that its convenience, accessibility and affordability is guaranteed (Gillwald and Esselaar, 2005; Vodafone, 2005). Mobile telephony

²⁵ “Ushahidi” means “testimony” in Kiswahili. See Appendix B for description of platform.

is believed to be an enabler of economic enhancement and that the real benefits that accrue from its adoption and uses are indirect. Mobile phones may play a crucial role in transforming the way individuals', businesses and societies work, communicate and co-exist (Gillwald and Esselaar, 2005; Vodafone, 2005). Despite its promise, Mobile Telephony is not a means to an end. Under-utilisation of mobile phones by African communities can be detrimental to the fulfilment of its potential as an enabling technology tool. What is needed is an integrated development plan that will effectively use mobile telephony in productive ventures (Gillwald and Esselaar, 2005; Vodafone, 2005). One such initiative with potential for socio-economic development in the long term is Mobile Crowdsourcing.

Projection for future growth in Africa's mobile phone penetration was estimated to have risen from 15.37% in 2005, to 31% in 2011, with the number of mobile phone subscribers on the continent estimated to grow at an average rate of 13% between 2007 and 2011 (Bavni, Chiu, Jankiram and Silarzky, 2008). Additionally, lessons can be learnt from the Kenyan experience, which demonstrates that early adopters of mobile telephony are promoting its use in the developing world (Ngugi et al, 2010). This presents a unique opportunity for Crowdsourcing-based platforms to make use of the benefits of Mobile Telephony in the developing world, particularly among rural to peri-urban Africans.

2.5 Summary

This section has provided the contextual background to this study. It has argued for the case of Mobile Crowdsourcing in a developing country context, supported by research findings on mobile telephony and its impact on the developing world. The next section introduces the Kenyan context which informs this study.

Chapter 3: Kenya

3.1 Introduction

This chapter discusses the Kenyan context, and presents a historical, geographical, economic and demographic background of Kenya. It also discusses the concept of “mobile money”, M-Pesa, Mobile Crowdsourcing and Txteagle. The chapter is then concluded.

3.2 Overview

The Republic of Kenya is a country situated in Eastern Africa that lies on the equator. It is in close proximity to the Indian Ocean, which is due South-East. It shares common borders with Tanzania to the South, Uganda to the West, South Sudan to the Northwest, Ethiopia to the North and Somalia to the North-East. It covers a land area of approximately 580,000 square kilometres (NCAPD, 2010) and has almost 41 million people, representing 42 distinct cultures. The capital city of Kenya is Nairobi, which acts a regional economic hub. Kenya’s second largest city is Mombasa, a global tourist destination along the Indian Ocean coastline. Another prominent city is Kisumu, on the shores of Lake Victoria, the second largest fresh water lake in the world and the source of the River Nile. Figure 3.1 depicts a map of Kenya.



Figure 3. 1: Map²⁶ of Kenya

²⁶ Map shows borders and provincial boundaries. Source of map: Nations Online Project (2011) (www.nationsonline.org).

3.3 Historical background²⁷

Kenya, formerly known as British East Africa (a colony of the British empire), gained independence in 1964, and has since been a sovereign state. Under the old constitution, Kenya comprised eight provinces headed by a provincial commissioner (appointed under the authority of the president). These provinces were subdivided into districts. As of the 1999 national census, there were 69 districts in Kenya. These districts were then subdivided into 497 divisions and these divisions were then subdivided into 2,247 locations, and subsequently 6612 sub-locations. Nairobi is designated as a full administrative province, among Kenya's eight main provinces. The other seven are the Central, Coast, Eastern, North Eastern, Nyanza, Rift Valley and Western provinces. Currently there are 210 constituencies in Kenya, dispersed across all eight provinces.

3.4 Geographical background

Kenya has distinct geographical features such as the snow-capped Mount Kenya, the second highest peak in Africa after the famous Mount Kilimanjaro in Tanzania. Mount Kenya stands at 5200 metres above sea level (NCAPD, 2010). Kenya also boasts the Great Rift Valley, which runs from the Cape all the way to Israel. Furthermore, the Wildebeest migration in the Masaai-Mara is described as the "eighth wonder" of the world. Kenya has 25,334 km² of national parks, in addition to an extensive 536 km coastline that borders the Indian Ocean, and typically enjoys a tropical climate, characterised by warmth and humidity all year round.

3.5 Economic background

Kenya's economy is the largest by Gross Domestic Product (GDP) in East and Central Africa. Agriculture is a major employer and the country traditionally exports tea and coffee, and more recently fresh flowers to Europe. The service industry is a key driver of the local economy, with the telecommunications industry contributing not less than 62% of the GDP. As East and Central Africa's largest economy, Kenya has rapidly expanding telecommunications and finance sectors that now contribute 62 % of the GDP.

A small portion of the population has faced starvation and drought and has been heavily dependent on foreign assistance as a result. This is however, being addressed by the Kenyan government. Industry and manufacturing represent the smallest sectors, collectively accounting for 16% of the national GDP.

²⁷ Additional perspective available on: www.bbc.co.uk/news/world-africa-13681341.

The agricultural sector contributes 25% of the GDP, while employing 75% of the labour force (this continues to be an attribute of developing economies that have not yet attained sufficient levels of food security, as an important catalyst for economic growth). Kenya's main export commodities are coffee, tea and horticultural products, with Kenya being the top global flower exporter.

Kenya's economy grew at a rate of more than 7% in 2007 and this has led to a large reduction in its foreign debt. However, Kenya's economic growth rate had slowed down to 2.6% in 2009, but has risen steadily to 4% as of 2011 (NCAPD, 2010). As of May 2010, estimates for economic growth were positive, with growth rates of between 4% and 5% being forecasted. This growth has been attributed to expansions in the tourism, telecommunications, transportation and construction sectors. Additionally, recovery in the agricultural sector has been noted. The World Bank predicted growth of 4% in 2010 and a potential 4.9% growth rate in 2011.

One of the major challenges Kenya is facing is unemployment, as the limited number of income generating opportunities have not kept pace with a growing labour force. Moreover, it is estimated that 46% of the population live in poverty (below USD 2 per day). With a high inflation rate of 19% and the rising cost of living, the unemployed segment of the population who are predominantly the youth are vulnerable to economic shocks. The Government's long-term economic policy proposes to transform the youth into a globally competitive and prosperous group with potential to hasten development in Kenya.

3.6 Demographic background

Kenya has a youthful population with 73 % of Kenyans below the age of 30. Young people below 15 years account for 43% of the population (Kenya Population Data Sheet, 2011), while those aged 15-34 years make up 35.4% of the population. The population stood at 38.6 million people in 2009. The current population stands at over 40 million people. It is estimated that 1 million people are added to the population every year. The annual rate of increase at more than 3.6% per annum is considered high and economically unsustainable (NCAPD, 2010). Rural to urban migration by youth in search of employment has resulted in the unprecedented growth of urban and peri-urban areas. The 2009 census revealed that 67.7% of the population was rural while 32.3% was classified as urban.

Kenya's rising urban population is ethnically diverse, with the two official national languages being English and Kiswahili. Peri-urban Kenyans are fast acquiring similar traits to their urban counterparts due to migration to the capital Nairobi, and close proximity to urban centres in general. Rural Kenyans are not as multi-lingual as either peri-urban or urban Kenyans, and mostly speak traditional languages. However, due to the urbanisation of rural communities as a result of nationwide penetration of mobile technology, rural communities are becoming more peri-urban. The largest of these are the Kikuyu, Luhya, Luo, Kamba, and Mijikenda tribes.

3.6.1 Education

Kenya has a tiered education system comprising eight years of primary education, four years of secondary education, and between four and six years of university education, depending on the course. Progression through this education system is regulated through nationwide examinations at the end of primary and secondary levels of education.

Following the introduction of free primary education, Kenya has attained gender parity in enrolment at primary school level. However, access to and financing of secondary and post-secondary education is still a major challenge, as many youths lack access. Recent national surveys on the socio-economic status of the population reveal that literacy levels are rising in both rural and urban areas. The overall national literacy rate is 78.8%. Rural literacy stands at 71.8%, whereas the urban literacy rate is 87.7%, and Kisumu has a literacy rate of 98.2%. The overall literacy rates for females are lower (71.6%) as compared to males (82.6%). In urban areas, 91% of the males are literate as compared to 84.4% for females. Similarly in rural areas, 78.6% of males are literate as compared to 65.4% for females (KNBS, 2011).

3.6.2 Gender

The 2009 National Census showed that gender distribution of the male-female population was more or less even at 50%, with a slightly higher physical number of females. When it comes to enrolment and completion rates in formal education, males have distinct advantage at all levels except primary. Despite high unemployment levels among the youth, gender parity is skewed in favour of males who have employment opportunities, and hence higher income levels. Results of the recent socio-economic status of Kenyans revealed that the section of the population hardest hit by poverty comprises women, unemployed youth, orphans and people with disabilities. It has also been observed that, despite provisions in the

new constitution ensuring gender parity in all aspects of national life, many cultures do not allow women to own assets such as land or even livestock. Given the relatively high literacy rates (the minimum skill for operating a mobile phone), the potential to transform both the livelihoods of women and youth and other vulnerable groups still remains unfulfilled. Table 3.1 presents a summary of key facts and figures.

Table 3. 1: Kenya Facts and figures	
General profile	
Official name	Republic of Kenya, formerly British East Africa. Declared a republic on 12 th of December 1964.
Capital city	Nairobi (2.1 million people)
Other cities	Mombasa (665,000 people), Kisumu (504,000 people), Nakuru (1.2 million people)
Government type	Republic (Gained independence on the 12 th of December 1963). Has a progressive new constitution. Country advocates for multi party democracy.
Geography	
Location	Eastern Africa, bordering the Indian Ocean, between Somalia and Tanzania.
Area	582,646 square kilometres
Water (%)	2.3%
Terrain	Has a low coastal plain on the Indian Ocean in a series of mountain ridges and plateaus, which soar 3000 metres (9000ft) high, in the centre of the country. The Rift Valley bisects the country above Nairobi, extending to a broad arid plain to the North. Mountain plains cover the South before descending to Lake Victoria's shores in the West.
Highest altitude	Mount Kenya (Kirinyaga, 5199 metres)
Climate	Varies from the tropical South, West, and Central regions to arid and semi-arid in the North and North-East.
Natural resources	Wildlife and land
Demographics	
Nationality	Kenyan (s)
Population	2011 estimate: 41 million, 2009 national census: 38.6 million
Ethnic groups	African: Kikuyu 21%, Luhya 14%, Luo 13%, Kalenjin 11%, Kamba 11%, Kisii 6%, Meru 5%. Non-African: Asian, European, Arab, 1%
Religions	Protestant, 30%, Roman Catholic, 30%, Muslim, 20%, indigenous beliefs, 10%
Languages	English and Kiswahili are main languages. There are an additional 40 local ethnic languages.
English literacy	59%
Employment	15.8 million employed, 2.2 million seeking work, 12.8 million economically inactive
Life expectancy	53 years
Population not meeting daily food needs	46%
Economy	
Industries	Agriculture/livestock, tourism, and manufacturing.
Currency	Kenya Shilling (KES/Ksh)
Per capita income	USD 700
Gross National Product (GNP)	2011 estimate: USD 70.6 billion
Gross National Income (GNI)	USD 21 billion
Human Development Index (HDI)	0.509
Annual growth rate	4%

Source: Nations Online Project (2011) (www.nationsonline.org).

3.7 Mobile money

3.7.1 “M-Pesa”: The success story of mobile money in Kenya

From 2005, mobile finance applications (m-money or m-banking) have emerged in various developing countries. These systems usually involve interfaces that enable a number of financial transactions to be made through mobile phones, including the transmission of airtime, the payment of bills, and the transfer of money between people. There are also a few “m-money” systems at present, in developing countries that allow international money transfer mechanisms.

Initially devised to enable users to transfer small amounts of airtime to others, transfer mechanisms such as the Safaricom²⁸ service “Sambaza” or MTN Rwanda’s “me2u” systems quickly became popular throughout East and Central Africa. It was common practice in a number of rural communities for mobile phone users to accept an airtime transfer to their handsets as a form of payment or cash payment equivalent. The popularity of airtime transfer systems in Eastern Africa and the utilisation of airtime as a substitute for physical currency in rural areas led local mobile phone operators to allow users to transfer electronic cash in addition to airtime.

The Kenyan money transfer platform, “M-Pesa”, has probably received the most attention. Launched in 2007, “M-Pesa” (“M” for mobile, “Pesa” for money in Swahili) is a mobile phone service that allows a number of transactions, such as the purchase of airtime, transfer of money and payment of bills, to be made. In its first month of launch, Safaricom had registered over 20000 “M-Pesa” customers, well ahead of financial projections. By September of 2009, “M-Pesa” had 8 million registered subscribers and a network of 13000 agents.

“M-Pesa”, the first service of its kind, was initially developed by Safaricom in Kenya to enable any mobile phone user to send or receive currency (Kenya Shillings) from another mobile phone subscriber. A recipient can withdraw money at any Kenyan postal office, or from one of the many registered “M-Pesa” agents” nationwide. Previously, close to 40% of Kenyans had never used the service to send and receive money. From its launch date, the total amount of money transferred through “M-Pesa” was US\$ 3.7 billion, close to 10% of Kenya’s yearly GDP (Safaricom, 2009). As of July 2007, there were 268, 499 registered “M-

²⁸Safaricom is the leading mobile phone operator in Kenya.

Pesa” customers and by July 2009, the number of registered customers was 7,387,980. This is approximately 21% of a population of over 30 million Kenyans covered within 2 years (Safaricom, 2009, Ngugi et al., 2010).

In no time at all, Safaricom became the largest bank in the Eastern African region and rapidly scaled to bordering countries (Eagle, 2009, p.3.). M-money technologies have been emergent in Africa, Asia and South America. “M-Pesa” and other m-money platforms have recently made the transition from purely being money transfer systems to being fully fledged payment platforms, allowing NGOs, schools, hospitals, and firms to send and receive money in the form of payment (Aker and Mbiti, 2010). Technological innovation now allows for people to benefit from cheap and effective mobile-based transaction services. “M-Pesa” represents a typical example of how low-cost approaches that make use of modern technology can enhance the reach of financial services. It is a cost effective and secure technology service (Kimenyi and Ndungu, 2009).

3.7.2 The M-Pesa mechanism

In March of 2007, Safaricom (part of the Vodafone group) deployed “M-Pesa”, as an innovative payment platform targeted at unbanked communities. The product concept is very basic, in that an “M-Pesa” user can transfer money efficiently, securely, and across large distances, directly to another mobile phone user. The customer does not need to have a bank account. The customer instead registers²⁹ with Safaricom and opens an “M-Pesa” account. This is a relatively simple registration process whereby a customer sets up this account into which they can deposit and withdraw cash at a large number of Safaricom re-sell and distribution vendors nationwide. Making a deposit is a similar process to the “topping up” of an airtime balance (pre-paid). The mobile phone number acts as the account identifier, and the user may visit the exact same location they would purchase airtime from (Vodafone, 2007).

Upon registration, the users can transfer electronic money to any other phone number on the same network. Users first transform their cash into e-money³⁰ at designated Safaricom agents, then follow simple instructions on their phones to effect transactions via their “M-Pesa” accounts. This system provides money transfers in similar fashion to banks in

²⁹ A national identification (ID) card, and a Safaricom SIM (Subscriber Identity Module) card or “Safaricom phone number” are all that is required.

³⁰ Electronic cash money.

developed nations. User accounts are secure, PIN³¹-protected, and are supported by Vodafone and Safaricom, 24 hours a day (Hughes and Lonie, 2007).

The receiver obtains an SMS text message that is delivered to a re-seller agent and “cashed in”, enabling money transfer to occur, in real-time, and over large distances. Users are also able to use their M-Pesa accounts for the purchase of goods and services. Kenya was the first country globally to use the M-Pesa service, officially launched in 2007 (Ngugi et al., 2010). One example of the practical value is the increased use of “M-Pesa” by “cab drivers”, in order to receive payment from foreign visitors, for transportation services. This is a convenient way in which electronic cash can be used instead of physical cash.

3.8 Mobile Crowdsourcing

Enabling communities to earn small amounts of money as compensation for simple task performance is not a new idea, but rather an innovative way to implement an already existing concept. Crowdsourcing works across a number of different applications. Amazon’s Mechanical Turk (AMT) for instance, is a web service that enables people to submit simple tasks, known as Human Intelligence Tasks (HITs), and get paid for successful completion. A routine task is one that can be easily completed by a human being but is typically problematic for computers. Examples include image tagging, natural language processing, and even survey responses. Most tasks require little time to complete and payments are usually made in cents (Eagle, 2009).

3.8.1 Txteagle (JANA)

Txteagle or JANA as it is currently known, is a platform that enables individuals to earn small amounts of money by completing basic mobile-based tasks on their mobile handsets for organisations who pay them in either airtime or mobile money (using services such as “M-Pesa”). This payment is supported by Txteagle, which acts as an intermediary that provides a Mobile Crowdsourcing platform for communities. Txteagle was launched in Kenya and Rwanda in 2007, in partnership with mobile phone operators Safaricom (a Vodafone subsidiary) and MTN Rwanda. In East Africa, over 90% of the population occupy an area in

³¹ Personal Identification Number.

which there is GSM³² reception, and mobile phones are expected to serve as a digital equivalent of conventional wallets (Eagle, 2009).

There is a high level of dependence on mobile telephony by many people, especially in order for them to do their jobs. For example, road construction workers throughout the Kenyan capital of Nairobi no longer need to congregate in central locations to be collected and taken to work sites. Instead, daily labour is now organised via SMS³³ technology. With unemployment levels rising to close to 50% in Kenya, there are still hundreds of millions of mobile phone users (Eagle, 2009) in the developing world who are unable to consistently find work. In Kenya for instance, unemployment levels have risen close to 50%. Given high rates of unemployment and sources of marginal income, the majority of the more than 2 billion mobile phone users that currently live in the developing world benefit greatly even from an extra dollar a day (Eagle, 2009). The next section discusses mobile-based work.

3.9 Mobile-based tasks

Human beings can easily outperform computer systems in “simple task” performance. This section discusses some key mobile-based tasks (text and voice based), which can be completed on every one of the 4 billion GSM phones (Eagle, 2009) in use globally. This offers users a practical way in which they can use their mobile handsets to earn mobile money or airtime.

3.9.1 Transcription

The global transcription market was expected to grow to US\$ 18 billion as of 2010. With currently in excess of \$US 12 billion in annual revenue, standard rates in the medical transcription industry are \$100 for every 1000 lines of text, or approximately 10 cents for every 65 character lines, with an average accuracy rate of 98%. Using SMS concatenation, it has been shown that 5 lines of audio text can be handwritten and copied into an SMS text message in less than 2 minutes (Eagle, 2009). Payment of proficient users would amount to up to US\$ 3 per hour, and this drops costs to 2 cents per line. Despite the collection of a full (100%) overhead to cover payments to the mobile phone operator in a specific region and partnering organisations, overall costs are reduced by more than 60 %, compared to current

³² GSM stands for Global System for Mobile Communications, an industry standard developed by the European Telecommunications Standards Institute (ETSI) to describe technologies for second-generation (2G) digital cellular networks.

³³ SMS stands for Short Messaging Service.

global transcription rates. This corresponds to annual cost savings within the medical transcription sector amounting to over US\$ 7 billion (Eagle, 2009).

3.9.2 Software localisation

Kenya has 60 distinct languages and cultures. Software companies find it increasingly difficult to incorporate these languages into their interfaces because few effective mobile-based translation services are in existence at present. Txteagle for instance, has devised a digital “phrase book” in Kenya, made up of relevant words in every Kenyan language, and as of 2009, Txteagle users in Kenya have been able to translate these words into more than 15 local languages. This is one way in which a rural or peri-urban community can be utilised as a knowledge resource and paid for task performance via mobile handsets (Eagle, 2009).

3.9.3 Citizen journalism

Citizen journalism is a relatively old concept, and as yet it has not had a profound impact within the developing world, due in part to low Internet penetration and literacy rates. Furthermore, the need for compensation is critical to aspiring journalists in the developing world. Through the use of mobile payment platforms (such as M-Pesa) mobile phone users can submit a story³⁴ for free and have them paid for their contribution directly on their mobile-handsets (Eagle, 2009).

3.9.4 News translation and sentiment analysis

Commercial products are advertised online thousands of times a day in various languages. Gauging the perceived value of these products provides critical branding and marketing information for organisations. Txteagle proposes to ask users through their mobile handsets if a segment of text or a symbol experiences a positive, negative or neutral sentiment about a particular brand. This creates new opportunities for marketing and advertising, and enables communities to actively engage as market consumers, for mobile-based pay (Eagle, 2009).

3.9.5 Surveys and market research

Administration of surveys in remote areas in the developing world is a costly undertaking, due to poor road networks. Despite this, in a country such as Kenya, where even the remotest areas have GSM reception, it is possible to administer surveys using SMS text messaging.

³⁴ “Ushahidi” (see Appendix B) is a classic example of Mobile Crowdsourcing, which allows for citizen journalism. Mobile phone users are allowed to provide first hand accounts of any occurrences within their communities, and submit a news story to a mobile platform.

Phone-based surveys are an efficient and economical method of collecting a wide variety of information including market research, census, health, activity and commerce data. While there is no perfect response when assessing individual opinion, Txteagle have devised a system whereby it is possible to discern (via estimation) from any mobile phone user what the average response from any individual within their community is likely to be (Eagle, 2009).

3.9.6 Future tasks

The performance of voice-enabled tasks for use during off-peak hours is being mooted, to take advantage of periods when network bandwidth is unused or usage is very low. One such task with future potential could be the rating of radio-commercials, as mobile-based tasks. These ratings would be incorporated into filtering mechanisms³⁵ to provide subscribers with targeted advertisements. In addition, in conjunction with Nokia, mobile-based tasks based on speech recognition are being developed. Eventually it will be possible to complete online-based tasks on mobile handsets with Internet capability (Eagle, 2009). This is devised to capitalise on the growth of the mobile web in many areas in the developing world. Tasks may range from auditory information for language transcription to image recognition tasks for video security monitoring, or even extensive text-based analysis. This can only be realised if a Mobile Crowdsourcing intermediary or platform such as Txteagle works closely with mobile phone operators in a number of developing countries to offer “bandwidth-rich” services, especially during “off-peak” hours (Eagle, 2009).

3.9.7 System design

Compared to other Crowdsourcing platforms, such as Amazon’s “Mechanical Turk”, a passive service, Txteagle is an active service (Eagle, 2009). In other words, this system is designed to match the most appropriate mobile-based task to be performed by a “mobile worker”. It then customises the task difficulty for a specific user. Furthermore, Txteagle works by producing high-quality task responses in a short time frame. With increased task performance by any mobile worker, the system acquires information on perceived areas of skill of the “mobile worker”, and builds a knowledge database of competencies. It then uses this iterative information for continuous task improvement.

³⁵ Specially designed algorithms.

3.9.8 Improving Task Accuracy Through Repetition

In order to ensure thorough task completion, the same task is sent out repeatedly to multiple independent mobile phone users and refined each time a response is received. This is made possible through a specially devised mathematical algorithm, which means that all received responses can be gathered, and accuracies inferred for every task response per user. It takes into account that each and every response received may be from an error-prone user. This user's accuracy may be drawn from a generated distribution of accuracies based on responses received (Eagle, 2009). This mechanism works in similar fashion to majority voting, where a single collective response from a large number of users, is inferred as the most popular task based on respondent patterns. This enables a platform such as Txteagle to estimate, fairly well, the levels of accuracy per user, and therefore infer their levels of expertise. This system defines expertise as individual accuracy based on the nature of the task performed by users, while basing this definition on the response history for each user (Eagle, 2009). In essence, a ranking system, based on ranking most proficient users at the top, is devised. This means that more proficient users can perform more tasks, for more pay, on their mobile handsets.

3.9.9 Deployment

In Africa, Txteagle has been implemented in Kenya and has since launched in Rwanda. This platform has been used at local schools, among “cab drivers”, and with security personnel in a number of communities (Eagle, 2009). Groups in these communities have successfully completed language translation tasks, with accuracy levels of 75% being achieved. It has been found that high school students for example, were able to complete almost twice as many language based tasks as drivers and security guards, presumably due to their proficiency with entry of text on mobile handset keypads (Eagle, 2009).

Txteagle has paved the way for new mobile-based opportunities, enabling communities of mobile phone users to do mobile-based work for pay. Txteagle may be the first of many such services, that potentially could transform the lives of billions of people, and through this, a powerful knowledge workforce can be harnessed (Eagle, 2009).

3.10 Summary

This section has presented Kenya, and discussed Mobile Crowdsourcing within the Kenyan context. In order to predict the intention of peri-urban Kenyans to participate in Mobile Crowdsourcing, a theoretical framework informs the present study. The following section discusses this theoretical framework, including development of a conceptual model, and presentation of hypotheses.

Chapter 4: Model development

4.1 Introduction

This section discusses the theoretical framework used for this study, while justifying its selection and how it fits into the context of the study. It discusses the use of motivational theory, followed by a discussion of the Theory of Reasoned Action (TRA). These constitute core theories used for this study. The McKnight trust model, (strongly related to the TRA), Socio-Cognitive Theory (SCT), and extended Technology Acceptance Model (TAM) are discussed as supporting theories. Finally, the conceptual model for this study is presented and hypotheses are discussed.

4.2 Theoretical framework

This section discusses core theories used for this study. In addition, auxiliary or supporting theories are discussed. The rationale behind their selection for this study is also justified.

4.2.1 Motivational theory

Motivation can be described as either intrinsic or extrinsic in nature. The underlying motivations behind individual action have been studied (Deci, Koestner and Ryan, 1999). According to Lindenberg (2001), economics is based on incentives. Extra rewards increase and extra costs diminish the frequency of a particular behaviour type. In this way, Mobile Crowdsourcing may be influenced by perceived monetary reward, on the part of peri-urban Kenyans. It is also argued that there is no apparent reward but the behaviour itself (Lindenberg, 2001). This is the essence of intrinsic motivation. This type of motivation differs from its extrinsic counterpart, in that an individual performs a task purely for its instrumental value rather than out of personal interest (Ryan and Deci, 2000). A peri-urban Kenyan may partake in Mobile Crowdsourcing due to the need to develop personal skills for example. The next section discusses both intrinsic and extrinsic motivation, while drawing on Self-Determination Theory and Schwartz's Theory of Human Values.

There are ten distinct motivational goals, each classified as a personal value (Scwhartz, 1992). These are classified as power, achievement, hedonism, stimulation, self-direction, universalism, benevolence, tradition, conformity, and security. Openness values such as self-direction emphasize change, the pursuit of new ideas and independent thinking, whereas the value of conformity is based on preserving the status quo, avoiding risk, and observance of

rules and norms (Oreg and Nov, 2007). Such contradictions influence individual motivation to perform an action. This is the essence of “Schwartz’s theory of human values” (Schwartz, 1992). Based on the high prevalence of mobile technology adoption and use in Kenya, the concept of openness may be most applicable. This is because peri-urban Kenyan youths are likely to partake in Mobile Crowdsourcing, which supports the already existing mobile telephony infrastructure in a country like Kenya.

4.2.2 Intrinsic and extrinsic motivation

Intrinsic motivation refers to a situation whereby an individual performs an activity out of personal interest, and derives satisfaction from the activity itself. By contrast, extrinsic motivation, involves the existence of an external outcome such as a reward, from which satisfaction is derived (Gagne and Deci, 2005). Mobile Crowdsourcing may elicit both intrinsic and extrinsic motivation, through participation due to either perceived personal value addition, or the existence of money.

Incentives have been known to promote performance and human effort, and evidence from prior research suggests this (Benabou and Tirole, 2003). In the case of Crowdsourcing, participants can be compensated for performance of a specific task. Contingent rewards serve as a stimulus for desired individual behaviour. Effort and capability are complementary determinants of performance, and incentives may be used to influence this performance (Benabou and Tirole, 2003). The existence of money for example, may affect the participation of peri-urban Kenyan youths in Mobile Crowdsourcing. Intrinsic motivation, relates to activities that are partaken out of personal interest, whereby satisfaction accrues from a perceived sense of duty (Frey and Oberholzer-Gee, 1997). Past studies suggest that there exists “hidden costs” of reward (Frey and Oberholzer-Gee, 1997; Benabou and Tirole, 2003) and that external rewards such as money, may decrease intrinsic motivation of an individual. If an individual derives extrinsic rewards from performance of a task, then paying them may reduce their motives (which may be altruistic) (Frey and Oberholzer-Gee, 1997).

Intrinsic and extrinsic motivation are psychological, because an individual attempts to interpret signals (actions and words from others), and assess whether their personal motivational needs have been met. This aspect of motivation is cognitive (Benabou and Tirole, 2003, p.491.). Rewards are perceived to play a short-term role, and may become negative determinants once they are withheld. However, rewards (extrinsic in nature) limit individual action, reducing personal motivation to perform future tasks. It remains to be

ascertained whether or not the existence of a reward such as money, may in the long run inhibit the participation of peri-urban Kenyan youths in Mobile Crowdsourcing.

Extrinsic motivation is external in nature and is triggered by components that are external to an individual (Frey and Oberholzer-Gee, 1997). Extrinsic motivation is described as performance of an activity as a result of external pressures that impact on an individual's anxiety. This stems from a personal desire for competence and determination of oneself. Intrinsic motivation however, extends far beyond "self-determination" and involves task performance without the presence of conditions or a feeling of obligation on the part of an individual (Lindenberg, 2001).

In explaining motivation, the influence of goals needs to be taken into account. Previous studies have shown that an individual's output (quality) differs based on whether or not their behaviour is intrinsic or extrinsic (Ryan and Deci, 2002). Intrinsic motivation has emerged as a key human motivator, especially in educational circumstances, based on learning and acquisition of personal skills. In terms of Mobile Crowdsourcing among peri-urban Kenyan youths, the use of mobile handsets to perform mobile tasks may foster the enhancement of personal skills. Furthermore, intrinsic motivation leads to high quality learning and allows creativity to thrive. Individuals are therefore able to act either with disinterest or on the contrary, show a willing attitude that demonstrates a personal appreciation for value derived from a particular task (Ryan and Deci, 2002).

Ryan and Deci (2002) suggest that intrinsic motivation, which is natural, is crucial to an individual's social, cognitive and physical enhancement. This is because when individual's act on their personal interests, they can improve their knowledge and enhance their skills. In various studies on human behaviour, intrinsic motivation has been defined either from the perspective of a task arousing interest in the individual, or from the perspective of the individual being motivated to perform the task (Ryan and Deci, 2002). In terms of the developing country context of this study, the need for Mobile Crowdsourcing and related services as a means to help development, may be a sufficient motivational factor. Prior studies have also indicated that intrinsic and extrinsic motivational theories have limitations. The next section introduces Self-Determination Theory, followed by a discussion of these limitations.

4.2.3 Self-Determination Theory (SDT)

SDT views individuals' as proactive agents whose motivation levels are either encouraged or impeded by the social environment in which they live. This theory looks at "internalisation" as a process of changing external regulations into internal regulations, while integrating these regulations into an individual's "sense of self". This is directly related to the prevailing social context, which influences the extent of internalisation of the individual (Deci and Egrahi, 1994).

Integration is defined as a form of internalisation in which an individual identifies with the perceived value of their behaviour and is fully accountable for it. Thus, a process of regulation is embedded in the individual (Deci and Ryan, 1991). In essence, the perception of the potential value of Mobile Crowdsourcing among peri-urban Kenyan youths may influence present and future participation. Individual behaviour stems from the individual, meaning that it is "self-determined". An individual takes action voluntarily because of the perceived importance of the task at hand and the way in which it aligns with personal goals.

In a developing country context, the need for social upliftment or improvement of livelihood is likely to supersede any personal goals. Prior literature suggests that individual behaviour and an individual's internal state are aligned (Deci and Ryan, 1991; Kostner, Barnieri, and Zuckerman, 1992). SDT suggests that behaviours can be classified according to the extent that they are either controlled or independent. Independent or "autonomous" motivation, and "controlled" motivation are both intentional, and together they stand in contrast to "amotivation", which involves a lack of intention and motivation (Gagne and Deci, 2005). Various degrees of motivation that influence "self-determined" behaviour, form a continuum, showing motivational aspects. An analysis of Mobile Crowdsourcing from the perspective of self-determination may help explain or anticipate the potential participation of peri-urban Kenyan youths.

4.2.4 Possible shortcomings of motivation theory

There appears to be a lack of discussion in the literature on how various goals influence individual motivation. Additionally, motivation should be viewed from the perspective of goals defining a cognitive process as opposed to the aspects of either intrinsic or extrinsic motivation (Lindenberg, 2001). For instance, an individual may seek to earn money, but this does not prohibit them from enjoying themselves. This is an indicator that to assume that

either money or enjoyment are dominant factors at play is somewhat misguided. Furthermore, in various studies on intrinsic motivation, the perspectives of personal-well being and psychological needs come into play. It is argued that an individual has to move beyond needs as well as human goals, and categorise goals³⁶ as being either substantive or operational. Substantive goals touch on physical and social well-being, whereas operational goals are based on improvement of current conditions.

This is further broken down into frames, which are described as being hedonic, normative, and gain based. Hedonic frames stem from the need to feel better, while normative frames are based on taking appropriate action. Gain frames are based on improvement of personal resources. This allows for a more realistic motivation based argument, stating that intrinsic motivation can either be enjoyment or obligation based. This challenges conventional views on intrinsic motivation being simplistic in nature, when in fact it is more complex. Social Psychology research suggests that rewards may produce detrimental effects. When individuals are rewarded for task performance, they may lose interest in a particular task especially if rewards are no longer a perceived outcome. Rewards are therefore said to destroy personal intrinsic motivation (Pierce, Cameron, Benko and So, 2003). This may or may not be the case regarding participation of peri-urban Kenyan youths in Mobile Crowdsourcing. It can also be argued that motivation may be informed by reasoning. The core concept of “reasoned action” is discussed next.

4.2.5 The Theory of Reasoned Action (TRA)

The Theory of Reasoned Action (TRA), devised by Fishbein and Azjen (1975), is prominent within the field of consumer behaviour. As described by Azjen (1975)³⁷:

“A behavioural intention measure will predict the performance of any voluntary act, unless intent changes prior to performance or unless the intention measure does not correspond to the behavioural criterion in terms of action, target, context, time-frame and/or specificity”

Since human behaviour is mostly voluntary, it can be predicted accurately based on a measure of individual intention to perform a behaviour (Fishbein and Azjen, 1975, p.380). The TRA focuses on determinants in addition to performance of a single action. When determining what influences individual action, “attitude”, “subjective norm” and “intention”

³⁶ In the case of Mobile Crowdsourcing in a peri-urban context, substantive goals would be prioritised over operational goals.

³⁷ Additional references: (Azjen, 1975; Azjen and Fishbein, 1977, 1980; Fishbein, 1980).

toward the behaviour must be considered (Fishbein and Azjen, 1975). This will be examined in light of participation of peri-urban Kenyan youths in Mobile Crowdsourcing.

TRA was developed to understand and predict human behaviour (Fishbein and Azjen, 1975, p.376). This theory has its roots in the field of Social Psychology. The TRA posits that people evaluate outcomes of a specific form of behaviour and form intentions based on their evaluations, with these intentions in turn influencing their actions. Furthermore, “behavioural intention” is described as the likelihood of engagement in particular behaviour (Fishbein and Azjen, 1975, p307). An evaluation of Mobile Crowdsourcing on the part of peri-urban Kenyan youths may determine whether or not they participate. The TRA therefore indicates that intention to behave strongly influences an individual’s actual behaviour (Fishbein and Azjen, 1975, p.372).

TRA dissects “intention” as a function of formation of “attitude” towards the intended behaviour, and subjective norms that concern the behaviour. To partake in Mobile Crowdsourcing, peri-urban Kenyan youths may initially form an attitude towards participation. Figure 4.1 shows that individual “attitude” formation is influenced by individuals’ behavioural beliefs in conjunction with potential outcomes of these beliefs.

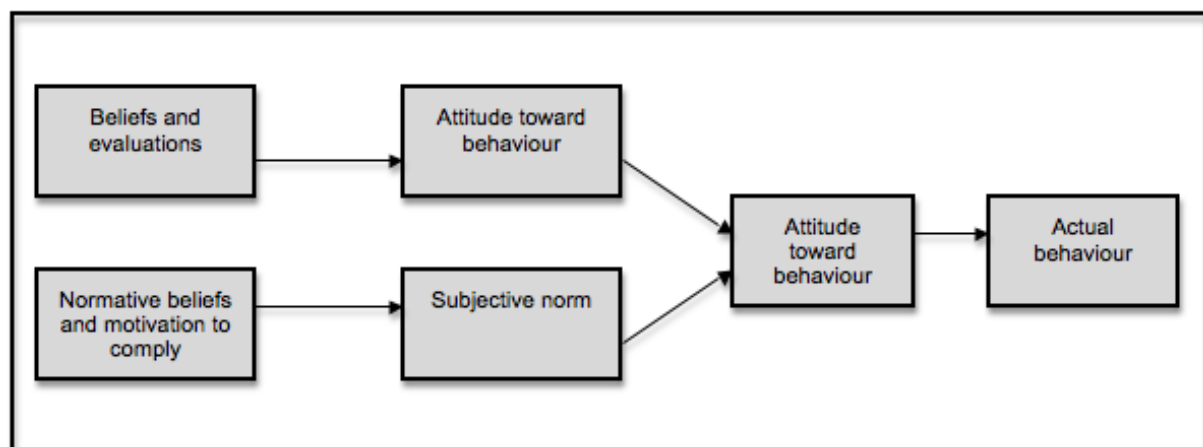


Figure 4. 1: Theory of Reasoned Action (TRA): Fishbein and Azjen (1975)

“Subjective norm” on the other hand, stems from the perception of the influence of others on individual behaviour. This is based on the motivation to comply with the expectations of others. The TRA will support some of the variables that constitute the conceptual model developed for this study. Although usable in the context of this study, this theory is not free of limitations, discussed next.

4.2.6 Possible shortcomings of the TRA

The foremost criticism leveled against the TRA is that it is limited in that it does not properly distinguish between a goal intention and a behavioural intention (Sheppard, Hartwick and Warshaw, 1998). The TRA was devised originally to deal with behaviour, and not outcomes. Furthermore, a problem that stems from the use of the TRA is that it is used to study goals for which achievement involves a degree of uncertainty (Sheppard et al., 1998, p.326). Two scenarios arise when the TRA is applied to this context. Firstly, the effectiveness of the intention-performance relation implies that individual intention is not the sole determining factor of goal attainment. More specifically, determinants such as resources, skills and collaboration play a significant role. This is not accounted for by the TRA.

Secondly, there seems to be no apparent provision in the TRA that addresses the possibility of failure to attain individual goals. This is a limitation of the Fishbein and Azjen (1975) framework. The TRA was originally devised to focus on determinants and performance of singular behaviour. Fishbein and Azjen (1975) concede that by not taking into account the possibility of choosing from a set of alternatives, a weakness of the TRA becomes obvious.

An additional limitation of the TRA is that in predicting “intention” and behaviour in situations whereby knowledge about and control of events is imperfect, it has failed to differentiate between intention to act, and the subjective estimates of whether or not an individual will act or attain a goal. The TRA does not necessarily examine individual “trusting beliefs”, and therefore a trust-based framework that is supplementary to TRA is necessitated. The McKnight model is such a model, and is discussed in the following section.

4.2.7 The McKnight Model

Trust has been viewed as a fundamental part of many relationships, both personal and commercial, over time (Li, Hess and Valacich, 2006). In recent studies, trust has been examined within the context of the use of technology platforms. A number of studies have examined consumer trust with e-vendors for instance (Gefen, Karahana and Straub, 2003; Grazioli and Jarvenpaa, 2000; McKnight, Choudhury and Kacmar, 2002). There is little doubt as to the importance of trust in Information Systems, but there has been a lack of focus on trust in the area of Crowdsourcing and by extension, Mobile Crowdsourcing. This trust model (McKnight et al 2002) emanates from prior studies on trust in the field of Management, specified within the framework of the TRA (Fishbein and Azjen, 1975). The

McKnight Model³⁸ follows the general composition of the TRA, but leaves out the dimensions of “attitude” and “subjective norm”. Figure 4.2 illustrates this.

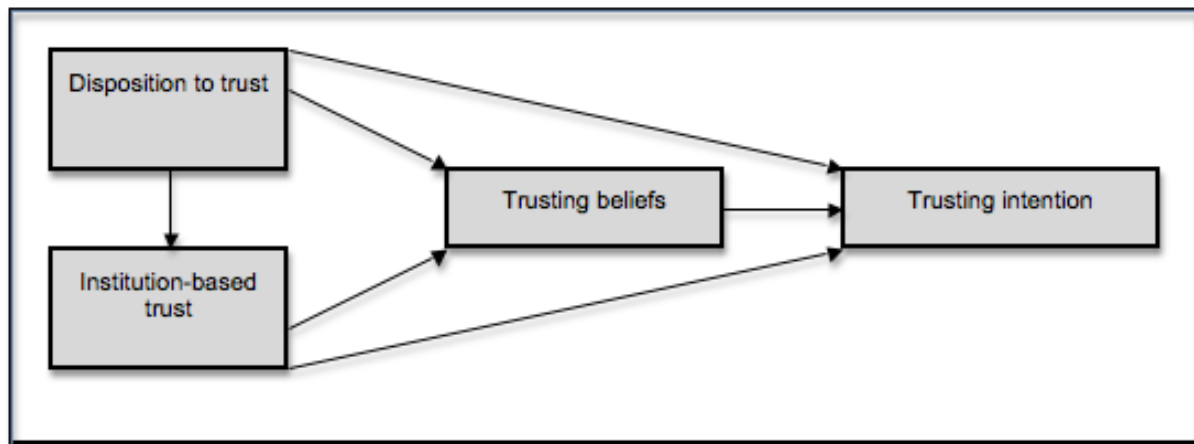


Figure 4. 2: The McKnight Model: Li et al (2006)

Trust enables consumers to overcome perceptions of uncertainty or risk (McKnight et al., 2002). They are then able to engage with vendors by making purchases and even volunteering personal information. This concept can be extended to Mobile Crowdsourcing, where there is a need for peri-urban Kenyans to interact with a mobile-based platform. One key aspect of the McKnight model, adopted for purposes of this study, is the dimension of “trusting beliefs”. This is defined as the perception of the “trusting” party that the “trusted” party has attributes that are of benefit (McKnight et al., 2002).

Previous studies on trust indicate that three trust dimensions (Mayer, Davis and Schoorman, 1995) are utilised most often, namely “competence”, “benevolence”, and “integrity”. “Competence” refers to the ability of the trusted party to do what the trusting party requires, while “benevolence” arises when the trusted party is motivated to act in the altruistic interests of the trusting party. “Integrity” refers to honesty on the part of the trusted party and whether or not they can keep promises (McKnight et al., 2002). These three trusting dimensions appear most frequently in prior studies on “trusting beliefs”, identified from at least fifteen distinct dimensions (McKnight et al., 2002). Due to the need to focus specifically on the perception of peri-urban Kenyans and the credibility of Mobile Crowdsourcing platforms, the dimension of “benevolence” has been omitted, because it addresses altruism, which is not a key feature of this study.

³⁸ In line with the context of this study, the aspect of “Trusting beliefs” provides the necessary trusting dimensions. Please note: Each aspect of trust (in its own box in Figure 7) provides similar trusting dimensions. The concept of “Trusting beliefs” is a key part of the overall framework of the McKnight model. The dimensions selected for this study are discussed in detail in section 4.3 (Research model).

4.2.8 Socio Cognitive Theory (SCT)

Socio Cognitive Theory posits that individual behaviour is partially influenced and controlled by social network systems, and individual beliefs and expectations (Bandura, 1986; Chiu et al., 2006). In a peri-urban Kenyan community for example, certain expectations of the perceived value of Mobile Crowdsourcing, may impact individual participation. In essence, if an individual is not confident in his or her own ability, then performance of intended behaviours becomes difficult (Bandura, 1982). Social influences have been found to be important determinants of human behaviour and participation. Furthermore, there has been focus on networks between individuals and assets embedded within these networks, such as “norms”, and “identification” (Chiu et al., 2006).

In previous studies that have used this theory, the impact of social network influence on individual behaviour has been ignored. In studies around virtual communities for instance, less attention has been paid to the role of the psychology of an individual and social networks in general. Additionally, there is little that explains what resources are part of a social network and how they influence individual behaviour (Chiu et al., 2006, p.1875.). SCT provides a theoretical framework within which psychological and social behaviour can be analysed. Moreover, individuals are self-organising, proactive, reflective and self regulating, and are part of a larger social network (Bandura, 2009).

4.2.9 Extended Technology Acceptance Model (TAM)

Following on from theories in Social Psychology such as the TRA (Azjen and Fishbein, 1980) and the Theory of Planned Behaviour (TPB) (Azjen, 1991), the TAM (Davis, 1989; Davis et al., 1989) has provided an effective model that explains technology use and adoption. This model suggests that user adoption of a new information system is determined by user intention, which is contingent upon personal beliefs about the system. The two beliefs of “Perceived Usefulness³⁹ (PU)” and “Perceived Ease of Use⁴⁰ (PEOU)” are key predictors that explain user intention and adoption. PEOU is believed to predict PU, and both beliefs are externally influenced. The dimension of “perceived credibility” has been introduced as a new construct, to account for the security and privacy concerns of Internet banking consumers. It has been supported as a predictor of “behavioural intention” (Wang et al., 2003). It has been

³⁹ Perceived Usefulness is defined as the extent to which an individual believes that system use will enhance their job performance.

⁴⁰ Perceived Ease of Use is defined as the extent to which a person believes that system use will be free of effort.

shown to predict and explain the “intention” of consumers to use and adopt Internet banking platforms. This is a trust related concept, which has successfully added to the TAM in prior studies on technology adoption and use, and accurately reflects perceptions of security and privacy of consumers (Luarn and Lin, 2005). This construct will be applied to the context of Mobile Crowdsourcing to ascertain the strength of its effect on “participation intention” of peri-urban Kenyan youths. Figure 4.3⁴¹ depicts this theoretical framework.

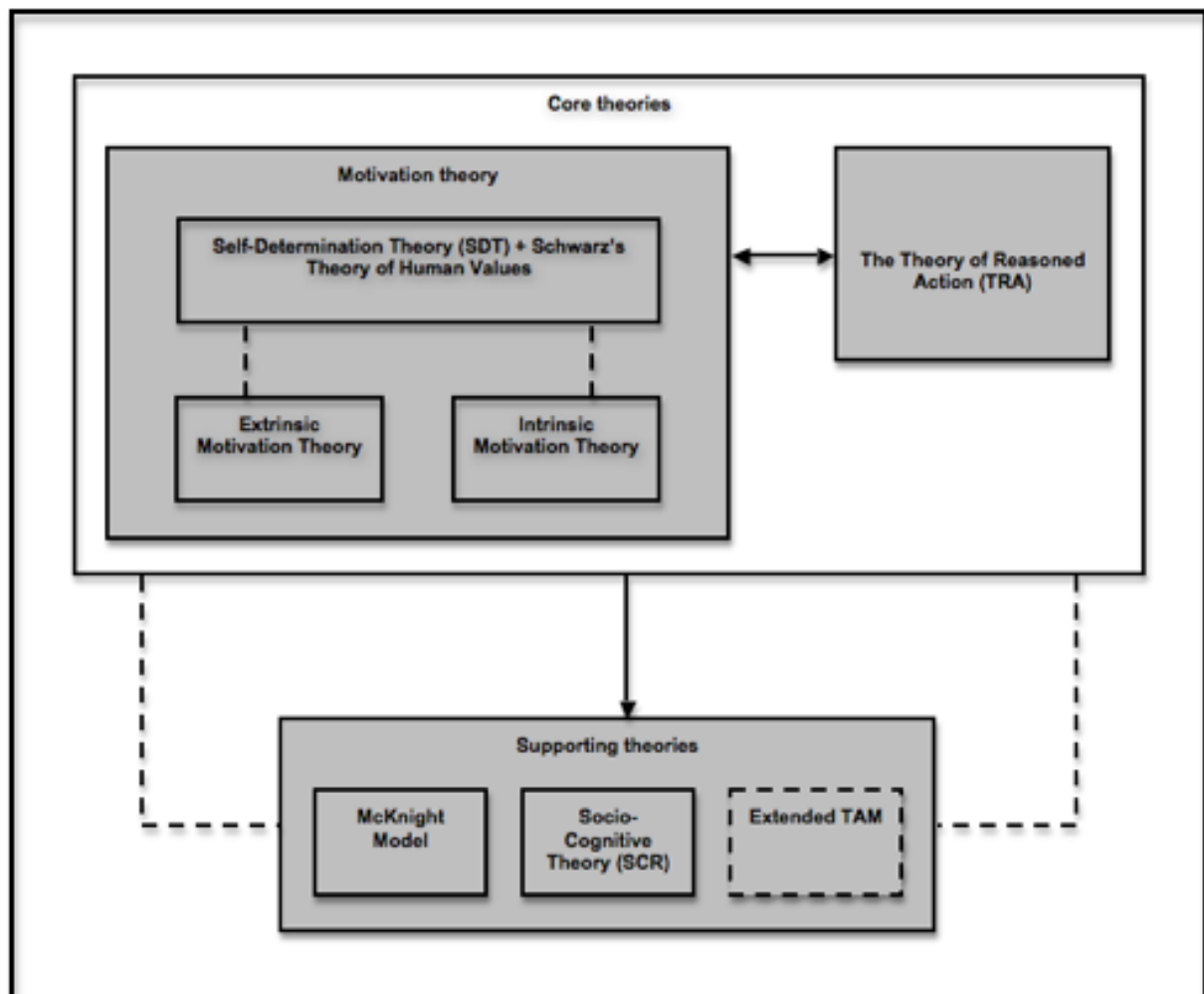


Figure 4. 3: Theoretical framework for current study. See Appendix G for more detailed conceptual overview.

From both a theoretical and practical standpoint, and following the proposed theoretical framework for this study, a conceptual model has been developed. The next section presents and discusses the development of this model.

⁴¹ Extended TAM is depicted in a dotted box to indicate that only the concept of “perceived credibility” is touched upon. In essence, extended TAM does not play a strong supporting role in this study.

4.3 Research model

4.3.1 Introduction

The proposed conceptual model for this study identifies two important groupings of variables, and three additional key variables selected from prior studies on Crowdsourcing and Technology Adoption. These variables will be used to predict the “participation intention⁴²” of peri-urban Kenyans in Mobile Crowdsourcing.

The first grouping consists of “motivational factors”, made up of “personal needs” and “external rewards”. “Personal needs⁴³” capture the “intrinsic” aspect of motivation, while “external rewards” capture the “extrinsic” aspect. “Self-development” is included as a personal need, whereas “reputation” and “monetary compensation” are included as external rewards. The second grouping consists of “competence”, and integrity”, included as “trusting beliefs”. In addition to the two groupings, “technology anxiety”, “attitude⁴⁴”, “social influence”, and “community identification⁴⁵” are additional variables that measure individual perceptions.

The conceptual model developed incorporates “trusting beliefs”, which consist of variables (“competence” and “integrity”) that constitute part of the McKnight model. “Perceived credibility” provides an additional trusting dimension, and is positioned outside⁴⁶ the trusting beliefs of “competence” and “integrity”. The core theories for this study are Motivation Theory⁴⁷ and the TRA (Fishbein and Azjen, 1975). Supporting theories for this study are SCT, the McKnight Model, and Extended TAM. SCT contributes the variables “technology anxiety” and “community identification”. The proposed conceptual model for this study is depicted in Figure 4.4.

⁴² This is the dependent variable for this study.

⁴³ In some studies on Crowdsourcing, “enjoyment” is considered an intrinsic factor. However, for this study, “self-development” was selected over “enjoyment”, because it is more critical to the context of this study. This study aims to impact a developing country setting, where technology may be instrumental to development. Therefore, the need for “self-development” is more relevant than personal enjoyment.

⁴⁴ This is the mediator variable for this study.

⁴⁵ This is the moderator variable for this study.

⁴⁶ This is because unlike “competence” and “integrity” which are drawn from the same theoretical framework, “perceived credibility” is a borrowed construct, adapted from an extended version of the Technology Acceptance Model (TAM).

⁴⁷ This study incorporates Self-Determination Theory, and Intrinsic and Extrinsic motivation theories.

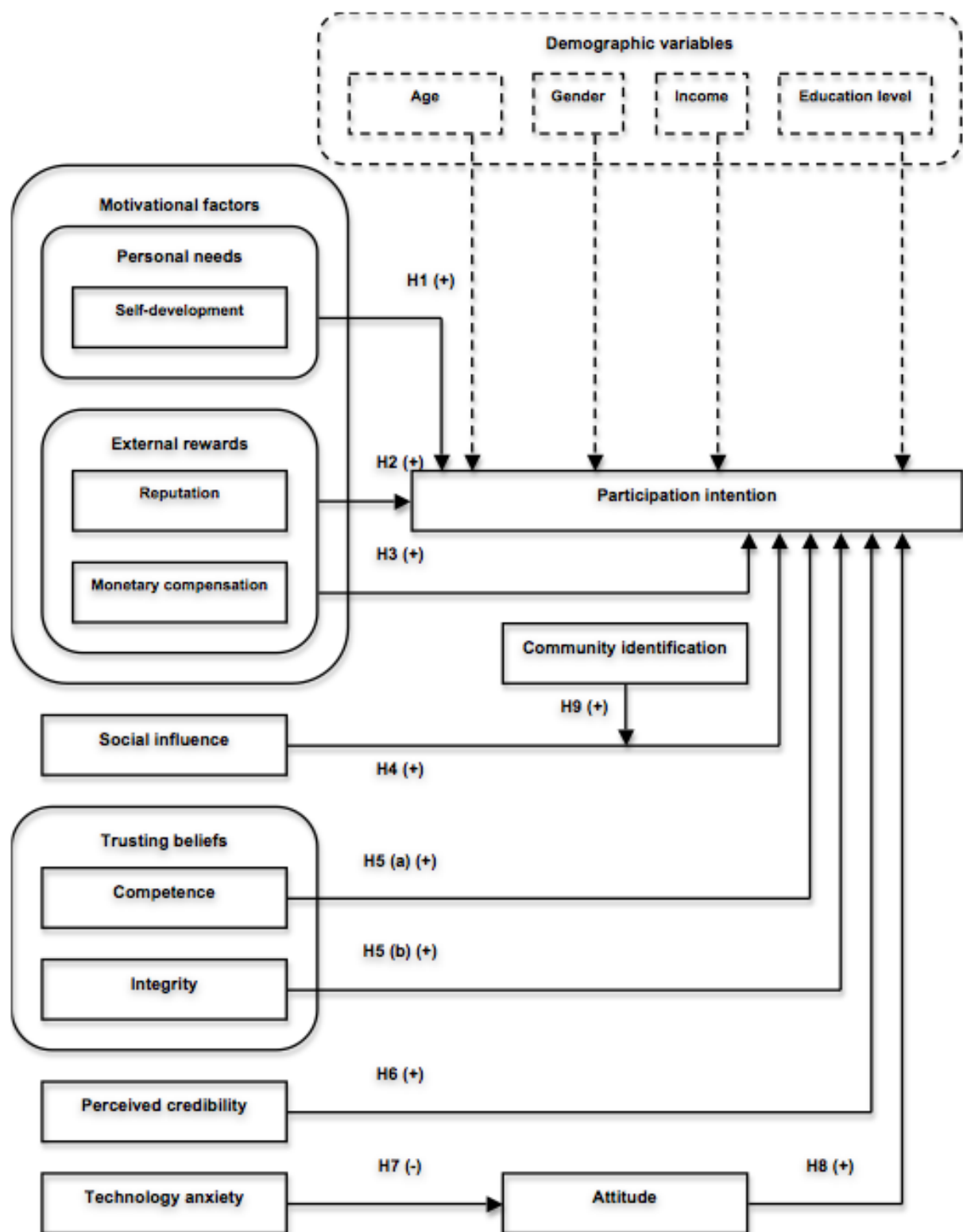


Figure 4. 4: Conceptual model for study. Note: "Demographic variables" (age, gender, income and education level) may or may not have a direct effect on the dependent variable "participation intention".

4.3.2 Participation intention

According to the TPB, there are three conceptually independent determinants of “intention”. The first is attitude toward the behaviour, defined as the extent to which an individual is favourable or unfavourable towards the behaviour in question (Azjen, 1991). The second is “subjective norm”, which deals with the perceived social pressure to perform or not perform the behaviour. The third and final antecedent of intention (Azjen, 1991) is the degree of “perceived behavioural control”, or the level of ease or difficulty of performance of the behavior. As a rule of thumb, the more favourable the attitude and subjective norm that influences behaviour, and the greater the perceived behavioural control, the greater the individual intention to perform the intended behaviour (Azjen, 1991).

The relative importance of attitude, subjective norm and perceived behavioural control in the prediction of intention, is expected to vary depending on the behaviour in question and its context (Azjen, 1991). Therefore it may be found that only attitudes have a significant impact on intentions, while in alternate situations attitudes and perceived behavioural control sufficiently account for intentions. Moreover, all three predictors may yet contribute independently. For purposes of this study, the dimensions of “attitude” and “subjective norm” are most applicable.

Technology usage and behaviour has been measured using various techniques. A good number of measures of behaviour are either “self-reported” or reflect actual behavioural patterns. Self-reporting does not necessarily portray human behaviour accurately. Theories that emerge in the fields of Psychology and Sociology, such as the TRA and its successor the TPB, provide a measure of intention that is a close approximation of actual behaviour (Fishbein and Azjen, 1975, p.334.). Furthermore, a number of studies on technology adoption have measured “behavioural intention” and not actual behaviour (Venkatesh and Davis, 2000; McKnight, Choudhury and Kacmar, 2002). Despite it being difficult to replicate human behaviour in an experiment, this study predicts “behavioural intention(s)”.

Intentions are said to capture the motivational factors that influence behaviour, indicating how much of an effort an individual is willing to exert, in order to perform the intended behaviour (Azjen, 1991). The stronger the intention to engage in the behaviour, the more likely it is that the behaviour will be performed. This variable of “participation intention”, derived from “behavioural intention” (Azjen, 1991), later adopted by Venkatesh, Morris, Davis, G.B and Davis, F.D (2003), will play the role of dependent variable for this study.

4.4 Proposed hypotheses

4.4.1 Self-development

Learning and skill development have been cited as key contributors (Lakhani and Wolf, 2005) to OSS development. According to Hars and Ou (2001), “self-development”, otherwise described, as “human capital enhancement” is highly important for software contributors, with 88% of respondents having indicated a favourable response. This construct has shown the highest percentage among Open Source motivations studied (Hars and Ou, 2001).

Various studies have shown that the opportunity to develop one’s personal skills is a key motivator in participating in Crowdsourcing initiatives (Hertel, Niedner and Herman, 2003). A typical peri-urban Kenyan may seek to participate in Mobile Crowdsourcing as a means to improve their personal skills and learn a new craft. The use of mobile telephony provides them with a means with which to harness such skills, therefore enabling them to enhance their social well-being. By performing a set of mobile-based tasks, a peri-urban Kenyan can earn money while harnessing a skill, and this is described as “self-development”. This need for self-development may influence Kenyans to participate in Mobile Crowdsourcing in the near future.

This is closely linked to the value of “self-direction”, which involves emphasis on making one’s own choices, and on learning, creating and exploring. People who identify with this value tend to appreciate creativity, freedom and opportunities for self-enhancement. Self-direction values have been shown to guide individuals’ attention and action towards intrinsically rewarding intellectual opportunities (Van Dijk and Kluger, 2004). Open source programmers for instance, may also participate in open source projects to expand their skill base. Personal skills, capabilities and knowledge are described as special forms of capital, otherwise referred to as human capital (Hars and Ou, 2001) by economists. A need for personal enhancement would lead to the intention of peri-urban Kenyans to participate in Mobile Crowdsourcing, and as a result, the first hypothesis arises:

H1: A higher perceived opportunity for “self-development” leads to a higher intention to participate in Mobile Crowdsourcing.

4.4.2 Reputation

In previous studies on blog usage, Hsu and Lin (2008) state that “reputation”, in addition to “expected relationships” and “trust” are likely to provide perceptions of social reward. Reputation in this context refers to the degree to which an individual believes that they can enhance their personal status through knowledge sharing (Hsu and Lin, 2008). According to Jones, Hesterley and Borgatti (1997), the prospect of gaining “reputation” motivates people, since “reputation” is an asset they can leverage for maintenance and achievement of status. McLure-Wasko and Faraj (2005) point out that one potential way an individual can benefit from actual participation in knowledge contribution, is if it enhances their “personal reputation” within a network. Additionally, “reputation” is an important asset that an individual can leverage to achieve and maintain status within a collective (Jones et al., 1997). The perception that knowledge contribution will enhance individual “reputation” may motivate individuals to contribute their valuable, personal knowledge to others in the network.

In the field of OSS Collaboration, “reputation building” has been extensively discussed (Perkins, 1999; Raymond, 1999; Markus et al., 2000; Lakhani and von Hippel, 2003). By contributing to Open Source Software initiatives contributors signal their status (Kollock, 1999; Raymond, 1999), identity (Hertel, Niedner, and Herman, 2003) and abilities (Osterloh, Rota and Kuster, 2003; Raymond, 1999). Reputation is found to be a motivator for content contributors as well (McLure-Wasko and Faraj, 2005).

In the case of peri-urban Kenyans, a perceived improvement in personal well-being would affect social standing in ones’ community. It is possible that if a peri-urban Kenyan has a higher “reputation” within their community. This means that individual status may influence individual perception towards Mobile Crowdsourcing.

For example, in the field OSS Collaboration, rewards or virtual tokens or the ranking of contributions among peers, lead to an increase in contributions, due to “perceived enhanced reputation” (Lakhani and Wolf, 2005). Mobile Crowdsourcing would bring about a similar predicament. Thus, the following hypothesis is put forth:

H2: A higher perceived opportunity for enhancement of “reputation” leads to a higher intention to participate in Mobile Crowdsourcing.

4.4.3 Monetary compensation

Crowdsourcing incorporates the existence of a bounty (Brabham, 2010). This bounty may assume the form of cash and prizes, but may also include an element that enables personal skill enhancement. Brabham (2010) further suggests that the opportunity to make money is a key determinant of crowd usage of Crowdsourcing applications. In a study of iStockphoto, a stock photography business, Brabham (2008b) states that the opportunity to make money or earn a bounty, and the opportunity to develop personal skills trumped other altruistic considerations. In addition, at Crowdsourcing and innovation company InnoCentive, Lakhani et al (2007) found that intrinsic motivation, in addition to financial rewards, were significant to success in problem solving. According to Cameron and Pierce (1994), reward has been known to increase motivation. Deci and Ryan (1985) further suggest that rewards given out are categorised as non-contingent or rewards offered despite user actions, and contingent, or rewards offered for engaging in a task. Additionally, performance contingent rewards or rewards offered for attainment of a specified level of performance are also awarded. As suggested by Brabham (2010), bounties⁴⁸ are instrumental to Crowdsourcing.

Additionally, the desire to make money is one of the strongest motivators for participation. Crowdsourcing is different from OSS Collaboration due to the presence of money as a component. Cameron and Pierce (2002) draw on “extrinsic motivation” theory to suggest that greater incentives create higher motivation levels. Furthermore, these incentives are financial, meaning that the opportunity to make money is an enticing prospect for any individual. Peri-urban Kenyans would be keen to participate in Mobile Crowdsourcing, since this activity enables them to perform mobile-based tasks and receive some form of monetary compensation for their work. This may be a very strong motivator, especially within the context of a developing country such as Kenya, where social empowerment is strongly linked to this opportunity for monetary compensation. The extent to which monetary compensation influences the “participation intention” of Kenyans in Mobile Crowdsourcing requires empirical observation. In order to test this relationship, the following hypothesis is proposed:

H3: *A higher perceived opportunity for “monetary compensation” leads to a higher intention to participate in Mobile Crowdsourcing.*

⁴⁸ In the context of Crowdsourcing research, bounties refer to some form of reward, even monetary.

4.4.4 Social influence

“Social influence” is defined as the degree to which an individual perceives that important others believe he or she should use a new system. “Social influence” as a direct determinant of behavioural intention is also represented under different names such as “subjective norm”. This measure contains the explicit or implicit notion that individual behaviour is influenced by the way in which an individual believes that others will view them as a result of having used a particular piece of technology (Venkatesh et al., 2003). “Subjective norm” is included as having a direct impact on “behavioural intention” according to the TRA (Fishbein and Azjen, 1975) and subsequently, the TPB (Azjen, 1991). It is further argued that people may choose to behave a certain way, despite not being favourable towards the behaviour in question. This is if they are convinced that people important to them believe that they should engage in the said form of behaviour (Venkatesh and Davis, 2000).

This stems from the motivation to comply with social pressures. This may also be dependent on voluntary and mandatory usage contexts, whereby in the case of Mobile Crowdsourcing, participation is voluntary. This means that any form of social influence that has an effect on intention is voluntary.

There is evidence that suggests that the direct effect of “subjective norm” on “behavioural intention” diminishes over time as system experience increases (Venkatesh and Davis, 2000). Furthermore, despite “subjective norm” having a significant effect on “intention” prior to system development, this effect becomes non-significant shortly after system implementation (Venkatesh and Davis, 2000). However, it is important to note that “subjective norm” is more applicable to mandatory settings, whereas the emergent related factor of “social influence” applies to a scenario in which individual behaviour is voluntary.

Prior to system development, user beliefs about systems are termed as “vague” and “ill-informed”, and hence they rely more on others to influence their intentions and by extension their behaviour (Venkatesh and Davis, 2000). After use of a system, user experience increases and subsequently, “social influence” diminishes. Hsu and Lin (2008), suggest that empirical studies have found that social norms are positively associated with individual behaviour. In addition, Brabham (2008b) suggests that individuals participate in activities as part of a need to conform to a larger community. Thus, for a peri-urban Kenyan to participate in Mobile Crowdsourcing, the perceptions of fellow members of a community could play a part in influencing their “participation intention”. This is also discussed by Fishbein and

Azjen (1975), who suggest that individuals perform an intended behaviour, based on the perceptions of people around them. To test this assertion, the following hypothesis is put forth:

H4: *“Social influence” will have a positive direct effect on intention to participate in Mobile Crowdsourcing.*

4.4.5 Trusting beliefs

Prior studies have acknowledged the importance of trust in aspects of technology adoption and use, yet there has been limited focus within specific applications of Information Systems (Li et al., 2006). McKnight et al (2002) proposed a model to predict initial user trust in an e-vendor, drawn from literature and combined with the TRA (Fishbein and Azjen, 1975). In this model, “disposition to trust”, in addition to “institutional trust” are external determinants of “trusting beliefs”, with trusting intentions then jointly determined by these three aspects. Trusting beliefs refer to situations whereby the trusting party perceives that the trusted party possesses characteristics that are beneficial. Despite the existence of several similar trusting dimensions, the key trusting components are “competence”, “integrity” and “benevolence⁴⁹”. “Competence” and “integrity” are discussed next.

4.4.6 Competence

“Competence” refers to the ability of the trusted party to do what the trusting party needs (Li et al., 2006). The trusted party in the context of this study would be a Mobile Crowdsourcing facilitator, whereas the trusting party would be the peri-urban Kenyan who intends to participate in Mobile Crowdsourcing. Additionally, McKnight et al (2002) suggest that “competence” is a determinant of trust, and trust influences consumer behaviour. In previous studies on trust, “competence” is described as part of a grouping of characteristics that enables a party to wield influence within a specific domain (Mayer et al., 1995). Furthermore, in the fields of Management and Information systems, “competence” has also been described as “perceived expertise” (Mayer et al., 1995). In this study, the domain in question is Mobile Crowdsourcing, and the party refers to the Mobile Crowdsourcing intermediary or facilitator in a given community. “Competence” will be examined in the present study within the context of Crowdsourcing. The following hypothesis is put forth:

⁴⁹ For purposes of this study, “benevolence” has been omitted, because it measures characteristics associated with perceived well-being and selflessness. This is opposed to trust in some form of behaviour or even a technology platform, which is more closely related to the present study. Therefore “competence” and “integrity” will constitute trusting beliefs.

H5 (a): *“Competence” will have a positive direct effect on intention to participate in Mobile Crowdsourcing.*

4.4.7 Integrity

Integrity refers to the level of honesty and the extent to which the trustee can fulfill its promises (Li et al., 2006). Integrity refers to keeping commitments, traits more utilitarian than altruistic in nature (Li et al., 2006). For purposes of this study, the dimension of “benevolence” will not be explored because the dimensions of “competence” and “integrity” more accurately reflect trusting perceptions of peri-urban Kenyans towards Mobile Crowdsourcing platforms.

In previous studies, an aspect described as the “trusting stance” is based on a consumer deliberately trusting a vendor to the point that the vendor proves them wrong, whether or not they are worthy of consumer trust (McKnight et al., 2002). According to Mayer et al (1995), if the trusting party perceives the trusted party’s ability, and “integrity” to be sufficient, then “trusting beliefs” are developed. When an individual exhibits their “trusting beliefs”, he or she shows a tendency to be willing to depend on others across a number of different situations (McKnight, Cummings and Chervany, 1998). Beliefs and intentions tend to be consistent (Fishbein and Azjen, 1975), and these initially remain so. This is especially true if one has no exceptional basis not to believe the other party as trustworthy. Within the context of Mobile Crowdsourcing among peri-urban Kenyans, the trusting belief of “integrity” will therefore be examined closely. The following hypothesis is put forward:

H5 (b): *“Integrity” will have a positive direct effect on intention to participate in Mobile Crowdsourcing.*

4.4.8 Perceived credibility

In Mobile Banking studies, and according to beliefs of usefulness in the TAM, usage intention of mobile-based banking can be influenced by the security and privacy concerns of users (Luarn and Lin, 2005). This “perceived credibility” is differentiated conceptually from perceived risks and trust (Wang et al., 2003). It has been found for instance, that “perceived credibility” has a significant positive influence on the “behavioural intention” to use online banking platforms (Luarn and Lin, 2005). Wang et al (2003) suggest that “perceived credibility” refers to the extent to which an individual holds the belief that the use of mobile banking poses no security or privacy threats. This concept may be applicable to the context of

Mobile Crowdsourcing among peri-urban Kenyan youths. “Perceived credibility” can also be viewed as the first dimension of trust, or the extent to which one party believes that the other party has the required expertise to perform a job reliably and effectively (Ganesan, 1994).

Ba and Pavlou (2002) suggest that “perceived credibility” is usually impersonal and relies on reputation, information and economic reasoning. For this study, “perceived credibility” is used to portray the privacy and security concerns of peri-urban Kenyan youths in Mobile Crowdsourcing. Despite ease of use and usefulness of technology in the area of Internet based banking, user perceptions of credibility or privacy, and security are influenced. It is further suggested that the majority of computer system users are somewhat ignorant about the security of the systems they use (Karvonen, 1999).

The Internet has been perceived as a threat to user information privacy in new and extreme ways, and this influences user decisions to provide personal, sensitive information to web sites for banking transaction purposes. This stems from the fear Internet banking platforms will transfer personal information or money to third parties without user knowledge or permission. This same fear is translatable to the context of Mobile Crowdsourcing among peri-urban Kenyan youths. Since a mobile financial transaction service such as “M-Pesa” will be used to facilitate payment of a workforce, peri-urban youths need to be sure that their transactions or facilitation of payments are conducted without any breach of security.

“Perceived credibility” therefore touches on the two aspects of security and privacy, identified across various studies on “intention” to adopt various technology platforms (Wang et al., 2003). Security is defined as the safeguarding of information or systems from unsanctioned intrusions. Privacy, the other aspect examined in prior studies, refers to the protection of various types of collected personal data during user interactions with banking systems. Thus, in order to measure the extent to which peri-urban Kenyans believe that Mobile Crowdsourcing will pose no threats to individual privacy, the following hypothesis is proposed:

H6: *“Perceived Credibility” will have a positive direct effect on intention to participate in Mobile Crowdsourcing.*

4.4.9 Technology anxiety

According to Venkatesh et al (2003), prior studies have shown the constructs of “self-efficacy” and “technology anxiety” to differ from variables such as “effort expectancy”, (perceived ease of use) both empirically and conceptually. “Technology anxiety” has been found to have no direct effect on “behavioural intention” (Venkatesh et al., 2003).

Previous research has established that it is important to examine the ability and willingness of customers to use these new technologies (Meuter, Ostrom, Bitner and Roundtree, 2003). Moreover, the concept of Technology Readiness (TR) has been developed to understand consumer use of new technology to attain goals (Parasuraman, 2000). Parasuraman (2000) further suggests that “technology anxiety” closely relates to Technology Readiness, described as the pre-disposition to use new technology. Similarly, “technology anxiety” describes the so-called fear, apprehension and hope felt when considering the use of technology (Cambre and Cook, 1985; Scott and Rockwell, 1997).

Studies have also shown that “computer anxiety” for instance, is in fact a common occurrence (Meuter et al., 2003). A lot of research on anxiety revolves around personal computers, yet the concept is applicable to technology tools in general (Meuter et al., 2003). “Technology anxiety” is distinct from “computer anxiety” in that it is based on the state of mind of a user when using technology tools generally. “Technology anxiety” refers to the extent to which emotions are evoked by an individual, when using a particular technology tool. “Computer anxiety” by contrast, is more context specific (Meuter et al., 2003). When peri-urban Kenyan youths use mobile phones for Crowdsourcing, their emotional responses may influence their participation. This relation may strongly depend on the attitude formation of peri-urban Kenyans with respect to Mobile Crowdsourcing. Thus, the following hypothesis is proposed:

H7: *“Technology anxiety” will have a negative direct relationship with attitude towards Mobile Crowdsourcing.*

4.4.10 Attitude

“Attitude” stems from the personal belief that performance of intended behaviour will result in a specific outcome, based on an individual’s evaluation of whether or not this outcome is desirable to them (Taylor and Todd, 1995). This dimension is considered to be part of an individual’s belief structure (Ajzen, 1991). Attitude predisposes individual actions (Ajzen,

1991), which are consistently favourable toward the intended behaviour, which in the context of the present study is defined as Mobile Crowdsourcing. In order to appreciate the role “technology anxiety” plays in this study, it is important to consider the potential mediating effect of “attitude” and how it enhances the association between “technology anxiety” and “participation intention”.

Three basic features of “attitude” have been identified, and these are the notion that an individual learns an attitude, that the attitude influences action and that this action favours the intended behaviour. Moreover, an individual needs to be stimulated to act. However, this description of “attitude” is somewhat ambiguous, because it does not distinguish “attitude” from other concepts such as individual motives or habits (Azjen, 1975, p.6.). This can be circumvented by specifying the extent to which behaviour is favourable or not. An additional dimension of “attitude” involves the extent of consistency between different forms of individual behaviour under identical circumstances.

Additionally, various forms of behaviour across different time-spans are also possible. The extent to which this behaviour is favourable is constant, and the behaviour is perceived to be consistent. Thus, individual actions are also dependent on both occasion and prevailing context. This in turn influences whether or not behaviour is favourable. Knowledge of individual attitude allows for prediction of a number of specific behaviours (Azjen, 1975, p.8). This brings into focus the attitudes of peri-urban Kenyan youths towards Mobile Crowdsourcing. The following hypothesis is therefore proposed:

H8: Attitude will have a positive relationship with intention to participate in Mobile Crowdsourcing.

4.4.11 Community identification

“Community identification”, refers to a situation in which individuals perceive themselves as being part of a unit, comprising other individuals (Nahaphiet and Ghosal, 1998). This study extends this definition by applying it to the context of Mobile Crowdsourcing in peri-urban Kenyan communities. In previous research, there is a focus on linkages established between individuals who are part of networks that consist of a series of defined relationships (Chiu et al., 2006). Literature around the concept of “identification” has mostly revolved around the domain of knowledge sharing in virtual communities (Bagozzi and Dholakia, 2002;

Ardichivili and Wentling, 2003; Chiu et al., 2006) and describes individual perceptions that relate to the concept of self-inclusion in a social group.

The current study takes place in a community based setting (peri-urban Kenya) and empirically observes the notion of this perceived “sense of belonging” among peri-urban Kenyan youths, and its subsequent effect on their intentions to participate in Mobile Crowdsourcing. This identification may be emotional in nature (Elmers, Kortokaas and Ouwerkerk, 1999), and may explain the willingness of individuals to maintain committed relationships with their designated communities (Chiu et al., 2006). Previous studies suggest that individuals form levels of self-awareness that may influence their sense of belonging to a particular community (Bergami and Bagozzi, 2000; Dholakia, Bagozzi and Pearo, 2004). This perception is psychological in nature, and in the context of this study, may include cognitive, affective and evaluative responses (Bergami and Bagozzi, 2000) among peri-urban Kenyan youths. Thus, the following hypothesis is proposed:

***H9:** The greater the level of “community identification”, the more impact “social influence” will have on intention to participate in Mobile Crowdsourcing.*

4.5 Demographic variables⁵⁰

The “age”, “gender”, “income” and “education levels” of peri-urban Kenyan youths will be used as demographic variables for this study. Demographic variables (also usable as control variables⁵¹) provide additional information on respondent patterns (Brace, Kemp and Snelgar, 2006). These are discussed next.

4.5.1 Age

Venkatesh et al (2003), suggest that age may have an effect on individual “intention” to adopt technology platforms. Moreover, younger adopters may adopt technology sooner than their older counterparts. Meso, Musa and Mbarika (2005) suggest that older technology adopters are more apprehensive towards technology use. For this study, peri-urban youths will be in focus, with distinct age groupings defined.

⁵⁰ See “Demographic background” section (page 31) for additional information reflecting Kenyan context.

⁵¹ This is if there is an intention on the part of the researcher to test the effect of control variables on the dependent variables. For this particular study, demographic variables only provide perspective on demographic patterns of the sample population.

4.5.2 Gender

Gefen and Straub (1997) suggest that women use mobile technology more than their male counterparts. This is attributed to an increased need among women to socialise. Furthermore, in prior literature, it has been observed that male decisions are strongly affected by their perceptions of usefulness. By contrast, female decisions are based more on the ease of use of technology (Venkatesh and Morris, 2000). For this study, the differences in perception between young peri-urban Kenyan males and females will provide additional demographic perspective.

4.5.3 Education level

Polatoglu and Ekin (2001) suggest that individuals with a higher level of education are more likely to adopt technology platforms. In addition, previous studies suggest that advanced education affects individual capability to use technology (Piccoli et al., 2001). The education level of peri-urban Kenyan youths may affect their perceptions of participation in Mobile Crowdsourcing.

4.5.4 Income

Daily income levels of peri-urban Kenyans would help explain their potential participation, showing the extent to which daily earnings influence “intention”. The inclusion of an income dimension helps explain whether or not personal daily incomes of peri-urban Kenyan youths may influence their potential participation in Mobile Crowdsourcing. This helps understand income vis-à-vis mobile technology adoption in an African context.

4.6 Summary

This section has provided the theoretical framework, presented the conceptual model, and presented and discussed hypotheses for this study. Additionally, demographic variables have been discussed. The next section discusses the research methodology used for this study.

Chapter 5: Research methodology

5.1 Introduction

The previous chapter provided a review of literature, development of a conceptual model, and proposition of hypotheses. The objective of the present study is to examine relationships between a set of independent variables, two intervening variables and the dependent variable, “participation intention”.

This chapter describes the methodology used, while justifying the choice of techniques. The research design, sampling process, and data collection approach are also discussed. The concepts of instrument validity and reliability are described, and analysis procedures are identified and discussed. To close this chapter, limitations and delimitations of this study are highlighted, and a summary of the overall approach used is provided.

5.2 Research design

5.2.1 Approach

This study employs a quantitative approach⁵². Quantitative analysis involves the collection of numerical primary data and testing of an empirical model. Relationships between independent variables and a dependent variable are studied. Quantitative research involves the empirical measurement of quantity (Pierce, 2008). This approach is used often, especially in descriptive research. This study uses a survey approach, whereby trends or attitudes of a given population are provided, by studying a sample representative of the population (Babbie, 2004; Creswell, 2009). Quantitative research allows for the validation of proposed associations between variables, and this allows for prediction of phenomena (Leedy and Ormrod, 2005).

Qualitative research, on the other hand, seeks to discern more about meaning. More specifically, qualitative research uses non-numerical examination and interprets underlying patterns and themes while attempting to explain phenomena (Bailey, 1982; Neuman, 1997; Creswell, 2009). This type of research is typically exploratory (Myers and Neuman, 2007).

⁵² A detailed comparison of detailed research approaches is displayed in table H1 of Appendix H.

This study necessitated a quantitative approach for a number of reasons. To begin with, a set of variables that required examination were identified. Secondly, the scale instrument for data collection was pre-defined (Creswell, 2009). Lastly, numeric data was collected and as a consequence, proposed hypotheses were tested.

This study followed a “descriptive” design, whereby relationships between independent variables and the dependent variable (Leedy and Ormrod, 2005) are tested. Descriptive research allows for the description of characteristics of a sample. Literature from top academic journals has been used to support the proposed framework for this study and enhance current Information Systems research on behavioural intention⁵³. The literature review provided and the conceptual model proposed present supporting evidence for examination of variables. These variables, derived from prior literature, were used to predict “participation intention”. Consequently, hypotheses were presented and tested.

5.2.3 Unit of analysis

The unit of analysis classifies the specific unit to be sampled (Terre Blanche, Durrheim and Painter, 2008). Peri-urban Kenyan youths comprised the target sample (Bhattacharjee, 2012⁵⁴) for this study. Thus, the individual unit of analysis is the individual, as represented by the “peri-urban Kenyan youth” respondent. This unit of analysis is a data point. Data will be collected from data points using a survey instrument or questionnaire. Construction of this instrument is discussed next.

⁵³ A new measure of “participation intention”, derived from “behavioural intention”, will be used for this study.

⁵⁴ Source copyrighted to 2012, despite prior publication. Correct referencing convention observed by researcher.

5.2.4 Instrumentation

This study measures eleven constructs: “participation intention”, “self-development”, “reputation”, “monetary compensation”, “social influence”, “competence”, “integrity”, “perceived credibility”, “technology anxiety”, “attitude”, and “community identification”. In order to maintain instrument consistency, these constructs were measured using a multiple item, five-point Likert scale. This allowed respondents to indicate their levels of agreement or disagreement with a given statement (Carter, 2010). This scale ranged from “strongly disagree” to “strongly agree”. Likert⁵⁵ scales are respondent friendly, allowing for coded responses. Additionally, Likert scales have been found to be a reliable measure of human behaviour (Oliver and Linda, 1982; Hussey and Hussey, 1997; Carter, 2010). Each instrument construct comprised three to four items⁵⁶, validated in prior literature.

(i). Participation Intention

“Participation intention” was measured using three items derived to measure “behavioural intention” (Venkatesh et al., 2003). A fourth item was added to provide a measure of intention based on availability of a technology platform (Jimoh, Juriyansyah, and Olagunju, 2011). These four items are: (1) “I am likely to participate in Mobile Crowdsourcing”, (2) “I predict I will participate in Mobile Crowdsourcing in the near future”, (3) “I plan to use my mobile phone to perform mobile phone tasks in the near future”, and (4) “I will perform mobile tasks if I have access to a Mobile Crowdsourcing platform”.

(ii). Self-Development

Three items, derived from a scale devised by Oreg and Nov (2007), was used to measure “self-development”. This scale emphasises aspects of learning and improvement of personal skills. The following are the construct items: (1) “Mobile Crowdsourcing will provide me with a means of developing my skills with a mobile phone”. (2) “Mobile Crowdsourcing will give me an opportunity to learn new mobile phone tasks”. (3) “Mobile Crowdsourcing will give me an opportunity to improve my mobile phone skills”.

⁵⁵ 1 = Strongly Disagree: 2 = Disagree: 3 = Neutral: 4 = Agree: 5 = Strongly Agree

⁵⁶ This was the case for all dimensions except “perceived credibility” which constituted two items.

(iii). Reputation

A three-item scale, adopted from Hsu and Lin (2008) was used to measure “Reputation”. This construct is characterised as the degree to which an individual believes that their social standing in a given community will be enhanced. The items for this dimension are: (1) “I am likely to earn more respect from fellow members of my community after earning airtime or mobile money for performing mobile phone tasks”. (2) “By participating in Mobile Crowdsourcing, I am likely to earn respect in my community”. (3) “Participating in Mobile Crowdsourcing is likely to improve my social standing in my community.”

(iv). Monetary compensation

This dimension was adopted and derived from a scale developed by Hars and Ou (2001), comprising four items, devised to measure perceptions related to the opportunity to make money. This construct has been renamed “Monetary Compensation” to more accurately capture the context of this study. The four items are: (1). “I am likely to make money by participating in Mobile Crowdsourcing”. (2) “I am likely to receive mobile money or airtime for participating in Mobile Crowdsourcing”. (3) “My participation in Mobile Crowdsourcing can be profitable”. (4) “Mobile Crowdsourcing is a better option than work alternatives available to me”

(v). Social Influence

“Social influence” was adapted and derived from a four-item scale devised by Venkatesh et al (2003). Items from a similar two-item scale, devised by Hsu et al (2008) to measure the dimension “social norm” were also identified in the literature. These two items were reflected in the four-item scale. The scale developed by (Venkatesh et al., 2003) was designed to measure the dimension “subjective norm”, whose items have also been used to measure a dimension described as “social influence” in previous studies. The name “social influence” will be used for purposes of this study⁵⁷. The four items that measure this construct are: (1) “People important to me think that I should participate in Mobile Crowdsourcing” (2) “People important to me encourage my participation in Mobile Crowdsourcing” (3) “Mobile Crowdsourcing facilitators in my community should be helpful to me”. (4) “In general, Mobile Crowdsourcing facilitators in my community will support my participation”.

⁵⁷ The term “social influence” is more in line with the context of this study i.e Mobile Crowdsourcing in peri-urban Kenyan communities.

(vi). Competence

This dimension, adapted and derived from a four-item scale devised by Li, Hess and Valacich (2006), measures the ability of the trusted party (Mobile Crowdsourcing facilitator) to do what the trusting party (peri-urban Kenyan) requires. The four items that measured this construct are: (1). “Mobile Crowdsourcing platforms are likely to be reliable.” (2) “Mobile Crowdsourcing facilitators will perform their roles very well”. (3) “In general, my participation in Mobile Crowdsourcing will help with knowledge creation and sharing in my community” (4) Overall, Mobile Crowdsourcing would be a reasonable way to provide work in my community.”

(vii). Integrity

This construct, also adopted and derived from a four-item scale proposed by Li, Hess and Valacich (2006), measures the level of honesty of the trusted party (Mobile Crowdsourcing facilitator) to fulfil its obligations (Li, Hess and Valacich, 2006). The four items for this proposed variable are: (1) “Mobile Crowdsourcing facilitators would truthfully provide information on mobile tasks”. (2) “Mobile Crowdsourcing facilitators would be honest in their dealings with the community”. (3) “Mobile Crowdsourcing facilitators would do what they promised”. (4) “Mobile Crowdsourcing facilitators would be sincere”.

(viii). Perceived Credibility

This construct was derived from a two-item scale devised to measure the “perceived credibility” of mobile banking (Wang, Y.S., Wang, Y.M., Lin and Tang, 2003).

This scale, adapted for this study, measured the “perceived credibility” of Mobile Crowdsourcing facilitators. The two items for this construct are: (1) “My personal details will be safe when I participate in Mobile Crowdsourcing”. (2) “I trust Mobile Crowdsourcing facilitators to pay me securely (using services such as “M-Pesa”)”.

(ix). Technology Anxiety

This variable, was adapted and derived from a four-item scale devised by Venkatesh et al (2003), to measure the negative perceptions associated with technology adoption and use. Its four constituent items are: (1) “I am uncomfortable with Mobile Crowdsourcing” (2) “I feel that I will not be able to use my mobile phone to perform tasks properly” (3) “I am hesitant

about using my mobile phone to perform tasks”. (4) “Mobile Crowdsourcing is likely to be difficult for me”.

(x). Attitude

This variable “attitude”, was adopted from a four-item scale developed by Taylor and Todd (1995), to measure attitudes and perceptions of individuals. It was adopted for this study as a measure of attitudes towards Mobile Crowdsourcing, and mediates the relationship between “Technology Anxiety” and “Participation Intention”. Its items are: (1) “Participation in Mobile Crowdsourcing is likely to be a good idea”. (2) “Participation in Mobile Crowdsourcing is likely to be a bad idea”. (3) “I like the idea of participating in “Mobile Crowdsourcing”. (4) “Participating in Mobile Crowdsourcing would be unpleasant”.

Item statements (2) and (4) will be reverse coded⁵⁸, as they measure negative perceptions, yet the hypothesised relationship between “attitude” and “participation intention” is positive.

(xi). Community Identification

This construct, adapted from a four-item scale proposed by Chiu, Hsu and Wang (2006), measures the sense of personal affiliation with a particular community. It comprises the following items: (1) “Participating in Mobile Crowdsourcing will give me a sense of belonging in my community” (2) “I feel a strong bond to fellow members of my community” (3) “I am likely to have a strong positive feeling towards Mobile Crowdsourcing in my community” (4) “I am a proud mobile phone owner in my community”.

A survey instrument was used for measurement of attitudes and perceptions. With a survey, closed-ended questions were used and specific data was obtainable. Response bias is however possible, whereby participants respond to statements based on personal perceptions of what the researcher would prefer. Non-response bias is described as the effect non-responses may have on survey estimates.

(xiii). Demographic variables

Demographic information was also collected from sample respondents. More specifically, information on the “age”, “gender”, “educational level”, “occupation status”, “mobile phone

⁵⁸ The proposed hypothesis involving “attitude” and “participation intention” was positive. Thus, the two negatively worded “attitude” items were reverse scored, to align them with other “attitude items” measuring the same construct.

ownership”, “daily income”, and “task preference” was gathered. A nominal scale was used to measure these variables.

5.3 Sample background

The National Youth Policy, established in 2010, is designed to support the youth component, as per the constitutional “Bill of Rights”. More specifically, “Vision 2030”, Kenya’s development agenda, proposes to transform youths into a competitive and prosperous group of people (NCAPD, 2010). At independence in 1963 (from British colonial rule), the Kenyan Government established a youth network referred to as the National Youth Service (NYS). This has remained the major avenue for empowerment of youths in Kenya. Since then, there have been several initiatives by various non-governmental agencies aimed at empowering youths who face social and economic challenges. The high turnover of the education system coupled with the inability of the economy to generate gainful employment opportunities for youths presents serious developmental challenges. Consequently, nationwide youth networks have been formed, constituting diverse groups such as environmental clubs, small enterprises and self-help groups. Youth groups are widespread and are typically in rural to peri-urban communities. Kenya has a youthful population whereby 43% are aged below 15 years and 37.7% are aged between 15 and 34 years. The constitution of Kenya defines youths as all those who have attained the age of 18 years but have not attained the age of 35 years (NCAPD, 2010).⁵⁹

Furthermore, the National Population Census (Kenya Population and Housing Census, 2009) indicated that the largest rise in the working population during the last decade was among youths aged between 15 and 29 years. In line with the context of this study (Mobile Crowdsourcing), youths aged⁶⁰ between 18 and 29 years were sampled. This categorisation is consistent with the age grouping applied in the National Population Census (Kenya Population and Housing Census, 2009). This study was conducted in peri-urban communities in the capital city of Nairobi, which comprises four administrative districts. From the youth groups described, a sample will be selected and data on their intention(s) to participate in “Mobile Crowdsourcing” will be collected.

⁵⁹ See table I 1 in Appendix I.

⁶⁰ Despite the largest increase in the working population in Kenya being attributed to Kenyans aged between 15 and 29 years, the age range of 18-29 was deemed appropriate for this study. This is because anybody aged below 18 years (the minimum age for youths) is considered a minor (NCAPD, 2010). Thus, the age range of 18-29 (best captures the context of this study, while reflecting national statistics).

5.4 Pre-test and pilot study

Pre-test

Content validity, refers to the extent to which items fully represent the concept being measured (Vanderstoep and Johnston, 2009, p.59.). To ascertain content validity, the research instrument was pre-tested by five academic members of staff within the Department of Information Systems (IS) in the School of Economic and Business Sciences (SEBS). This school is part of the Faculty of Commerce, Law, and Management (CLM) at the University of the Witwatersrand (Wits), Johannesburg. Subsequent feedback was used to enhance the instrument, with minor changes to the wording of questionnaire items suggested. These were effected so as to improve overall question readability and the specificity of worded statements.

Pilot-study

After pre-testing, the research instrument was pilot tested⁶¹ to ensure that all worded statements were comprehensible, and that the full range of the scale was used (Straub, 1989). Pre-testing was used to test for face validity⁶². In addition to these checks, responses were also timed so as to determine the average completion time per respondent.

The estimated completion time for the questionnaire was set at between ten and fifteen minutes. Pilot study respondents easily completed the questionnaire within this time frame. All 20 responses administered were received and the research instrument was deemed readable, and easy to complete. Improvements were made to the layout of the research instrument. Of note, a new age category (27-29) was added, in order to align demographic measures with national statistics. In light of this minor but significant refinement, the pilot study results were excluded from the data analysis phase. A copy of the final research instrument used for data collection is displayed in appendix J.

5.5 Sampling phase

A research sample refers to a subset of a population, used to learn and gain informational characteristics or attributes of the sample population (Riley, Roy, Clark, Wilkie and Scivas,

⁶¹ The peri-urban areas of Dagoretti and Kikuyu were used for pilot testing. The group sampled comprised youths from these two areas. A form of cluster sampling was used (see Sampling approach section on pg 75).

⁶² Face validity, is based on the researchers evaluation of whether or not the research instrument sufficiently measures intended behavioural responses (Leedy and Ormrod, 1989). This type of validity is normally described as content validity, despite subtle differences between the two concepts.

2000). The sampling phase of this study occurred in two phases. The first phase involved considerations made prior to the identification of communities and subsequent sample selection. The second phase described the sampling approach used to collect data.

5.5.1 Sampling considerations

A cross-section of peri-urban youths in the Kenyan capital of Nairobi was sampled. As a result, this study ensured minimal “coverage bias”. This cross-section (of peri-urban areas) was characterised by sampling conurbations⁶³ adjoining the city of Nairobi, to the east (Kayole and Umoja), west (Kikuyu), and south (Dagoretti). Since a specified segment of the target population was sampled, “overcoverage bias did not occur”, and there was no “undercoverage bias” involved either (Daniel, 2012). By using different sampling sites, the researcher ascertained that respondents already sampled, were not sampled again. This nullified the risk of “multiple-coverage bias”. In addition, screening of respondents helped ensure minimal “coverage bias” (Daniel, 2012).

The use of a probability-sampling element minimised potential “selection bias”. This was aided by training and supervision of research assistants at the designated sampling sites, during the data collection exercise. The mean substitution imputation method (Hair, Black, Babin and Anderson, 2010) will be used to minimise any effects of “non-response bias”. This will be part of thorough data cleaning, also effected to ensure minimal “response bias⁶⁴”.

The first consideration was whether the sample would be rural or urban or a mixture of both, with a mixture being the preferred option. This would give a chance to youths who portray both urban and rural characteristics. Such populations that are neither purely rural nor urban are referred to as “peri-urban”. This constitutes the sample population for this study.

The second consideration made was the presence of youth networks in peri-urban areas. In these communities, there is a wide range of youth networks, also dispersed all over the country. These networks include the National Youth Service (NYS), a community based network, the nationwide “Kazi Kwa Vijana” network for young people, and business based and church organised youth networks. The study selected the church based network (PCEA⁶⁵) because of its national spread and its accessibility to all youths in peri-urban areas

⁶³ A conurbation is an extended urban area, comprising several towns, which merges with the suburbs of one or two cities. It is an area of continuous development (OED, 2011).

⁶⁴ Conceptually distinct from non-response bias. See footnote (75) on page 77 for description of source (Daniel, 2012).

⁶⁵ “PCEA” stands for Presbyterian Church of East Africa.

irrespective of their race, gender or religious affiliation⁶⁶. Kenya is a predominantly Christian nation, with more than 80% of the population represented. As a result, possibly every other youth respondent is likely to be Christian, but this was of no consequence for the study. Of more importance, is the fact that they were affiliated with a youth network in their communities.

5.5.2 Sampling approach

There are two main types of sampling, namely non-probability sampling, and probability sampling (Babbie, 2004). Non-probability sampling is not informed by probability theory⁶⁷ (Babbie, 2004, p.182.). Probability sampling on the other hand, describes samples selected based on probability theory (Babbie, 2004, p.186.).

Kenya has a population of about 40 million people, and youths⁶⁸ in Kenya constitute 37.7% or approximately 15 million (KNBS, 2011, NCAPD, 2010). Due to strict labour laws in Kenya, anybody below the age of 15 (minor) is not classified as part of the working population. As a result, youths aged from 15 to 17 years were excluded from sampling. In the last 10 years, the largest rise in the work population has been attributed to youths aged between 15 and 29 years (Kenya Population and Housing Census, 2009).

This represents the most vulnerable segment of the population. Additionally, there has been an increase in rural to urban migration among youths, who are defined as peri-urban⁶⁹. In light of this statistic, and exclusion of minors from this study, youths aged between 18 and 29 years, from peri-urban communities were sampled.

A sampling decision based on consideration of both the context and objectives of this study was made. The context of this study involves peri-urban communities, and the objective of this study involves Kenyan youths in these communities. This consideration, in addition to the relevant national statistics, resulted in the identification of an appropriate sample. This is an element of “purposive” or “judgmental” sampling, whereby a sample is selected based on

⁶⁶ Despite being a church based organisation, the PCEA supports youth from diverse religious and ethnic backgrounds, throughout Kenya. It merely provides a supporting and enabling role for youths.

⁶⁷ This type of sampling involves random selection, whereby each element has “an equal chance of selection, independent of any other event in the selection process” (Babbie, 2004).

⁶⁸ Youths are officially classified as those aged between 15 and 34 years (KNBS, 2011, NCAPD, 2010). Although this may be the case, youths aged below 18 years did not constitute the sample population for this study. This is due to ethical guidelines around inclusion of minors in a research study, coupled with an appreciation for strict national guidelines on child labour.

⁶⁹ Peri-urban may refer to an area adjoining the city and the countryside (OED, 2005) or an individual from a rural community who acquires urban traits (mobile phone use in “rural” Kenya is a typical example of this).

informed judgment of how representative or useful a sample is likely to be (Babbie, 2004, p.183.). Sometimes it is necessary to select a sample based on knowledge of a population, and the study's purpose (Babbie, 2004). This was the first part of the sampling approach.

Since the selection of youths aged between 18 and 29 years was based on purposive judgement, a “quota⁷⁰ sampling” strategy was not used. This is despite targeting a segment of the population with specific attributes. Furthermore, in the case of quota sampling a matrix cell is created, and weights are assigned to portions (quotas) of the sample population (Henry, 1990; Babbie, 2004). Thus, quota sampling was not required for this study.

Lastly, the peri-urban sites selected were in areas surrounding the city of Nairobi. Out of about seven such communities near and around Nairobi, the peri-urban areas of Dagoretti, Kikuyu, Kayole and Umoja were selected, to increase the chance of selecting peri-urban youths covered by this study. Youths from the PCEA networks in these areas were then randomly reached in community centres. Out of those who were reached, only those between 18 to 29 years of age were sampled, as earlier explained. This is an element of “random selection”, whereby each respondent has an equal chance of selection. This is independent of other occurrences in the selection process (Babbie, 2004). In this instance, the sampling sites selected represented clusters of peri-urban youths.

This part of the sampling phase constituted a form of “cluster sampling”, whereby each member of a targeted sample belongs to a group (cluster), selected at random⁷¹ (from a choice of other possible clusters), and all members of a selected cluster form part of the overall sample. By contrast in the case of “stratified⁷² sampling”, each member of a sample population is assigned to a group (stratum), and simple random sampling is used to select a sample from each group (Henry, 1990, p.27.). Cluster sampling is a form of probability sampling. Furthermore, cluster sampling may be used when it is impractical to sample all elements of a target population (Babbie, 2004).

⁷⁰ Quota sampling is defined as a form of non-probability sampling whereby sample selection is based on predefined attributes, such that the sample will exhibit a similar distribution of characteristics existent in the population being studied (Babbie, 2004)

⁷¹ “Random selection” is part of “cluster sampling”. “Simple random sampling” also involves random selection. However, in the case of simple random sampling, units comprising a population are assigned numerical values (Babbie, 2004, p.201.). Due to the purpose of this study, simple random sampling was not deemed appropriate. Similarly, in “systematic sampling”, every “kth” or “nth” unit in a list is selected and included in a sample (Babbie, 2004, p.203.). This principle was not applicable to this study and this design was not necessitated.

⁷² For “stratified sampling”, only specific components within a group (selected via random sampling), may constitute the final sample studied.

Cluster sampling is distinct from “multi-stage” cluster sampling, which involves standard cluster sampling, used with simple random sampling within a pre-selected sample, over the course of a number of stages (Henry, 1990). Clusters are typically groupings that occur naturally, such as housing units, city blocks, and schools. These clusters are randomly chosen and each member of each cluster is included in the sample (Henry, 1990, p.29.). The terms “cluster” and “multi-stage cluster” tend to be used interchangeably, despite being distinct concepts. Since the sampling approach used was deliberate, and a target population was identified, “convenience sampling”⁷³ was not used for this study.

The inclusion of a probability-sampling component improved overall representativeness. A sample is deemed representative when the sample population closely resembles the actual population in terms of the variables being observed (Daniel, 2012⁷⁴). A probability sample is not necessarily representative of the population. Similarly, a non-probability sample is not necessarily unrepresentative of the population. However, probability samples are more likely to yield representative samples (Daniel, 2012, p.73).

For statistical inferences to be made, a minimum sample ratio of 5:1 or 5 observations per independent variable, is allowed⁷⁵ (Hair, Black, Babin and Anderson, 2010).

The entire process produced a sample made up of mostly mobile phone users. The sample may be said to be representative of any peri-urban population in any other area of Kenya. 200-250 youths, across the four peri-urban centres of Kayole, Umoja, Dagoretti and Kikuyu were targeted. The PCEA and sponsored community empowerment initiatives nationwide have mobilised these youth groups. Kenya is a predominantly Christian nation, with more than 80% of the population represented and every other youth is likely to be Christian, but this was of no consequence for the study. In Dagoretti and Kikuyu, four research assistants (including a youth leader) helped with administering of the questionnaire to sample respondents. The two sites in Kikuyu Town in which sampling occurred were Kikuyu town

⁷³ Convenience sampling or “haphazard” sampling is a form of sampling whereby a researcher selects cases purely based on availability and convenience. This sampling design is most likely to yield unreliable, unrepresentative samples. For example, in the case of “street interviews” conducted by news reporters, whereby people walking by are approached based on availability, convenience sampling is at play (Neuman, 2003, p.211). Thus, a convenience sample comprises individuals who are readily available to respond (Henry, 1990, p.19).

⁷⁴ Sampling Essentials: Practical Guidelines for Making Sampling Choices: Published prior to 2012, but copyrighted with year indicated as 2012 on official publication. Thus, proper referencing convention observed by researcher.

⁷⁵ As a rule of thumb, this ratio should fall below the 5:1 threshold. Despite this being a minimal requirement, a more preferred ratio is 15 or 20 observations per independent variable (Hair et al., 2010, p.175).

centre and Thirime. Respondents in Kikuyu Town centre were sampled in the morning. Respondents in Thirime were sampled in the afternoon of the same day. Data collection in these two sites spanned three hours⁷⁶. In all four sampling locations, data was collected in either youth halls, or church facilities⁷⁷. In Kayole and Umoja, two research assistants (including a youth leader) helped with administering of the questionnaire to sample respondents. As was the case in Dagoretti and Kikuyu, data collection spanned three hours.

An integrated sampling approach was used. This is also described as a “mixed methods sample design”, in which elements of both probability and non-probability sampling are incorporated. More specifically, this sampling strategy resembles a form of the “sequential nested non-probability-probability” design (Daniel, 2012, p.220.). This is a form of sampling whereby a subset of a non-probability sample is selected using a probability sampling method (or vice versa). The term “sequential” implies that the sampling methods used were not concurrent. The term “nested” indicates that one method is dominant⁷⁸, and the other plays a subordinate role. This design was selected for the following five reasons: (1) Due to the objective(s) of this study, and the desire to capture attitudes and perceptions of peri-urban youths. (2) To compensate for limitations of using a single approach and reduce the vulnerability of reliance on a singular method. (3) To improve the generalisability of findings. (4) To add rigour, sophistication and depth to this study, and (5) To increase the likelihood of credible findings (Daniel, 2012, p.220.). Table 5.1 provides a summary of the different types of probability and non-probability sampling. In addition, a tabulation of mixed-methods sampling designs is displayed in table K1 of Appendix K.

⁷⁶ Results of data collection are discussed in chapter 6 (Data Analysis).

⁷⁷ See Appendix O for photographs of select peri-urban sites and sample respondents for this study.

⁷⁸ There are three types of relationships classified in mixed methods sampling. The first is “equivalent”, whereby dominance of methods is equal. The second “nested”, whereby one method is dominant and the other plays a supporting role. The third is “multilevel”, whereby methods that target different levels within a population, are used (Daniel, 2012, p.215). For all three relationships, two or more sampling methods may be used.

Table 5. 1: Sampling techniques ⁷⁹	
Design	Approach
Non-probability sampling	
Convenience sampling	Cases are selected because they are available.
Similar/Dissimilar case sampling	Cases are selected based on whether or not they represent similarities in conditions.
Typical case sampling	Cases known beforehand, that are not extreme, are selected.
Critical case sampling	Key cases, essential for assessment, are selected.
Snowball sampling	Members of a group identify other members to be included in a given sample.
Quota sampling	An interviewer selects a sample that yields similar proportions to population proportions.
Purposive (judgmental) sampling	Units to be observed are selected based on judgment on which ones are most likely to be representative. Background information on population characteristics may be used to arrive at a decision.
Probability sampling	
Simple random sampling	Each member of the population being studied has an equal chance of selection. Units that make up a population have designated numbers. A set of numbers is then computed to form the sample.
Systematic sampling	Each member of the population being studied is listed. A random start is defined and members of the population are sampled at equal intervals. A sampling interval (1/k) is then calculated. Once a random starting point is defined, every "kth" term (1/k) is sampled.
Stratified sampling	Each member of the population being studied is assigned to a group (stratum). A simple random sample is then selected from each group. A random sample is drawn from each category (of sampling frame), and all samples are combined.
Cluster sampling	Each member of the population being studied is assigned to a group (cluster). Clusters are then selected at random and all members of each selected cluster comprise the overall sample. Not to be mistaken with multi-stage (see below) sampling.
Multi-stage sampling	Clusters are selected, and sample members are selected from each cluster, using simple random sampling. Clustering may occur over more than one stage.

⁷⁹ Original source(s): (Henry, 1990; Neuman, 2003; Babbie, 2004). Also see table K1 in Appendix K.

5.6 Data collection

A structured survey instrument with closed-ended questions (Kitchenham and Pfleeger, 2002) was used to collect data (see Appendix J). This was the preference for the present study as it allowed for data from a large sample to be collected, across various locations, and allowing for generalisation (Creswell, 2009). Each questionnaire was completed in between 15 and 20 minutes. Since data was collected at a single point in time (Hair, Babin, Money and Samuel, 2003), the survey used was cross-sectional as opposed to being longitudinal (Rajulton, 2001), whereby a change in developmental status of the sample population over a specified period of time is accounted for. The response layout for the survey was uniform for all sample respondents and was administered in an efficient and convenient manner for respondents. Respondents were allowed to answer questions without any interference or coercion.

The administered questionnaire clearly defined and explained the term “Mobile Crowdsourcing” in addition to verbal guidelines prior to collection of data. The duration was indicated. Additionally, permission was granted for the data collection exercise, from the National Youth coordinator of the PCEA. An attached letter of permission is displayed in Appendix N.

5.6.1. Structure of questionnaire

The questionnaire consisted of forty worded items and seven additional questions (6 demographic and one mobile task preference selection question). Items 1-28 represented independent variables, items 29-32 represented the mediator variable, items 33-36 represented the moderator variable, and items 37-40 represented the dependent variable.

Table L2 in Appendix L shows the correspondence between instrument items and hypotheses for each construct.

5.6.2 Ethics clearance protocol

Ethical clearance was granted unconditionally, by the Human Research Ethics Committee (Non-Medical) office at the University of the Witwatersrand, Johannesburg. This is to ensure that: (1) The researcher abides by institutional ethical guidelines pertaining to research on human respondents. (2) To ensure that participation of respondents in the study was completely voluntary, and confidentiality or anonymity was guaranteed. (3). To assure respondents safety during data collection. (4). To ensure protection of the researcher by the legal office.

A protocol number (**H110703**) was also issued. In addition, a copy of the ethics clearance certificate obtained for this study is displayed in Appendix M.

5.7 Data analysis strategy

Data analysis was conducted using the IBM SPSS (version 19.0.0) software package for Windows or Mac. Data analysis occurred in four stages as described below:

Stage 1: Data screening and cleansing

The captured data was screened by the replacement of missing values and the detection and removal of outliers. Non-response bias was checked for, in addition to non-normal variables. Instrument items were then assigned numerical codes and classified within specified groups.

Stage 2: Respondent profile and descriptive statistics

Demographic data based on the respondents in the study was tabulated to present descriptive findings. Cross-tabulations were run to provide additional details on pairs of distinct demographic data.

Step 3: Ensuring research design and validity

(i). Validity

By drawing on pre-validated instruments for this study, a high degree of design validity was achieved (Bailey, 1982). Correct inferences from the data about the sample population of this study were made (Creswell, 2009). This study drew all its constructs from research instruments that had previously yielded high validity scores. These constructs were tested for reliability within the context of this study. To test for construct validity of the research

instrument, the Principal Component Factor Analysis (PCFA) technique (Straub, 1982; Hair et al, 2010) was used. This is a data reduction method whereby extractions are made from the data set.

The data was also checked to ensure convergent and discriminant validity to test the extent to which the different concepts in the research instrument were distinct (Hair et al., 2010). To confirm this, the Average Variance Extracted (AVE) was obtained. The AVE is used to measure convergent validity, which is a reflection of the overall amount of variance in the items that constitute the construct being measured (Fornell and Larcker, 1981). The square root of the AVE ($\sqrt{\text{AVE}}$) was used to measure discriminant validity. Discriminant validity is a measure of how much a construct differs from other constructs. An AVE cut-off value of 0.50 is acceptable, as recommended by Fornell and Larcker (1981).

(ii). Reliability

Reliability was ensured to determine the consistency of the research instrument used. Consistency is defined as the extent to which an instrument will measure in exactly the same way each time it is used on the same sample type. Cronbach's Alpha coefficient was obtained as an internal measure of consistency (Creswell, 2009). A cut-off value of 0.60 is recommended (Hair et al., 2010). Cronbach's Alpha coefficient testing has been widely used to measure the reliability of self-reported items (Vanderstoep and Johnston, 2009). After testing for validity and reliability, composite scores or summated scales were computed, for each construct. These composites were used in subsequent analyses.

Step 4: Hypothesis testing

(i). Correlation analysis

Pearson's product moment correlation coefficient was computed to ascertain the direction and strength between the variables (Hussey and Hussey; Hair et al., 2010). A product-moment correlation (r) was obtained. This value indicates the strength of the relationship between two variables. The direction of this relationship is indicated with either a negative sign (-) showing a negative correlation, or a positive sign (+) showing a positive correlation (Hair et al., 2010, p.156.).

(ii). Regression analysis

Multiple regression analyses were used to identify the proportion of variance explained by the independent variables (Hair et al., 2010). This is a statistical method used to determine the association between two or more independent variables and a dependent variable. The strength of this association is mathematically depicted to account for the variance observed in the dependent variable. The variance is denoted with an R^2 value, and the significance of the contribution of each independent variable to the total variance is expressed as the β (Beta) value coefficient (Hair et al., 2010).

(iii). Testing for Mediation

The Baron and Kenny (1986) four-step approach was used to test the proposed mediating effect of “attitude” on the relationship between “technology anxiety” and “participation intention”. Figure 5.1 visually depicts this relationship.

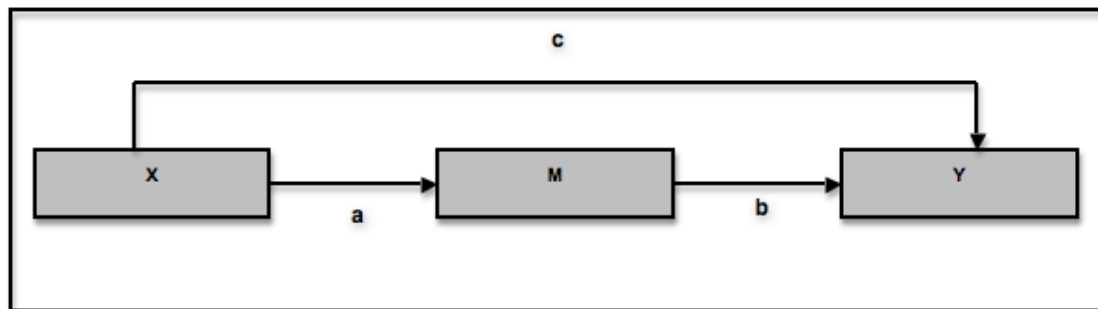


Figure 5. 1⁸⁰: Proposed mediated relationship⁸¹.

To test the above relationship, the four-step approach (Baron and Kenny, 1986) was followed. This approach uses regression analyses, as described in table 5.2:

Table 5. 2: Baron and Kenny (1986): Four step approach	
Step	Analysis
1	Conduct simple regression analysis with X predicting Y to test for path c alone. $Y = B_0 + B_1X + e.$
2	Conduct simple regression analysis with X predicting M to test for path a. $M = B_0 + B_1X + e.$
3	Conduct simple regression analysis with M predicting Y to test for path b alone. $Y = B_0 + B_1M + e.$
4	Conduct multiple regression analysis with X and M predicting Y. $Y = B_0 + B_1X + B_2M + e.$

⁸⁰ Path “c” denotes direct effect.

⁸¹ X = Independent variable, M = Mediator variable, Y = Dependent variable

Steps 1-3 establish the existence of zero-order relationships amongst the variables. If one or more of these relationships is not significant, then mediation is unlikely. However, if relationships from steps 1-3 are significant, then step 4 is initiated. In step 4, if the effect of M (path b) remains significant when X is controlled for, then some form of mediation is supported. If X is not significant when M is controlled for, then full-mediation is supported. If X is still significant (X and M both predict Y), then partial-mediation is supported.

Despite being a widespread approach, the significance of the indirect pathway (X affecting Y through pathways a and b), was not sufficiently accounted for. Therefore a second, alternate approach, the Sobel test (Sobel 1982) was used to test the significance of this indirect effect⁸². The Sobel approach was used to calculate the product of two regression models. The steps followed are shown in table 5.3 :

Table 5. 3: Sobel products of coefficients approach		
Model	Formula	Tested effect (pathway)
1	$Y = B_0 + B_1X + B_2M + e.$	M affects Y (path b)
2	$M = B_0 + BX + e$	X affects M (path a)

The second model (Model 2) in table 5.3 above, shows the relationship between X and M. These two coefficients are multiplied with each other to form a product. This is the partial regression effect, whereby M predicts Y, B_2 , and B, the simple coefficient whereby X predicts M:

$$B_{\text{indirect}} = (B_2)(B)$$

(iv). Testing for moderation

Hierarchical regression analysis (Aiken and West, 1991; Irwin and McClellan, 2001) was used to test the hypothesis (H9) that the greater the level of “community identification”, the more the impact “social influence” will have on “participation intention”. Figure 5.2 shows this relationship:

⁸² The regression coefficient for this indirect effect shows the change in Y for every unit change in X that is moderated by M.

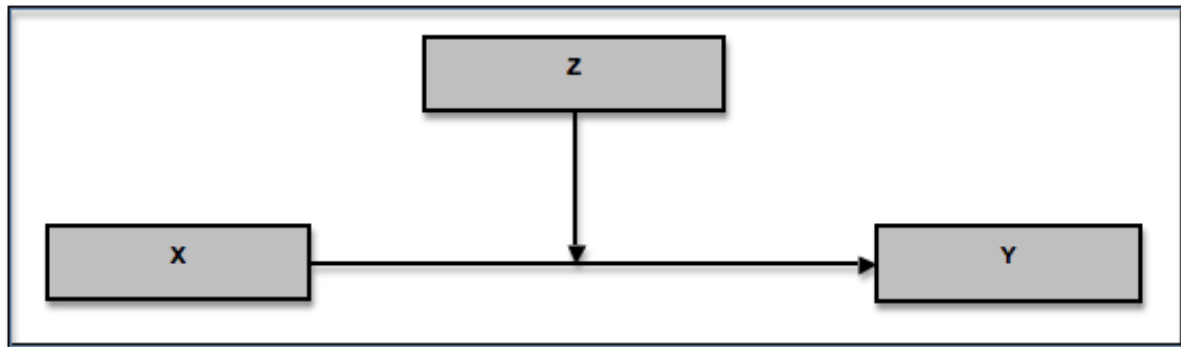


Figure 5. 2: Proposed moderated relationship.

Centred⁸³ mean scores were created (Aiken and West, 1991, p.11.) for “social influence” and “community identification”. This was done to reduce multicollinearity⁸⁴. Following this, three steps were used to test for moderation:

1. An interaction term (XZ) was calculated. $X*Z = XZ$
2. Y was regressed on X and Z. $Y = a + b_1X + b_2Z$
3. Y was regressed on XZ, while controlling for X and Z. $Y = a + b_1X + b_2Z + b_3XZ$

Moderation is supported if the interaction path (XZ) is significant. The t-test for the partial coefficient b_3 is used to test for moderation. This data is plotted⁸⁵ to examine the nature of this interaction. The data sample is split into three groups to differentiate between different levels of “community identification” (low, medium, and high). Mean split correlations are run for each of these three groups to determine the relationship between “social influence” and “participation intention”, at each level of “community identification”.

The extent to which levels of “community identification” moderate the relationship between “social influence” and “participation intention” are observed and reported.

⁸³ Standardized scores (z values) can be created and used in place of centred mean values (Aiken and West, 1991). Results of moderation testing will be identical.

⁸⁴ Multicollinearity occurs when an independent variable is highly correlated with other independent variables (Hair et al., 2010).

⁸⁵ A scatterplot will be generated in SPSS v 19.0.0 (for Mac or Windows).

5.8 Limitations and delimitations

Limitations and delimitations such as response bias were acknowledged. The use of a survey instrument, which enabled self-reporting, may have subjected this study to bias. One limitation in interpreting the survey results is the common method bias, which is introduced when all constructs used are measured using a single data source (Straub, Boudreau and Gefen, 2004).

Based on chosen data collection methods and sampling techniques, a number of limitations were recognised. Firstly, since the research was carried out in selected peri-urban communities, results may or may not have been necessarily representative of the whole population. Secondly, due to a limited sampling time frame, some target respondents may have been unavailable at a particular time. A third limitation is that of self-reporting whereby respondents may have been subjective and biased in their responses, and may therefore not have responded objectively. A fourth limitation is that the survey instrument measured perceptions of behaviour rather than actual behaviour. The fifth and final limitation is that responses were representative of respondent behaviour at one point in time.

5.9 Summary

This chapter discussed the objectives, research methodology, and techniques used in this study. A quantitative empirical approach was employed. This study's objective was to examine the influence of "self-development", "reputation", "monetary compensation", "social influence", "competence", "integrity", "perceived credibility", "technology anxiety", and "attitude" on "participation intention" among peri-urban Kenyan youths. The sampling methodology was explained, the general methodology discussed, and finally, the statistical methods used were identified and explained. The quantitative methodology was explained, including the sampling approach, instrumentation, administration of the questionnaire, and data analysis methods. Results of data collection and analysis of findings will be presented and discussed in the next chapter. Figure 5.3, graphically depicts a summary of the research methodology process followed.

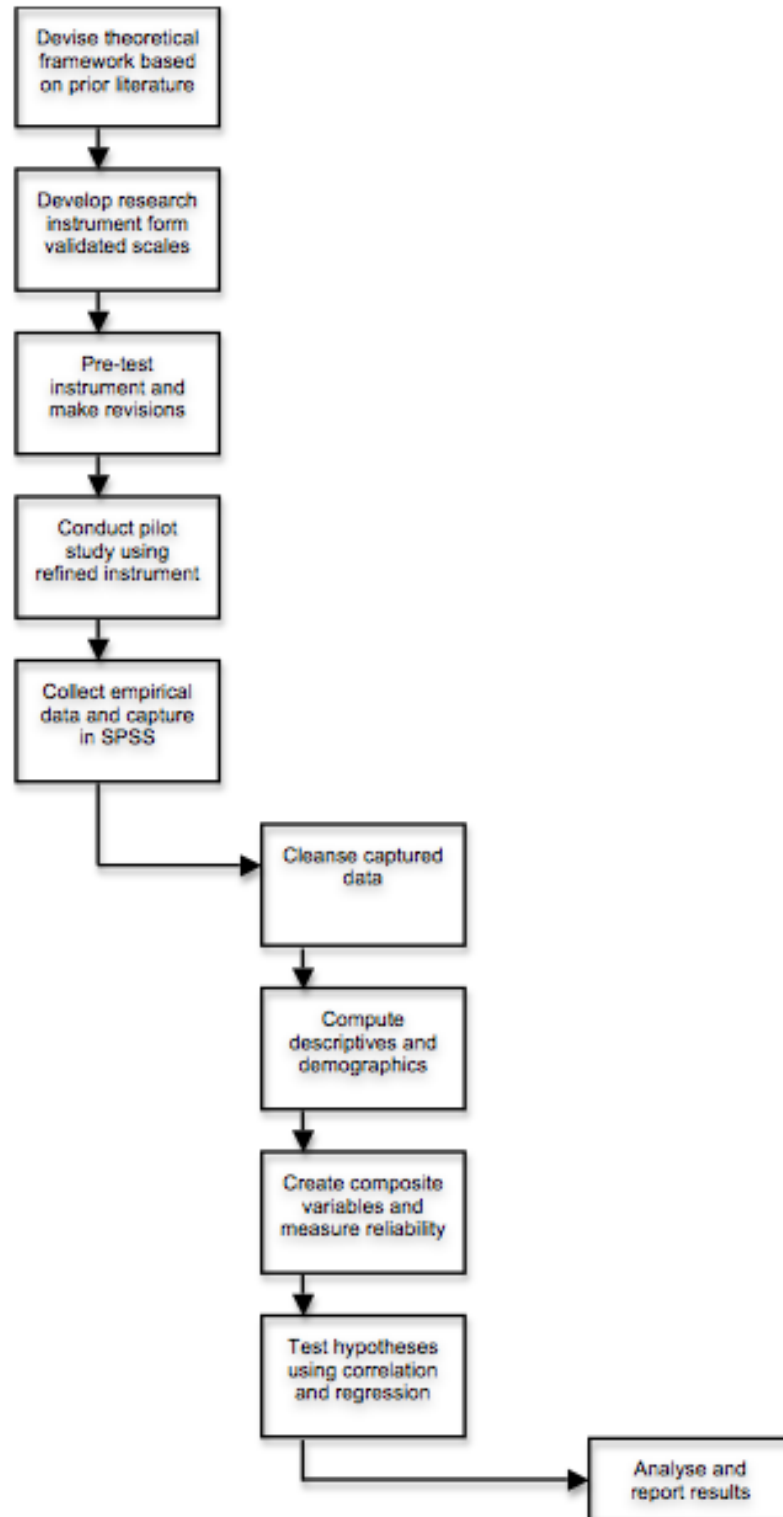


Figure 5. 3: Research methodology steps.

Chapter 6: Data analysis

6.1 Introduction

The previous chapter describes the research methodology applied in this study. This chapter discusses the results of analysis of data collected. Firstly, the data cleaning procedure applied is discussed, followed by sample demographics. Reliability and validity testing with factor analysis is then described, followed by descriptive statistics. The correlation of independent and dependent variables is also discussed. Hypotheses presented in chapter 2 are then tested using multiple linear regression and stepwise regression. Lastly, this chapter concludes with a summary of hypotheses, which have been supported, partially supported, and dropped.

6.2 Sample demographics

A total of 307 survey responses were collected over two weeks, from the 29th of August to the 11th of September (2011), in Nairobi, Kenya. The sample sites used were the four key peri-urban centres of Kikuyu, Dagoretti, Kayole and Umoja. A total of 28 responses were omitted due to missing values, with 279 responses being retained. Kikuyu yielded 174 usable responses for this study. In the area of Dagoretti, 30 were obtained. In Kayole and Umoja (areas in close proximity), with assistance from a research volunteer and a youth coordinator, 75 additional usable responses were obtained. This yielded the 279 usable responses for analysis⁸⁶.

The response rate was calculated and found to be 90.9%. A response rate summary is shown in table 6.1.

Table 6. 1: Response rate summary

	Number	Percentage (%)
Responses received	307	100
Usable responses	279	90.9
Disregarded responses	28	9.1
Response rate = $279/307 \times 100 = 90.9\%$		

Note: Response rate = usable responses/responses received*100

⁸⁶ Since elements of cluster sampling were applied, respondents from all clusters were included in the overall sample. Consequently, the number of respondents per site were not necessarily proportional.

Table 6.2 shows the age distribution of respondents. Since the acceptable age bracket for peri-urban youths stands between the ages of 18 and 29, all respondents captured were representative of this age range. The majority of respondents were aged between 18 and 20, with representation at 45.2%. This was followed by respondents aged between 21 and 23, with representation at 33.0%. Respondents aged between ages 24 and 26 were represented by 10.8% of the sample population, with 7.9% being represented by respondents aged between 27 and 29. Results of the sample age groupings closely resemble national age estimates, reported in the 2009 census in Kenya (Kenya Population⁸⁷ and Housing Census, 2009). The census estimates indicate that youths aged between 20 and 24 years comprise 10.8%, while those aged between 25 and 29 years stand at 8.3%.

Table 6. 2: Age group profile		
Age group	Number of respondents	Percentage (%)
18-20	126	45.2
21-23	92	33.0
24-26	30	10.8
27-29	22	7.9
Not specified	9	3.2
Total	279	100

Table 6.3 shows the gender profile of the respondents. Findings indicated that female respondents were slightly over-represented at 53.4% as compared to 46.6% for male respondents. National statistics (Kenya Population and Housing Census, 2009) indicate relative gender parity, with comparisons between the two genders standing at approximately 50% each.

Table 6. 3: Gender profile		
Gender	Number of respondents	Percentage (%)
Female	149	53.4
Male	130	46.6
Total	279	100

Table 6.4 shows the highest education levels obtained by the respondents. This table indicates that a significant percentage of peri-urban Kenyan youths have obtained academic qualifications beyond primary school level. The majority of respondents were found to have obtained diplomas, with 32.6 % represented. This was followed by secondary school

⁸⁷ Tables I 1 and I 2 in Appendix I provide additional data on national population estimates.

certificate holders and university graduates, with 31.2% and 27.2% respectively. Unspecified education levels accounted for 5.4% ⁸⁸ of the sample population.

Table 6. 4: Highest education level obtained		
Level	Number of respondents	Percentage (%)
Primary school certificate	10	3.6
Secondary school certificate	87	31.2
Diploma	91	32.6
University degree	76	27.2
Other	8	2.9
Not specified	7	2.5
Total	279	100

Table 6.5 displays the employment profile for the sample population. This table indicates that the majority of peri-urban Kenyan youths are students who are not otherwise employed. Respondents found to be still in school, were represented by 70.6% of the sample population. Self-employed respondents accounted for 7.2% of the sample population. Interestingly, an equal proportion of respondents were found to be either in formal employment or unemployed, each with 7.9%. This is reflective of a situation whereby the majority of peri-urban youths in Kenya are currently students⁸⁹.

Table 6. 5: Employment profile		
Current occupation	Number of respondents	Percentage (%)
Self employed	20	7.2
Formally employed	22	7.9
Unemployed	22	7.9
In school (no work)	197	70.6
Other	8	2.9
Not specified	10	3.6
Total	279	100

Table 6.6 shows the number of respondents who own mobile phones. The majority of the sample population was found to own a mobile phone, with representation at 94.6%. Since the majority of peri-urban youth in Kenya own mobile phones, this statistic was expected. A small proportion (5.4%) of the sample population comprises respondents who do not own mobile phones.

⁸⁸ 2.9% for “other” plus 2.5% who did not at all indicate their education levels.

⁸⁹ Upon completion of school, peri-urban youths in Kenya are not guaranteed employment, and join the ranks of the many unemployed citizens. Approximately 40% of Kenyans are unemployed (KNBS, 2011).

Table 6. 6: Mobile phone owners		
Mobile phone ownership	Number of respondents	Percentage (%)
Owns mobile phone	264	94.6
Does not own mobile phone	15	5.4
Total	279	100

Table 6.7 displays the daily incomes for respondents sampled in this study. Respondents who earn less than 500 Kenya Shillings (Kshs⁹⁰) daily accounted for 47.3% of the population, followed by 15.4% of the population represented by respondents who earn more than 1000 Kshs. Respondents who earned between 500 Kshs and 750 Kshs were represented by 9.3% of the sample population, with 6.1% represented by respondents who earn between 750 Kshs and 1000 Kshs. A total of 61 respondents (21.9%) did not wish to indicate their daily incomes.

Table 6. 7: Estimated daily income		
Daily income (Kshs)	Number of respondents	Percentage (%)
< 500	132	47.3
500-750	26	9.3
750-1000	17	6.1
>1000	43	15.4
Not specified	61	21.9
Total	279	100

Table 6.8 shows the mobile task profile for respondents sampled in this study. A majority of the respondents (91.0%) indicated preference across all 7 tasks⁹¹.

The most preferred task however was SMS transcription (73.8%), followed by Language translation (64.5%), Opinion surveys (62.0%), and Search Relevancy (60.2%).

The least preferred tasks were Citizen reporting (58.4%), News translation (58.1%), and Sentiment analysis (52.7%).

⁹⁰ The Kenya Shilling, abbreviated as Ksh or KES, is Kenya's national currency. 1 USD = approximately 83 Kshs. (www.xe.com). Please note that since the majority of youths sampled own mobile phones, affordability does not pose a major problem. Furthermore, in African communities, sharing of handsets is commonplace.

⁹¹ Respondents were allowed to indicate preference for more than one mobile-based task. No current statistics around frequency of task performance nationally, have as yet been compiled. However, since deployment in Kenya in 2007, Txeagle has seen increased response rates, particularly for translation tasks (Eagle, 2009). This is also reflected in the results of this study. i.e. Language translation has high levels of preference among peri-urban youths.

Table 6. 8: Mobile based tasks (preference)		
Task	Number of respondents	Percentage (%)
SMS transcription		
Prefers	206	73.8
Does not prefer	73	26.2
Total	279	100
Language translation		
Prefers	180	64.5
Does not prefer	99	35.5
Total	279	100
News translation		
Prefers	162	58.1
Does not prefer	117	41.9
Total	279	100
Search relevancy		
Prefers	168	60.2
Does not prefer	111	30.8
Total	279	100
Sentiment analysis		
Prefers	147	52.7
Does not prefer	132	47.3
Total	279	100
Opinion surveys		
Prefers	173	62.0
Does not prefer	106	38.0
Total	279	100
Citizen reporting		
Prefers	163	58.4
Does not prefer	116	41.6
Total	279	100
Other		
Prefers	25	9.0
Does not prefer	254	91.0
Total	279	100

Table 6.9 shows the mobile-based tasks listed in order of the highest number of preferences per task. This is an indicator of which tasks are the most popular across the sample population. Findings ranged from the highest number of peri-urban youth (206) indicating a preference for “SMS transcription”, through to the lowest number (147), indicating a preference for “sentiment analysis. This is reflective of the relative popularity of transcription tasks (Eagle, 2009).

Table 6. 9: Preferred mobile-based tasks		
Rank	Preferred task	Number of respondents
1	SMS transcription	206
2	Language translation	180
3	Opinion surveys	173
4	Search relevancy	168
5	Citizen reporting	163
6	News translation	162
7	Sentiment analysis	147

6.3 Cross-tabulations

A total of seven cross-tabulations were run to establish demographic patterns among the sample respondents. “Gender”, “highest education level”, “mobile phone ownership” and “daily income” were cross-tabulated, so as to provide additional information on the demographic data obtained for this study. The results of these cross-tabulations are summarized in tables 6.10-6.16.

Table 6. 10: Highest education level obtained-Gender cross-tabulation			
Level	Gender		Total
	Female	Male	
Primary certificate	6	4	10
Secondary certificate	47	40	87
Diploma	54	37	91
University degree	35	41	76
Other	4	4	8
			272

Note: 7 respondents (2.5% of sample population) did not indicate their highest education levels obtained.

Table 6.10 shows that of the majority of respondents with diplomas, 54 (59.3%) are female and 37 (40.7%) are male. Among respondents with secondary certificates, 47 (54.0%) are female and 40 (46.0%) are male. For respondents with university degrees, 35 (46.1%) are female and 41 (53.9%) are male. This is an indicator of the differences in male and female respondents with respect to their levels of education.

Table 6.11 shows results of a cross-tabulation between employment and gender. Among respondents who are still in school and not working, 115 (58.4%) are female and 82 (41.6%) are male.

Table 6. 11: Employment-Gender cross-tabulation			
Current occupation	Gender		Total
	Female	Male	
Self employed	5	15	20
Formally employed	8	14	22
Unemployed	12	10	22
In school (no work)	115	82	197
Other	4	4	8
			269

Note: 10 respondents (3.6% of sample population) did not indicate their current occupations.

Table 6.12 indicates that among the respondents that own mobile phones, female and male representation is almost evenly distributed with 138 (52.3%) being female, and 126 (47.7%) being male.

Table 6. 12: Mobile phone ownership-Gender cross-tabulation			
Ownership	Gender		Total
	Female	Male	
Owns mobile phone	138	126	264
Does not own	11	4	15
			279

Table 6.13 shows that the majority of the respondents earn less than 500 Ksh per day. A slightly higher number of females earn this amount. However, there is relative parity between males and females who earn either between 750 and 1000 Ksh per day, and more than 1000 Ksh per day.

Table 6. 13: Estimated daily Income-Gender cross-tabulation			
Daily income (Ksh)	Gender		Total
	Female	Male	
<500	70	62	132
500-750	9	17	26
750-1000	8	9	17
>1000	21	22	43
			218

Note: 61 respondents (21.9%) did not indicate their daily incomes.

Cross-tabulations on demographic variables by gender reveal that there is relative parity among males and females in educational attainment, incomes, and ownership of mobile phones. However, males are more advantaged when it comes to opportunities for self and formal employment. 90% of all the respondents indicated preferences for mobile phone-based tasks. This implies that Mobile Crowdsourcing has the potential to provide avenues for self-employment, especially for female respondents, and thereby bridge the gap in incomes or livelihoods.

Table 6.14 displays that among respondents with secondary certificates, diplomas or university degrees, the majority own mobile phones. For secondary certificate holders, 82 (94.3%) own mobile phones. For diploma holders, 88 (96.7%) own mobile phones, and for university degree holders 74 (97.4%) own mobile phones. This indicates that most mobile phone owners in the sample population have at least attained secondary level education.

Table 6. 14: Education level -Mobile phone ownership cross-tabulation			
Level	Mobile phone ownership		Total
	Does not own	Owns mobile phone	
Primary certificate	3	7	10
Secondary certificate	5	82	87
Diploma	3	88	91
University	2	74	76
Other	1	7	8
			272

Note: 7 respondents (2.5% of sample population) did not indicate their highest education levels obtained.

Table 6.15 shows that the majority of respondents who own mobile phones are still in school and do not work, with 188 (95.4%) who own mobile phones and only 9 (4.6%) who do not own mobile phones.

Table 6. 15: Employment-Mobile phone ownership cross-tabulation			
Level	Mobile phone ownership		Total
	Does not own	Owns mobile phone	
Self employed	1	19	20
Formal employment	0	22	22
Unemployed	3	19	22
In school (no work)	9	188	197
Other	0	8	8
			269

Note: 10 respondents (3.6% of sample population) did not indicate their current occupations.

Table 6.16 shows that most of the respondents who own mobile phones earn below 500 Kshs, with 125 (94.7%) who own mobile phones and only 7 (5.3%) who do not own mobile phones. For respondents who earn between 500 and 750 Kshs, 25(96.2%) own mobile phones, with only 1 respondent (3.8%) who does not own a mobile phone. For respondents who earn between 750 and 1000 Kshs, all 17 respondents sampled (100%) own mobile phones. Similarly, for respondents who earn more than 1000 Kshs, all 43 respondents sampled (100%) own mobile phones.

Table 6. 16: Estimated daily income-Mobile phone ownership cross-tabulation			
Daily income	Mobile phone ownership		Total
	Does not own	Owns mobile phone	
<500	7	125	132
500-750	1	25	26
750-1000	0	17	17
>1000	0	43	43
			218

Note: 61 respondents (21.9%) did not indicate their daily incomes.

6.4 Frequency distributions and descriptive statistics for survey items

In order to ascertain the response pattern of peri-urban Kenyan youths, frequency distributions for all items were generated prior to data cleansing. After replacement of missing values with the series mean, it is impossible to accurately assess the extent to which respondents agreed or disagreed with instrument items. Moreover, all missing values are accounted for, and the generated mean for the sample population alters the overall distribution of the data set. Results of the frequency distributions are displayed in Tables P1-P4 of Appendix P.

Results indicated that respondents rated most of the construct items as either “neutral” or “agree”, followed by respondents who indicated that they either “disagree” or “strongly agree”. The fewest respondents indicated that they “strongly disagree”. In the case of the construct “technology anxiety”, the majority of respondents indicated that they “disagree”. The items were used to measure the extent of “participation intention” in Mobile Crowdsourcing.

Overall, there was a strong intention among peri-urban Kenyan youths to participate in Mobile Crowdsourcing initiatives as evidenced by the frequency distributions⁹² for each of the four items of the construct “participation intention”.

6.5 Data screening

Data collected was captured in Microsoft Excel and then exported to SPSS (version 19.0.0) for data analysis. Reverse scoring⁹³ was required for survey instrument items 30 and 32, belonging to the variable “attitude”. This ensured that all correlations and loadings were aligned⁹⁴ within the same factor (Hair et al., 2010).

Preparation of data for analysis occurred in three phases. Firstly, the data was examined for missing values. Secondly, the data was screened for univariate outliers, and none were detected. Finally, the data was checked for normality, a statistical assumption that underlies analysis of multivariate data (Hair et al., 2010). Normality of the data was assumed. A detailed discussion of these steps follows.

⁹² See table P4 in Appendix P

⁹³ The abbreviation “RS” was used to denote reverse scored items (see table L2 in Appendix L).

⁹⁴ In this case, all items of the variable “attitude” were aligned as positive. This is consistent with the hypothesis (positive relationship) between “attitude” and “participation intention”.

6.5.1 Missing values⁹⁵

Missing data can be observed from the perspective of the number of cases with missing data per variable, and the number of variables with missing data for each case (Hair et al., 2010).

No case was detected with missing data for all constituent variables. However, across the entire data set, missing values were found for each case. In total, 109 missing values were identified.

Only 109 of 11160 variables or 0.98% contained missing values. This indicated that missing data would not pose a problem. Due to this small number of missing values per construct (less than 10%) (Hair et al., 2010), the mean substitution imputation method was appropriate. Missing values across the entire data set were replaced with the series mean for that particular variable, to retain the size of the sample and to ascertain that all cases had complete data (Hair et al., 2010).

6.5.2 Outlier detection and removal

The univariate method for outlier detection was used. This involves converting the data values into standard scores (Hair et al., 2010) and establishing a threshold for designation of an outlier. For small samples (80 observations or less), a standard score of 2.5 or greater is used. For larger sample sizes, this score is increased to 4 (Hair et al., 2010). Since the sample population comprised 279 responses, a threshold of 4 was used to identify outliers. This method allows for usually high or low values on each item to be identified, compared to other sample cases. No extreme values were detected and therefore no outliers were removed. Thus, all 279 usable responses were retained for further analysis.

6.5.3 Testing for normality⁹⁶

The most fundamental assumption in multivariate analysis is normality, which refers to the shape of the data distribution for an individual metric variable and its correspondence to the normal distribution (Hair et al., 2010). There was a minor indication of skewness and kurtosis for the construct “self-development”. A normal probability plot (p-plot) was then generated for this construct, showing that the data mostly followed the straight-line diagonal of the normal distribution. Thus the effects of skewness and kurtosis proved to be negligible,

⁹⁵ The number of missing values for each item is shown in table P5 of appendix P.

⁹⁶ Please note that this only occurred once composite variables were created. See page 104 for descriptive statistics of composites.

especially with a large sample size of 200 or more respondents (Hair et al., 2010). All other variables displayed skewness and kurtosis values within the -1 to $+1$ range for skewness, and -3 to $+3$ range for kurtosis, considered appropriate (Hair et al., 2010). Normal probability plots⁹⁷ were generated for all other constructs. The data mostly followed the straight line of a normal distribution, therefore ensuring normality of the data.

6.6 Preparation for factor analysis

A minimum absolute sample size should consist of 50 observations, or a desired ratio of 5 observations per variable. A more acceptable sample size would have a 10:1 ratio or a sample size of 100 or larger (Hair et al., 2010, p.102.). The data sample contained 279 usable responses, meaning that factor analysis was deemed appropriate. In assessing the suitability of the construct items for factor analysis, all independent variable items were inter-correlated. According to Hair et al (2010), if visual inspection of the emergent correlation matrix reveals no substantial number of correlations above 0.30, then factor analysis may be inappropriate. An item that inter-correlates with a score of less than 0.30 with any other item of the same construct must be excluded prior to factor analysis. This is because inclusion of the said item will reduce the factorability of the data.

The instrument items “MonC4” and “Com 2” failed to inter-correlate with their fellow construct items with a score of less than 0.30 and were therefore excluded. To further quantify the degree of inter-correlation among the independent variables and assess the appropriateness of factor analysis, the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy (MSA) was applied and found to be 0.875. The minimum value recommended is 0.5, with anything above 0.8 considered meritorious (Hair et al., 2010).

6.7 Factor analysis

Principal Component Factor Analysis (PCFA) was selected as the primary method of factor analysis.

The Varimax orthogonal rotation method with Kaiser Normalisation was applied (Hair et al., 2010). This method optimises the loading of a variable on one factor, while minimising the number of high loadings on a factor. Thus the number of variables and factors is reduced.

Factors were interpreted as follows:

⁹⁷ Normal probability plots for each construct are displayed in Appendix P.

1. Items should have high loadings⁹⁸ on a single factor.
2. Items that cross load (load highly on two or more factors) are usually deleted unless theoretically justified or if data reduction is strictly the objective.
3. Items should generally have communalities of greater than 0.50 to be retained for further analysis.
4. Items load onto unlikely factors.

The above guidelines are recommended by Hair et al (2010).

Four iterations of PCFA were run to arrive at an optimal solution. This outcome supported all four guidelines. Table 6.17 displays the construct items excluded from further analyses.

⁹⁸ Factor loadings above 0.35 are considered high loadings, for a sample size of more than 250 (Hair et al., 2010, p.117.).

Table 6. 17: Items excluded after PCFA				
Construct	No of initial items	No of retained items	Item excluded	Rationale
Monetary compensation	4	0	Mon C1	Item isolated ⁹⁹
			Mon C2	Cross-loaded onto other factor
			Mon C3	Cross-loaded onto other factor
			Mon C4	Inclusion reduces factorability of data ¹⁰⁰
Social influence	4	0	Soc I1	Cross-loaded onto other factor
			Soc I2	Cross-loaded onto other factor
			Soc I3	Cross-loaded onto other factor
			Soc I4	Cross-loaded onto other factor
Competence	4	0	Com 1	Cross-loaded onto other factor
			Com 2	Inclusion reduces factorability of data
			Com 3	Excluded due to low combined reliability with Com 4 ¹⁰¹
			Com 4	Excluded due to low combined reliability with Com 3
Perceived credibility	2	0	Per C1	Cross-loaded onto other factor
			Per C2	Item isolated ¹⁰²

Note: Technology Anxiety was tested as part of proposed mediated relationship (Section 6.10.8, figure 6.2)

⁹⁹ “Mon C1” was dropped, because due to the exclusion of “Mon C2” and “Mon C3” as a result of cross-loading, “Mon C1” was the remaining “Mon C” item. The variable “monetary compensation” was dropped from further analyses.

¹⁰⁰ “Mon C4” was dropped prior to PCFA, due to low correlation (< 0.30) with other “Mon C” items.

¹⁰¹ After exclusion of “Com 1”, “Com 3” and “Com 4” remained. Together, both do not meet the acceptable reliability cut-off ($\alpha > 0.60$). The variable “competence” was excluded from further analyses.

¹⁰² “Per C1” and “Per C2” were retained for PCFA. However, due to cross-loading, “Per C1” was dropped. The variable “perceived credibility” was excluded from further analyses.

The optimised solution for PCFA of the independent variables comprised 9 items and 3 emergent factors. Eigen values¹⁰³ exceeded 1.0, accounting for 67.99 % of the variance. Factor 1 had an Eigen value of 3.373, explaining 37.48% of the variance. Factor 2 had an Eigen value of 1.64, explaining 18.17% of the variance. Factor 3 had an Eigen value of 1.11, explaining 12.331% of the variance. The total Eigen value score was 6.12.

No cross-loadings were retained, with all loadings greater than 0.35. The lowest factor loading was 0.723, attributed to the construct item “Rep 3”, and the highest was 0.863 for the item “Self D1”. Each factor constituted two to four items. Similarly, PCFA¹⁰⁴ was run for the mediator variable “attitude”, the moderator variable “community identification” and the dependent variable “participation intention”. All items for these variables loaded on one distinct factor. No rotation was necessary, since only a single component was extracted. Communalities were found to be above the accepted cut-off of 0.50, except in the case of the moderator item “Commu 4”, which was subsequently dropped.

In further analyses, the construct “participation intention” is described as the dependent variable. Table 6.18 displays the optimal solution for all independent variables.

Table 6. 18: PCFA solution for independent variables			
Item	Factor		
	1	2	3
Self D1	0.863		
Self D2	0.802		
Rep 1		0.823	
Rep 2		0.848	
Rep 2		0.723	
Int 1			0.828
Int 2			0.828
Int 3			0.768
Int 4			0.730

¹⁰³ Eigen values are representative of the amount of variance shown by a factor (Hair et al., 2010).

¹⁰⁴ Factor loadings for the mediator, moderator, and dependent variables can be viewed in table 23.

6.8 Initial validity and reliability

Composite scores were calculated for each variable, as the average score of all relevant scale items¹⁰⁵ weighted equally. Eight composite scores were created, three for the independent variables, one each for the variables¹⁰⁶ “technology anxiety” and “social influence”, one each for the mediator and moderator variables, and one for the dependent variable. These composites were then examined for validity and reliability.

The optimal rotated solution shows that items for each construct loaded highly (> 0.35). Additionally, no items cross-loaded onto other factors. In addition to PCFA, Cronbach’s coefficient alpha values were computed to test the reliabilities of the revised scales. This was also done to test the internal consistency of the 6 composite scores. A cut-off level of 0.60 is deemed appropriate for construct items to be reliable (Hair et al., 2010).

The revised scales exhibited acceptable reliability scores, and these variables were then used for further analysis. Additionally, all variables displayed appropriate convergent and discriminant validity. AVE¹⁰⁷ was used to establish convergent validity. The Square Root of AVE (SQRT AVE) was used to establish discriminant validity. The validities and reliabilities for each variable are shown in table 6.19.

¹⁰⁵ Instrument items with significant factor loadings (>0.35) are reliable at the accepted cut-off level ($\alpha > 0.60$).

¹⁰⁶ Since “technology anxiety” and “social influence” play a part in the proposed mediated and moderated relationships in this study, composite scores for each variable were required.

¹⁰⁷ The Average Variance Extracted (AVE) for each variable was computed (cut off point ≥ 0.50) (Fornell and Larker, 1981). The AVE was measured according to the following formula, where λ_i is the loading of x_i on X , Var denotes variance, ε_i is the measurement error of x_i and Σ denotes a sum (Fornell and Larker, 1981).

$$\text{AVE} = \frac{\sum[\lambda_i^2]\text{Var}(X)}{\sum[\lambda_i^2]\text{Var}(X) + \sum[\text{Var}(\varepsilon_i)]}$$

Table 6. 19: Instrument validities and reliabilities					
Construct items	No. of items	Factor loading	Cronbach's α	AVE	SQRT of AVE
Participation Intention	4				
P Int 1		0.805	0.86	0.71	0.84
P Int 2		0.861			
P Int 3		0.863			
P Int 4		0.834			
Self development	3				
Self D1		0.863	0.64	0.69	0.83
Self D2		0.802			
Reputation	3				
Rep 1		0.823	0.76	0.64	0.80
Rep 2		0.848			
Rep 3		0.723			
Integrity	4				
Int 1		0.828	0.82	0.62	0.79
Int 2		0.828			
Int 3		0.768			
Int 4		0.730			
Tech anxiety ¹⁰⁸	4				
Tech A2		0.802	0.70	0.62	0.79
Tech A3		0.778			
Tech A4		0.779			
Attitude	4				
Att 1		0.731	0.79	0.62	0.79
Att 2		0.800			
Att 3		0.820			
Att 4		0.785			
Community identification ¹⁰⁹	3				
Commu 1		0.812	0.73	0.65	0.81
Commu 2		0.805			
Commu 3		0.799			

Note: Cronbach's alpha score above 0.60 is acceptable. All scores exceeded this threshold.

¹⁰⁸ The item "Tech A1" was excluded because its inclusion lowered the overall construct reliability score.

¹⁰⁹ The item "Commu 4" was excluded because its inclusion lowered the overall construct reliability score.

6.9 Descriptive statistics for composites¹¹⁰

Table 6.20 displays the descriptive statistics for all composite scores. “Self-development” had the highest mean score (mean = 4.11, sd = 1.01) whereas “technology anxiety” had the lowest (mean = 2.23, sd = 0.83). Standard deviation scores ranged from the lowest for “attitude” with 0.71, to the highest for “self-development” with 1.01. These scores were all close to 1.00, indicating that responses were fairly consistent (Hair et al., 2010).

With the exception¹¹¹ of “self-development”, skewness and kurtosis values were within the -1 to +1 range and -3 to + 3 range respectively, considered acceptable (Hair et al., 2010). Thus normality of the data was assumed.

Table 6. 20: Descriptive statistics for composites										
Scale items	Range	Minimum	Maximum	Mean	Standard deviation	Variance	Skewness		Kurtosis	
							Stat	Std.Error	Stat	Std.Error
n = 279										
Independent variables										
Self development	4.00	1.00	5.00	4.11	1.01	0.61	-1.484	0.146	3.846	0.291
Reputation	4.00	1.00	5.00	3.36	0.92	0.87	-0.241	0.146	-0.358	0.291
Integrity	4.00	1.00	5.00	3.27	0.92	0.66	-0.287	0.146	0.476	0.291
Technology anxiety	4.00	1.00	5.00	2.23	0.81	0.66	0.481	0.146	0.067	0.291
Social influence	4.00	1.00	5.00	3.15	0.83	0.69	-0.115	0.146	0.146	0.291
Mediator variable										
Attitude	3.25	1.75	5.00	4.05	0.71	0.51	-0.588	0.146	-0.090	0.291
Moderator variable										
Community identification	4.00	1.00	5.00	3.57	0.87	0.76	-0.588	0.146	0.409	0.291
Dependent variable										
Participation intention	4.00	1.00	5.00	3.95	0.80	0.65	-0.974	0.146	1.700	0.291

¹¹⁰ Composite scores were also generated for the constructs “technology anxiety”, “social influence”, “attitude”, and “community identification”. These constructs were required for mediation and moderation testing.

¹¹¹ A normal probability plot (p-plot) was generated for this variable, showing that it followed the straight-line diagonal of the normal distribution. In addition to the large sample size (n = 279), effects of skewness were very minor.

6.10 Hypothesis testing

Based on results of factor analysis and confirmation of validity and reliability of composites, correlation and regression analyses were applied to test the research hypotheses.

6.10.1 Correlation analysis

Pearson's product-moment correlation was computed to show correlations amongst the composites identified during factor analysis. This was done to measure the linear association between the independent and dependent variables (Hair et al., 2010). These correlations are displayed in table 6.21.

Table 6. 21: Correlation ¹¹² matrix				
	Participation Intention	Self- development	Reputation	Integrity
Participation intention	1	0.288*	0.279**	0.344**
Self- development	0.289**	1	0.348**	0.244**
Reputation	0.279**	0.348**	1	0.326**
Integrity	0.344**	0.224**	0.326**	1

Note: ** Correlation is significant at the 0.01 level (2-tailed),

The above results suggest that there were significant inter-correlations between independent variables.

Prior to regression, a correlation matrix of independent variables was created to check for multicollinearity¹¹³. To further verify convergent validity, the AVE for each composite score was calculated (Fornell and Larker, 1981). All AVE scores were equal to or more than 0.50. Therefore, the constructs accounted for 50% or more of the variance in their underlying factor. To verify discriminant validity, the square root of the AVE scores exceeded the correlation scores between that construct and others. This was acceptable. These findings are shown in table 6.22.

¹¹² The positive correlation scores indicate positive relationships between the three independent variables and the dependent variable (participation intention). This confirms the stated hypotheses for each of these variables.

¹¹³ Multicollinearity occurs when an independent variable is highly correlated with other independent variables. A lack of collinearity is evident when the correlation coefficient between two independent variables is 0. Complete collinearity only occurs when this coefficient is 1 (Hair et al., 2010).

Table 6. 22: Inter-correlations (Independent variables)				
	AVE	Self-development	Reputation	Integrity
Self-development	0.69	0.83	0.348**	0.224**
Reputation	0.64	0.348**	0.80	0.326**
Integrity	0.62	0.224**	0.326**	0.79

Note: ** Correlation is significant at the 0.01 level (2-tailed). Diagonals show square roots of AVEs.

6.10.2 Regression analysis

Regression analysis was run using the three factors extracted by factor analysis as independent variables. This was to discover the predictive power of each independent variable in predicting “participation intention”. Due to the large sample size ($n = 279$), multiple regression was workable (Hair et al., 2010).

Prior to regression analysis, all variables were checked to ensure they followed basic assumptions of regression analysis (Hair et al., 2010). An examination of their normal probability plots revealed normality. Scatterplots were drawn between the independent and dependent variables¹¹⁴. This showed evidence of linearity and a lack of heteroscedasticity¹¹⁵. Thus no transformations of the variables were required. Graphs are displayed in Appendix P.

6.10.3 Regression techniques

Stepwise multiple regression was run. The stepwise estimation method was used to select the fewest maximal predictors of the dependent variable (Hair et al., 2010). This is done by selecting the independent variable with the highest bivariate correlation with the dependent variable. This builds a regression equation. Alternatively, a confirmatory approach¹¹⁶ (enter method) was used to judge the effect on overall model fit of inclusion of all independent variables (Hair et al., 2010). Results of both analyses are discussed next.

¹¹⁴ Scatterplots were also generated for the mediator and moderator variables (“attitude” and “community identification respectively).

¹¹⁵ When error terms have increasing variance, the data is said to be heteroscedastic (Hair et al., 2010).

¹¹⁶ Whereby all variables are entered into the regression equation at once (Hair et al., 2010).

6.10.4 Stepwise estimation method

This section discusses the steps followed using the stepwise estimation approach.

“Integrity” had the highest correlation with “participation intention” ($r = 0.344$, $n = 279$, $p = 0.000$), and was used to calculate the regression equation to predict “participation intention”. The results of the first regression model (1st model) are shown in table 6.23.

Table 6. 23: Stepwise estimation: First model											
Model summary											
Multiple R					0.344						
Coefficient of determination (R^2)					0.118						
Adjusted R^2					0.115						
Standard error of the estimate					0.756						
Analysis of variance (ANOVA)											
	Sum of squares			df		Mean square		F		Sig of F	
Regression	21.235			1		21.235		37.149		0.000	
Residual(s)	158.334			277		0.572					
Total	179.568			278							
Regression model											
	Regression coefficient			Statistical significance		Correlations			Collinearity statistics		
Variable	B	Std error	β	t	Sig.of t	Zero-order	Partial	Part	Tolerance	VIF	
(Constant)	2.839	0.188		15.080	0.000						
Integrity	0.340	0.56	0.344	6.095	0.000	0.344	0.344	0.344	1.000	1.000	

Analysis of variance (ANOVA) indicates that the overall model is statistically significant with an F ratio of 37.149, at the 0.000 significance level. This results in an adjusted R^2 value of 0.115, a regression coefficient (B) of 0.340 and a standardized regression coefficient (β) of 0.344

The t-value of 6.095, statistically significant at the 0.000 level, indicates a significant partial correlation. “Integrity” explains 11.5 % of the variance in “participation intention”.

The next step involved the examination of regression coefficients (B) and t-values of the other independent variables not included in the first model, searching for significant coefficients (Hair et al., 2010).

As a result, the independent variable “self-development” was identified as the next candidate for inclusion in the regression model. Results are shown in table 6.24.

Table 6. 24: Stepwise estimation: Second model										
Model summary										
Multiple R						0.407				
Coefficient of determination of R ²						0.165				
Adjusted R ²						0.159				
Standard error of the estimate						0.737				
Analysis of variance (ANOVA)										
	Sum of squares			df		Mean square		F		Sig of F
Regression	29.704			2		14.852		27.352		0.000
Residual(s)	149.864			276		0.543				
Total	179.568			278						
Regression model										
	Regression coefficient			Statistical significance		Correlations			Collinearity statistics	
Variable	B	Std error	β	t	Sig.of t	Zero-order	Partial	Part	Tolerance	VIF
(Constant)	2.056	0.270		7,606	0.000					
Integrity	0.291	0.56	0.294	5.208	0.000	0.344	0.299	0.286	0.950	1.053
Self-development	0.230	0.58	0.223	3.949	0.000	0.289	0.231	0.217	0.950	1.053

ANOVA shows that this model is statistically significant with a reduced F ratio of 27.352, at the significance level of 0.000. This regression resulted in an adjusted R² value of 0.159. Therefore, “integrity” and “self-development” collectively explain 15.9 % of the variance, a 4.4 % increase from the first model. The standard error of the estimate decreased from 0.756 in the first model to 0.737. The B value for “integrity” decreased from 0.340 to 0.291, with a decrease in its standardized regression coefficient (β) from 0.344 in the first model to 0.294. This is due to interdependence between “integrity” and “self-development”.

The t value for “integrity” decreased from 6.095 in the first model to 3.949 in the second model, while retaining a significance level of 0.000. These results indicate that “integrity” and “self-development” are both statistically significant predictors of “participation

intention”. “Integrity” is a more significant predictor than social influence¹¹⁷. “Self-development contributes less to the overall model fit than “integrity”.

This indicates that “self-development” accounts for less of the variance in “participation intention”, in the presence of “integrity”, than it would alone.

“Reputation” was identified as the final candidate for inclusion in the regression model. These results are shown in table 6.25.

Table 6. 25: Stepwise estimation: Third model										
Model summary										
Multiple R					0.423					
Coefficient of determination of R ²					0.179					
Adjusted R ²					0.170					
Standard error of the estimate					0.732					
Analysis of variance (ANOVA)										
	Sum of squares		df	Mean square		F		Sig of F		
Regression	32.172		3	10.724		20.008		0.000		
Residual(s)	147.396		275	0.536						
Total	179.568		278							
Regression model										
	Regression coefficients			Statistical significance		Correlations			Collinearity statistics	
Variable	B	Std error	β	t	Sig.of t	Zero-order	Partial	Part	Tolerance	VIF
(Constant)	1.949	0.273		7.140	0.000					
Integrity	0.257	0.58	0.260	4.463	0.000	0.344	0.260	0.244	0.880	1.1137
Self-development	0.191	0.61	0.185	3.155	0.000	0.289	0.187	0.172	0.865	1.156
Reputation	0.112	0.52	0.130	2.146	0.000	0.279	0.128	0.117	0.814	1.228

ANOVA shows that this model is statistically significant with a reduced F ratio of 20.008, at the significance level of 0.000. This regression resulted in an adjusted R² value of 0.170. Therefore, “integrity”, “self-development” and ‘reputation” collectively explain 17.0 % of the variance, a 1.1 % increase from the second model. The standard error of the estimate decreased from 0.737 in the second model to 0.732. The B value for “integrity” decreased from 0.291 in the second model to 0.257, with a decrease in its standardized regression coefficient (β) from 0.294 in the second model to 0.260 in the third model.

¹¹⁷ For both predictors (p < 0.001)

This indicates that “integrity” and “self-development” account for more of the variance in “participation intention”, in the presence of “reputation”. This third model shows that “integrity”, “self-development” and “reputation” are the most significant predictors, accounting for 17.0 % of the variance in the criterion variable “participation intention”. No additional variables were excluded.

Thus after three iterations of regression, a final model emerges. Figure 6.1 shows this.

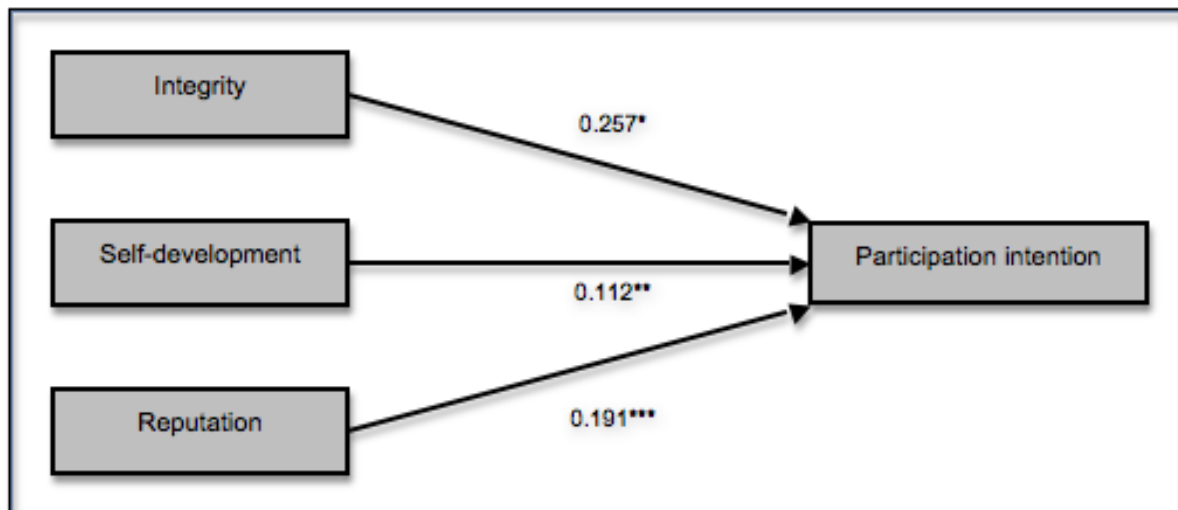


Figure 6. 1: Significant standardised regression coefficients¹¹⁸.

6.10.5 Alternate regression: Confirmatory approach (enter method)

This section discusses results of regression using an alternate approach (confirmatory).

All three independent variables were entered into the regression equation simultaneously. Table 6.26 shows results.

¹¹⁸ * $p = 0.000$, ** $p = 0.002$, *** $p = 0.033$

Table 6. 26: Enter method: First and only model					
Model summary					
Multiple R			0.423		
Coefficient of determination of R ²			0.179		
Adjusted R ²			0.170		
Standard error of the estimate			0.732		
Analysis of variance (ANOVA)					
	Sum of squares	df	Mean square	F	Sig of F
Regression	32.172	3	10.724	20.008	0.000
Residual(s)	147.396	275	0.536		
Total	179.568	278			
Regression model					
	Regression coefficients			Statistical significance	
Variable	B	Std error	β	t	Sig of t
(Constant)	1.949	0.273		4.463	0.000
Integrity	0.257	0.58	0.260	3.155	0.000
Self-development	0.191	0.061	0.185	3.155	0.002
Reputation	0.112	0.052	0.130	2.146	0.033

Dependent variable: Participation intention

Using the enter method, a significant model emerged ($F_{3, 275}, p = 0.000$). Adjusted R square = 0.170. Significant predictors are “integrity” ($\beta = 0.260, p = 0.000$), “self-development” ($\beta = 0.185, p = 0.002$), and “reputation” ($\beta = 0.130, p = 0.033$). This alternate approach confirms¹¹⁹ that all three predictors account for 17.0 % of the variance in “participation intention”.

After testing (via both correlation and regression techniques), hypotheses¹²⁰ 1, 2, and 5(b) were supported.

6.10.6 Assumptions of the regression variate

As discussed earlier, all individual variables met the assumptions required for regression analysis. However, the regression variate was also checked to ensure that it met these assumptions.

¹¹⁹ For both regression techniques used, the proportion of variance accounted for by models is the same (i.e. 17 %).

¹²⁰ See pages 55, 56, and 60 for proposed hypotheses.

The assumptions examined were linearity, homoscedasticity, residual independence, and normality. This was evaluated using the residual, which is the difference between the actual dependent variable and its predicted value (Hair et al., 2010, p.220). These assumptions were met and results are shown in Appendix P.

The regression variate of the final stepwise regression model (Table 27) yielded a regression equation as follows:

$$\text{participation intention} = 1.949 + 0.257(\text{integrity}) + 0.191(\text{self-development}) + 0.112(\text{reputation})$$

The constant (1.949) is statistically significant at the 0.000 level and contributes to the prediction of “participation intention”. “Integrity”, “self-development” and “reputation” have positive coefficients of regression. Increased levels of “integrity”, “self-development” and “reputation” may yield increased levels of “participation intention”. Standardised coefficients of regression show that “integrity” ($\beta = 0.260$), is a more significant predictor of “participation intention” than “self-development” ($\beta = 0.185$) or “reputation” ($\beta = 0.130$).

6.10.7 Test for multicollinearity

To test for effects of multicollinearity, tolerance and Variance Inflation Factor (VIF) values were calculated (see tables 27-29).

A high tolerance value (close to 1) shows minor collinearity, whereas tolerance values that approach zero show high levels of collinearity. The VIF is the reciprocal of the tolerance values. The lower the tolerance value, the higher the VIF and vice versa. Thus higher tolerance values are preferred.

Results showed that there was no evidence of multicollinearity. The next section discusses testing for mediation.

6.10.8 Testing for mediation

This study proposed a mediated relationship, involving “technology anxiety” (independent variable), “attitude” (mediator) and “participation intention” (dependent variable). Two approaches were used to test for mediation. These techniques are discussed and results of both tests are presented and discussed.

The four-step approach (Baron and Kenny, 1986) was used to test the proposed mediating effect of “attitude” on the relationship between “technology anxiety” and “participation intention”. Figure 6.2 depicts this relationship¹²¹.

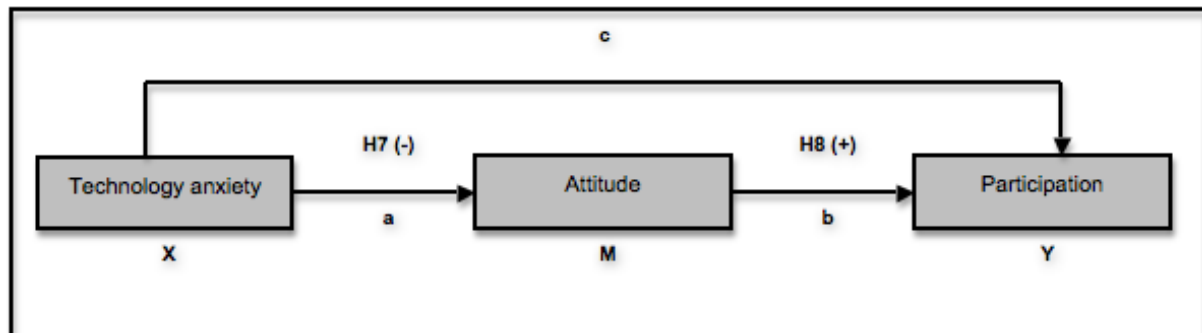


Figure 6. 2: Proposed mediated relationship¹²².

Table 6.27 describes the steps followed to test the proposed mediated relationship.

Table 6. 27: Four step approach	
Step	Analysis
1	A simple regression was run, with “technology anxiety” predicting “participation intention”.
2	A simple regression was run, with “technology anxiety” predicting “attitude”.
3	A simple regression was run with “attitude” predicting “participation intention”.
4	Multiple regression was run with “technology anxiety” and “attitude” predicting “participation intention”.

Adapted from Baron and Kenny (1986)

Steps 1-3 established that there were zero order¹²³ relationships among the variables. Step 4 showed that “technology anxiety” was no longer significant ($p = 0.538$) when “attitude” was controlled for. Thus full mediation was supported. These results are shown in table 6.28.

¹²¹ Two hypotheses involved. The first (H7) proposes a negative relationship between “technology anxiety” and “participation intention”. The second (H8) proposes a positive relationship between “attitude” and “participation intention” (See pgs 62 and 63).

¹²² Path “c” denotes direct effect. X = Independent variable, M = mediator variable, Y = dependent variable.

¹²³ Results for steps 1-3 showed that relationships were all significant at the 0.001 level ($p = 0.000$).

Table 6. 28: Four step regression (test ¹²⁴ for mediation)					
First regression model (Dependent variable: participation intention)					
	Regression coefficients			Statistical significance	
Variable	B	Std error	β	t	Sig of t
(Constant)	4.637	0.134		34.549	0.000
Technology anxiety	-0.307	0.057	-0.0310	-5.422	0.000
Second regression model (Dependent variable: attitude)					
	Regression coefficients			Statistical significance	
Variable	B	Std error	β	t	Sig of t
(Constant)	5.026	0.108		46.367	0.000
Technology anxiety	-0.438	0.046	-0.499	-9.588	0.000
Third regression model (Dependent variable: participation intention)					
	Regression coefficients			Statistical significance	
Variable	B	Std error	β	t	Sig of t
(Constant)	1.360	0.229		5.927	0.000
Attitude	0.640	0.056	0.567	11.470	0.000
Fourth regression model (Dependent variable: participation intention)					
	Regression coefficients			Statistical significance	
Variable	B	Std error	β	t	Sig of t
(Constant)	1.518	0.344		4.409	0.000
Technology anxiety	-0.035	0.057	-0.035	-0.617	0.538
Attitude	0.620	0.064	0.550	9.620	0.000

The four step approach discussed above, does not test the significance of the indirect pathway, where X affects Y through the path of a and b (see Figure 14). This indirect effect was calculated and its significance tested. This was done by running a Sobel mediation test. This technique involves multiplying two regression coefficients, resulting from two regression models (Sobel, 1982). Ideally, a product is formed by multiplying the two coefficients with each other. This is the partial regression effect for “attitude” predicting “participation intention”, and the simple coefficient for “technology anxiety” predicting “attitude”. The results of this test are shown in table 6.29.

¹²⁴ Note: The B and β scores for “technology anxiety” are negative. This is reflective of the negative relationship between “technology anxiety” and “attitude”. This confirms the stated hypothesis (see pg 62) involving these variables.

Table 6. 29: Sobel test for mediation					
Variables in simple mediation model					
Dependent			Participation intention		
Independent			Technology anxiety		
Mediator			Attitude		
Descriptive statistics and Pearson correlations ¹²⁵					
	Mean	Standard deviation	Participation intention	Technology anxiety	Attitude
Participation intention	3.953	0.804	1.000	-0.310	0.568
Technology anxiety	2.229	0.811	-0.310	1.000	-0.450
Attitude	4.050	0.712	0.568	-0.450	1.000
Sample size (n) = 279					
Direct effect and total effects ¹²⁶					
	Coefficients	Std error	t	Sig of t	
YX	-0.307	0.057	-5.422	0.000	
MX	-0.438	0.046	-9.588	0.000	
YM	0.620	0.065	9.620	0.000	
YX.M	-0.035	0.057	-0.617	0.538	
Indirect effect and significance (using normal distribution)					
	Value	Std error	Z score	Sig	
Effect	-0.272	0.040	-6.773	0.000	

As indicated in the table above, the Sobel test incorporates the four-step approach, used previously. However, an added advantage of this method is that it calculates the indirect effect and reports its significance. The indirect effect for the proposed mediated relationship was found to have a Z value of -6.773, thus confirming that full mediation occurred.

After running both mediation tests, it was found that hypotheses¹²⁷ 7 and 8 were supported. The next section discusses analysis run to test a proposed moderated relationship.

6.10.9 Testing for moderation

This study proposed that higher levels of “community identification” would result in “social influence” having a stronger impact on “participation intention”.

¹²⁵ Note: Correlations involving “technology anxiety” include negative scores. This also reflects the nature of the hypothesis (-ve), between “technology anxiety” and “attitude”. See figure 14 on page 113. In addition, see proposed hypothesis between “technology anxiety” and “attitude” on pg 62.

¹²⁶ X = Independent variable, M = Mediator variable, Y = Dependent variable

¹²⁷ See pages 62 and 63 proposed hypotheses.

To test this hypothesis, hierarchical regression was run (Aiken and West, 1991). The proposed moderated relationship is depicted in figure 6.3:

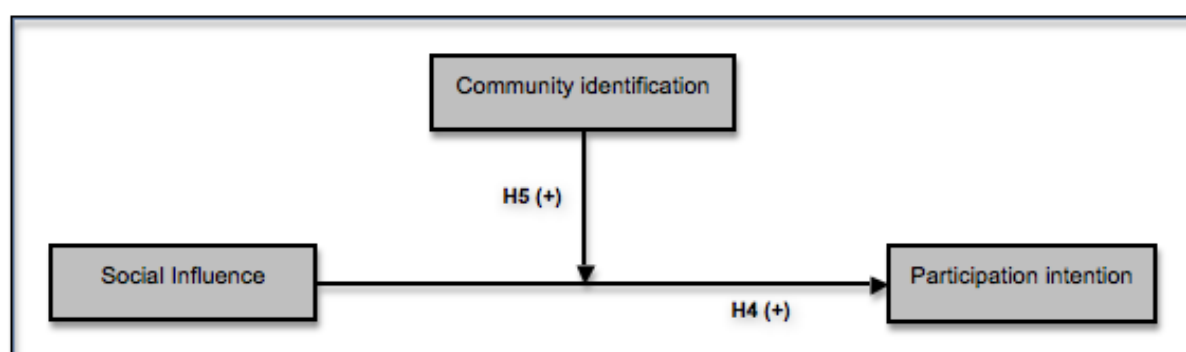


Figure 6. 3: Tested moderated relationship

The steps followed to test this relationship are summarised in table 6.30:

Step	Analysis
1	An interaction term XZ (social influence*community identification) was created.
2	Y (participation intention) was regressed on X (social influence) and Z (community identification).
3	Y (community identification) was regressed on XZ, while controlling for X (social influence) and Z (community identification).

Prior to creation of the interaction term (XZ), centred mean scores were created (Aiken and West, 1991, p.11.) for “social influence” and “community identification”. This was done to reduce multicollinearity. Results of moderation testing are shown in table 6.31:

Model	R	R ²	Adjusted R ²	Std error of estimate	Change statistics				
					R ² change	F change	df1	df2	Sig. F Change
1	0.590 ¹²⁸	0.348	0.344	0.651	0.348	73.777	2	276	0.000
2	0.591 ¹²⁹	0.349	0.342	0.562	0.001	0.300	1	275	0.584

For model 1: p = 0.000, for model 2, p = 0.584

The “R square change value”, when the interaction variable was added to the predictor and moderator variables (model 2) decreased to 0.001 from 0.348 (model 1). This change was discernible (R² changes minimally), F (1,275) = 0.300, p = 0.584. This indicates that “community identification” moderates the relationship between “social influence” and “participation intention”.

¹²⁸ For model 1: Predictors are “community identification” (centred mean 1) and “social influence” (centred mean 2).

¹²⁹ For model 2: Predictor is interaction effect (centred mean 1*centred mean 2).

To determine the extent of moderation, this interaction was plotted and interpreted (Aiken and West, 1991, p.12.). The resultant scatterplot showed evidence of a positive relationship between “social influence” and “participation intention”. This scatterplot is shown in Figure 6.4.

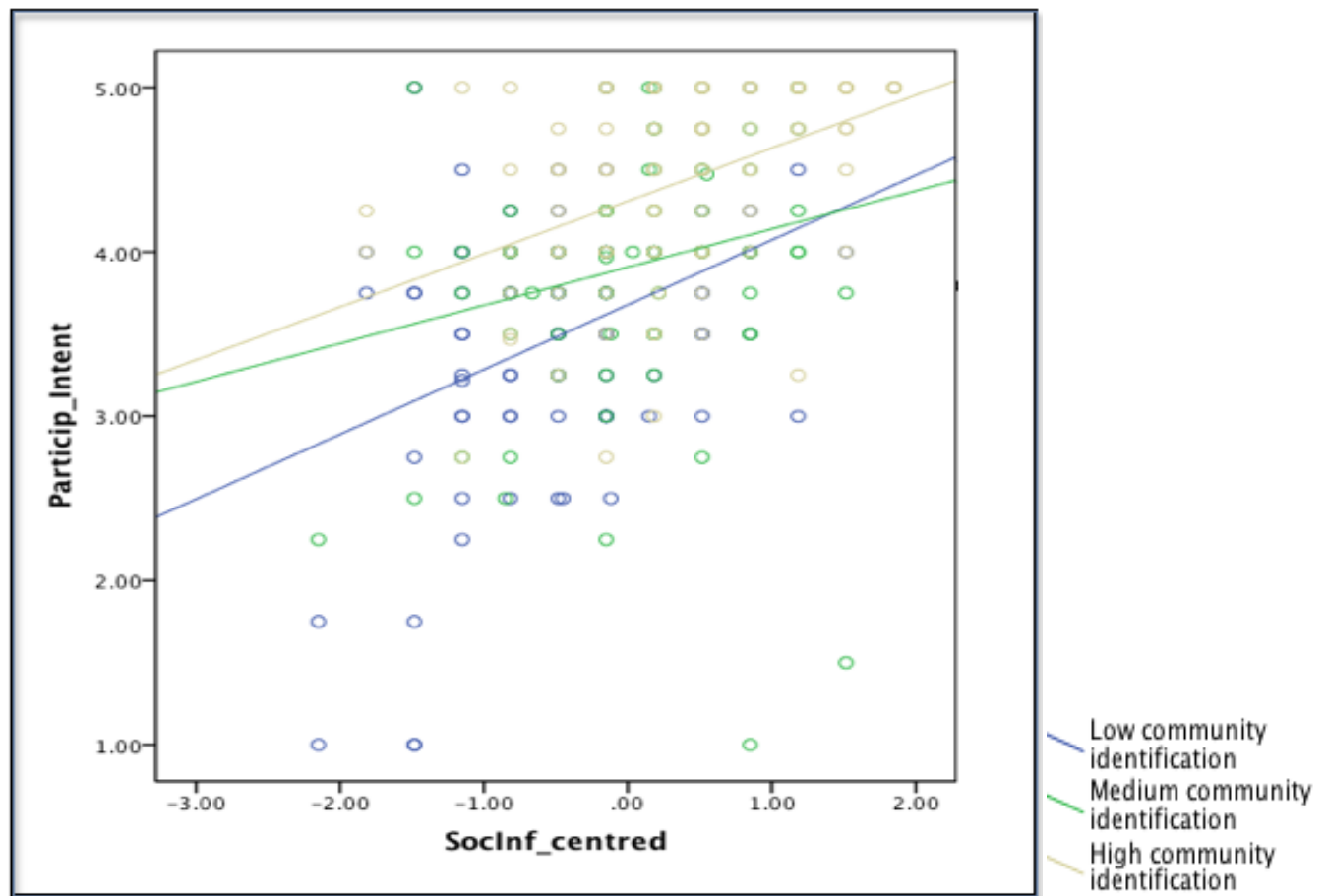


Figure 6. 4: Plotted effect of tested moderated relationship

The graph above shows that “participation intention” will increase when “social influence” increases but this is more so when there is a higher level of “community identification”. The top-most slope indicates that higher levels of “community identification” will moderate the relationship between “social influence” and “participation intention”.

To confirm this outcome, the data sample was split into three groups, representing “low”, “medium” and “high” levels of “community identification”. Mean split correlations were then run for each of these three groups to determine the relationship between “social influence” and “participation intention”, at varying levels of “community identification”. Results are shown in table 6.32:

Table 6. 32: Mean split correlations		
Group 1: Low levels of community identification		
Variables	Participation intention	Social influence
Participation intention	1.000	0.386**
Social influence	0.386**	1.000
** Correlation is significant at the 0.001 level (2-tailed)		
Group 2: Medium levels of community identification		
Variables	Participation intention	Social influence
Participation intention	1.000	0.224*
Social influence	0.224*	1.000
* Correlation is significant at the 0.05 level (1-tailed)		
Group 3: High levels of community identification		
Variables	Participation intention	Social influence
Participation intention	1.000	0.440**
Social influence	0.440**	1.000
** Correlation is significant at the 0.001 level (2-tailed)		

Results of the split correlations confirm that “community identification” moderates the relationship between “social influence” and “participation intention”. Thus, higher levels of “community identification” lead to a stronger relationship between “social influence” and “participation intention”.

An alternative approach was also used, whereby all above prescribed steps were followed, except that standardized scores (z values) were created instead of centred mean values. This shows that the proposed moderated relationship can be confirmed using either centred means (Aiken and West, 1991) or standardised scores (z values). Results for both approaches were identical. After running moderation tests, it was found that hypothesis¹³⁰ 4 was partially supported, and hypothesis¹³¹ 9 was supported.

6.11 Conclusion

This chapter presented and discussed results of data analysis. Firstly, data was screened and tested for reliability and validity. Secondly, the effects of “integrity”, “self-development”, and “reputation” on “participation intention” were examined. Thirdly, the proposed mediated and moderated relationships, involving “technology anxiety”, “attitude”, and “social influence” were examined.

¹³⁰ See page 59 for proposed hypothesis.

¹³¹ See page 64 for proposed hypothesis.

Of the ten hypotheses proposed, three were dropped, one was partly supported and seven were fully supported. A combined model involving “integrity”, “self-development”, and “reputation” was found to have significant predictive power in explaining the dependent variable “participation intention”. “Integrity” was the most significant predictor of “participation intention” followed by “self-development” and “reputation”. These three predictors explained 17.0% of the variance in “participation intention”.

“Technology anxiety” was found to have a negative relationship with “attitude”, which was positively related to “participation intention”. “Attitude” fully mediated the relationship between “technology anxiety” and “participation intention”. Additionally, “community identification” emerged as a strong moderator of the relationship between “social influence” and “participation intention”.

The next chapter discusses and interprets key findings made. In addition, limitations of the present study and future avenues for further research are identified.

Table 6.33 presents a summary of all findings made.

Table 6. 33: Summary of findings		
Hypotheses ¹³²	Proposition	Outcome ¹³³
1	A higher perceived opportunity for “self-development” leads to a higher intention to participate in Mobile Crowdsourcing.	Supported
2	A higher perceived opportunity for enhancement of “reputation” leads to a higher intention to participate in Mobile Crowdsourcing.	Supported
3	A higher perceived opportunity for “monetary compensation” leads to a higher intention to participate in Mobile Crowdsourcing.	Dropped
4	“Social influence” will have a positive direct effect on intention to participate in Mobile Crowdsourcing.	Partly supported
5(a)	“Competence” will have a positive direct effect on intention to participate in Mobile Crowdsourcing.	Dropped
5(b)	“Integrity” will have positive direct effect on intention to participate in Mobile Crowdsourcing	Supported
6	“Perceived credibility” will have a positive direct effect on intention to participate in Mobile Crowdsourcing.	Dropped
7	“Technology anxiety” will have a negative direct relationship with attitude towards Mobile Crowdsourcing.	Supported
8	“Attitude” will have a positive direct relationship with intention to participate in Mobile Crowdsourcing.	Supported
9	The greater the level of “community identification”, the more impact “social influence” will have on intention to participate in Mobile Crowdsourcing.	Supported

¹³² For hypotheses tested, both correlation and regression techniques were used. Mediation and moderation tests also incorporate correlation and regression.

¹³³ Hypotheses could not be tested for constructs excluded from further analyses after PCFA.

Chapter 7: Discussion of results

7.1 Introduction

This chapter proceeds by reflecting on proposed hypotheses in the present study and the effects of a set of variables¹³⁴ on the dependent variable “participation intention”. Borrowing from previous studies in Information Systems and the social sciences, select motivational and socio-cognitive factors¹³⁵, and trusting beliefs, were hypothesised to affect “participation intention” in Mobile Crowdsourcing. This chapter discusses the implications of findings made in the previous chapter, basing explanations of observed results on both the theoretical underpinnings and context of the present study. In conclusion, a more parsimonious predictive model of “participation intention” is presented.

7.1.1 Participation Intention (dependent variable)

The “participation intention” of peri-urban Kenyan youths in Mobile Crowdsourcing is a function of their individual attitudes. The TRA has been extensively used to predict “behavioural intention” in various settings (Azjen, 1991). However, for purposes of this study, this theory has been modified to apply to Mobile Crowdsourcing as a form of behaviour among peri-urban Kenyan youths. This study conceptualises “participation intention” as a form of “behavioural intention”, which may influence participation behaviour. More specifically, chapter 4 presented a conceptual model comprising motivational and socio-cognitive factors, and trusting beliefs, used to explain “participation intention”. Motivational factors such as “self-development” (Oreg and Nov, 2007), “reputation” (Hsu et al., 2008), and “monetary compensation” (Hars and Ou, 2001) should influence “participation intention” since Crowdsourcing is an activity that demands some form of individual motivation. Similarly, socio-cognitive factors such as “social influence”, “technology anxiety”, and “community identification” should influence “participation intention” (Venkatesh et al., 2003, Chiu et al., 2006), as the concept of Mobile Crowdsourcing involves the use of a technology tool (mobile phone), which affects individuals both cognitively and emotionally.

¹³⁴ These variables include independent variables, a mediator variable, and a moderator variable.

¹³⁵ Motivational factors strictly focus on factors that stem from motivation theory. i.e. “Self-development”, “reputation” and “monetary compensation”. Socio-cognitive factors include “social influence”, “technology anxiety”, “attitude” and “community identification”, borrowed from “Socio-Cognitive Theory” and the “Theory of Reasoned Action (TRA)”. This distinction has been made for purposes of this study.

This in turn may affect their behavioural intentions (potential participation). Lastly, the trusting beliefs of ‘competence’ and ‘integrity’ (Li et al., 2006) should affect ‘participation intention’ because formation of such beliefs may influence the intended behaviour (Mobile Crowdsourcing). Testing of these hypotheses confirm that the variables ‘self-development’, ‘integrity’, and ‘reputation’ strongly predict ‘participation intention’. The variable ‘attitude’ fully mediates the relationship between ‘technology anxiety’ and ‘participation intention’. Additionally, the variable ‘community identification’ fully moderates the proposed relationship between ‘social influence’ and ‘participation intention’. Contrary to expectations, ‘monetary compensation’ does not strongly predict ‘participation intention’.

The following section reflects on the proposed hypotheses and further explains the predictors of ‘participation intention’.

7.2 Motivational factors

‘Participation intention’ may be influenced by motivational factors. These factors are defined as ‘self-development’, ‘reputation’, and ‘monetary compensation’. Three hypotheses were proposed for the effects of each of these factors on the intention to participate in Mobile Crowdsourcing. This section discusses these relationships.

7.2.1 Self-Development

The present study proposed that a higher perceived opportunity for ‘self-development’ would lead to a higher intention to participate in Mobile Crowdsourcing. Individuals with high levels of ‘self-development’ would have their motivational needs satisfied as a result of being able to learn and improve on acquired personal skills (Lakhani and Wolf, 2005; von Krogh et al., 2003; Oreg and Nov, 2007). This hypothesis was strongly supported, confirming that a sense of ‘self-development’¹³⁶ (Hars and Ou, 2001; Hertel, Niedner, and Herman, 2003) may be a key determinant of behavioural (participation) intention. By performing a set of mobile-based tasks, peri-urban Kenyan youths are able to harness a skill and develop it iteratively. If Mobile Crowdsourcing affords Kenyan youths an opportunity for ‘self-development’, Crowdsourcing intermediaries or facilitators would have to consider the implications that arise due to the implementation of Mobile Crowdsourcing platforms. For example, the Mobile Crowdsourcing platform Txteagle¹³⁷ enables rural to peri-urban Kenyans to learn to perform mobile-based tasks such as user-friendly SMS based language

¹³⁶ Self-development is described in the literature as a form of motivational behaviour.

¹³⁷ Txteagle (otherwise known as JANA)

translation exercises (Eagle, 2009). Thus, work is provided with the added benefit of potential “self-development”.

The high literacy and mobile penetration rates in Kenya relative to other African countries, (ITU, 2009; CCK, 2010), may enhance the need for “self-development” among peri-urban Kenyan youths. This may influence the use of mobile phones to use Mobile Crowdsourcing platforms, perform mobile-based tasks (Eagle, 2009). For example, when performing SMS-based language translation tasks on their mobile handsets (Eagle, 2009), peri-urban Kenyan youths are presented with a unique opportunity to provide translation of basic language phrases on behalf of software companies that need to market their interfaces in local languages, but do not have the requisite capacity for translation. Peri-urban youths are familiar with the local dialects in their respective communities, and are mobile phone subscribers. Therefore, all that is required is for them to learn how to use their mobile phones to perform translation-based tasks (an acquired skill). This is much easier than having to learn a local language, which means they are already equipped with the requisite knowledge, but initially did not have a platform with which to use it to harness a need for “self-development” (Hars and Ou, 2001).

In prior studies, “self-development” is often described within the context of OSS Collaboration, whereby programmers participate in Open Source projects in order to expand their skill sets (Hars and Ou, 2001). In this case, “self-development” is voluntary on the part of the participant, and is undertaken due to the enjoyment that can be derived from it. However, in the context of the present study, where “self-development” plays a role in social development in communities, participants cannot interact with a platform because they perceive that there is enjoyment in doing so. In fact, the “self-development” of peri-urban Kenyan youths is instrumental to improvement of personal livelihoods, because through performance of mobile-based tasks, there is a means to earn money for technology-enabled work. This suggests that when “self-development” is tied to notions of social empowerment and survival, then it becomes more of a necessity than a voluntary need.

7.2.2 Reputation

Hsu and Lin (2008), view “reputation” as the degree to which an individual believes in enhancement of social status through participation in an activity. Highlighted in previous works on knowledge sharing and “blog activities”, this concept was applied to the context of this study as an individual’s belief that they would be able to enhance their social status by participating in Mobile Crowdsourcing. Subsequently, findings showed that peri-urban Kenyan youths strongly believe that the prospect of “personal reputation” plays a crucial role in their intentions to participate in Mobile Crowdsourcing.

Results from this study show that perceived higher levels of enhancement of reputation would lead to a higher intention to participate in Mobile Crowdsourcing. This strengthens the notion that “reputation” is a key asset that can be leveraged to achieve and maintain status within a collective (Jones et.al, 1997; Mclure-Wasko and Faraj, 2005; Hsu and Lin, 2008). “Reputation”, thus plays a crucial role in explaining “participation intention” in Mobile Crowdsourcing. As part of a larger community, peri-urban Kenyan youths may be motivated to participate in Mobile Crowdsourcing due to “perceived reputation enhancement” (Mclure-Wasko and Faraj, 2005), in addition to “self-development” needs. The implication of this finding is that a perceived lack of enhanced “reputation” among Mobile Crowdsourcing participants may hinder successful implementation of Mobile Crowdsourcing platforms in their communities. For instance, “Txteagle” (the Mobile Crowdsourcing platform) has built and designed a system based on ranking the most proficient mobile-based task performers within a community (Eagle, 2009). Therefore, the possibility that an individual will be ranked for superior task performance among peers would boost their “perceived enhanced reputation”. This further motivates them to continue to participate in Mobile Crowdsourcing.

As dual concepts, “self-development” and “reputation” strongly support the notion that motivational factors are key determinants of behaviour. In the current study, these two dimensions were subjected to empirical analysis and observation. In the literature on motivational factors, “reputation” has been described as being both “intrinsic” and “extrinsic” in nature, and as a result its origins are subject to deliberation. In the current study, “reputation” has been conceptualised as an external reward (extrinsic motivational factor) and supports the notion proposed in prior studies on OSS Collaboration, that rewards, tokens or the ranking of contributions among peers, increases perceived enhanced reputation (Lakhani

and Wolf, 2005). It is important to note therefore, that this interpretation of reputation is not necessarily generalisable to all contexts.

7.2.3 Monetary compensation

The “opportunity to make money”, was derived and developed as a measure defined as “monetary compensation” to better capture the essence of this study (Mobile Crowdsourcing). This component was examined as a potential predictor of “participation intention”. As an external reward (extrinsic motivation factor), “monetary compensation” was defined as the existence of a financial incentive (usually cash) that motivates individual behaviour (Cameron and Pierce, 2002). For this study, the individuals under observation are peri-urban Kenyan youths, and the behaviour in question is participation in Mobile Crowdsourcing.

The hypothesis that a higher perceived opportunity for “monetary compensation” would lead to a higher intention to participate in Mobile Crowdsourcing, was proposed. While the literature reviewed showed that the existence of a bounty or monetary reward (Brabham, 2010) is significant, the proposed hypothesis was not supported. More specifically, when considered in tandem with the motivational factors of “self-development” and “reputation”, “monetary compensation” does not seem significant as a predictor of participation of peri-urban youths in Mobile Crowdsourcing.

Despite the need for a sense of social empowerment, as defined by mobile-based task performance for pay (Mobile Crowdsourcing), the “self-development” and “reputation” needs of peri-urban Kenyan youths have to be met in order for them to interact with Mobile Crowdsourcing to make money. This challenges the notion proposed in the literature on Crowdsourcing and OSS Collaboration, that the opportunity to make money is the key motivator in participation in Crowdsourcing (Dickinson, 1989; Cameron and Pierce, 1994; Brabham 2008b; Brabham, 2009). Consequently, it may be the case that the perceived opportunity to make money through Mobile Crowdsourcing is viewed by peri-urban youths as a consequence of initial participation, rather than as a driving factor. This was an unexpected outcome, given the high levels of unemployment (50% across the Kenyan population) among rural-peri urban mobile phone subscribers (Eagle, 2009). It appears that the component of “monetary compensation” may be insufficient on its own, but rather more effective when reinforced by the notions of “self-development” and “reputation”, especially in the prevailing context of the present study (peri-urban Kenya).

This finding implies that for Mobile Crowdsourcing intermediaries or platforms that seek to successfully deploy Mobile Crowdsourcing in peri-urban Kenyan communities, it would be necessary to consider the significance of “self-development” and “reputation” as motivational factors, and “monetary compensation” as a necessary outcome, reinforced by the other two motivational factors.

The next section discusses trusting beliefs and their effects on “participation intention” in Mobile Crowdsourcing.

7.3 Trusting beliefs

This study proposed that trusting beliefs would have a positive effect on the intention to participate in Mobile Crowdsourcing. These beliefs are defined as “competence”, “integrity”, and “perceived credibility” in this study. The trusting component of “integrity” was found to have a significant effect on the “participation intention” of peri-urban Kenyans in Mobile Crowdsourcing. However, findings show that the trusting components of “competence” and “perceived credibility” do not play a prominent role in determining the “participation intention” of peri-urban Kenyan youths. This suggests that in the context of Mobile Crowdsourcing, “integrity” is a sufficient trust-based determinant of “participation intention”, over and above the other two trusting dimensions. Three hypotheses were proposed for the effects of each of these trusting beliefs on “participation intention”. This section reflects on these associations.

7.3.1 Competence

“Competence”, conceptually originates from prior literature in IS and Marketing, and is defined as the ability of a trusted party (otherwise known as the trustee), to do what is required of them by a trusting party (trustor) (Li, Hess and Valacich, 2006). Furthermore, trusting beliefs are based on the dimensions of both “disposition to trust” and “institutional trust” (McKnight, Chaudhury and Kacmar, 2002). “Competence” was examined in the current study within the context of Mobile Crowdsourcing. Perceptions of “competence” of Mobile Crowdsourcing platforms, therefore, bring about implications for future implementation of, and engagement in this activity. This is because “competence” is a determinant of trust, which in turn may influence consumer behaviour (McKnight et al., 2002).

The hypothesis that “competence” would have a positive direct effect on intention to participate in Mobile Crowdsourcing was proposed. This hypothesis was not supported. “Competence” is based on trust, and in literature on Consumer Behaviour, initially described perceptions of performance (McKnight et al., 2002). In the presence of the trusting belief of “integrity”, “competence” as a predictor of “participation intention” in Mobile Crowdsourcing, is somewhat neutralised. This may be because peri-urban Kenyan youths are more concerned with a sense of fulfilment of promises than performance based issues on the part of a Mobile Crowdsourcing facilitator.

As a trusting belief, “competence” did not emerge as a key dimension in the context of Mobile Crowdsourcing among peri-urban Kenyans. In prior literature on trust, “competence” describes a grouping of characteristics that enables a party to wield influence within a specific domain (Mayer, Davis and Shoorman, 1995). Presently, this domain is Mobile Crowdsourcing and the party in question is the facilitator in a given community. Thus, the perception of the characteristics (performance based) of this facilitator in the eyes of peri-urban Kenyan youths is in fact an evaluation on their part of the “competence” of Mobile Crowdsourcing platforms. In previous Management and IS studies, this trusting dimension has also been referred to as “Perceived Expertise” (Mayer et al., 1995.p.717).

Such notions of “competence” or expertise for that matter, connote a set of skills or abilities applicable to a particular (situation specific) domain. In other words, the proposition made in this study was that peri-urban Kenyan youths were likely to appraise the perceived abilities of Mobile Crowdsourcing facilitators with which they would engage. Upon reflection of findings made, this proposition does not appear to hold much weight. Findings made in this study confirm that engagement with Mobile Crowdsourcing platforms is not contingent upon perceptions of “competence”. In spite of this, “competence” is better understood when observed in tandem with the trusting belief of “integrity” (McKnight and Chervany, 2001), which is discussed next.

7.3.2 Integrity

“Integrity”, has been described in the fields of Marketing and IS as the extent to which a trusted party (trustee) can fulfill its obligations or promises (Li et al., 2006). This construct was examined within the context of this study (Mobile Crowdsourcing), in addition to the trusting dimensions of “competence” and “perceived-credibility”, to ascertain whether or not it has an effect on “participation intention”.

This study proposed that “integrity” would have a positive direct effect on intention to participate in Mobile Crowdsourcing. This hypothesis was fully supported. Despite all three trusting dimensions of “competence”, “integrity” and “perceived credibility” being important (Li et al., 2006), findings made in this study suggest that “integrity” is a powerful enough predictor of trust when considered on its own. The implication of this outcome is that for facilitators to successfully implement Mobile Crowdsourcing platforms, peri-urban Kenyan youths’ perceptions of their ability to honour their obligations must be considered important. When peri-urban Kenyan youths perceive Mobile Crowdsourcing facilitators as being able to keep their promises, they may have sufficient reason to be trusting. This is an instance where the trusting party (trustor) develops trust towards the trusted party (Mayer et al., 1995) or trustee. This supports suggestions in prior literature that “integrity” is measurable as an attribute of technology platforms (McKnight et al., 2002; Li et al., 2006), as opposed to being solely a human trait. Furthermore, the trusting dimension of “integrity” is more reflective of an ethical trait (Mayer et al., 1995) than the trusting component of “competence”.

In previous studies, “integrity” has been referred to as an “honesty belief” (McKnight and Cummings, 1998) defined as “keeping commitments and not lying”, therefore being reliable (McKnight et al., 2002). In this study, trust, in the eyes of peri-urban Kenyan youths, may be an evaluation on their part of the perceived reliability of Mobile Crowdsourcing platforms. This perception is instrumental to their intended participation in Mobile Crowdsourcing. The findings made confirm that Mobile Crowdsourcing may be contingent solely on “integrity”, in the absence of the component of “competence”. Despite this, “competence” on its own would be an unreliable predictor of “participation intention”. This leaves the third and final trusting component of “perceived credibility”, discussed next.

7.3.3 Perceived credibility

Studies on mobile banking have proposed the notion that intention to engage in electronic banking may be influenced by the security and privacy concerns of users (Luarn and Lin, 2005). “Perceived credibility”, conceptually refers to a scenario in which consumers believe that engagement in an activity will not pose any threats to their individual privacy and perceived sense of security (Wang et al., 2003). Furthermore, “perceived credibility” is considered as being impersonal and is reliant upon the paradigms of “reputation”, “information” and “economic reasoning” (Ba and Pavlou, 2002). Prior studies have suggested that within the domain of Internet Banking, the perceived threat to user privacy and security

may be a deterrent from engagement in electronic commerce (Luarn and Lin, 2005). This is applicable to Mobile Crowdsourcing, whereby the extent to which peri-urban Kenyan youths perceive privacy and security threats may be determined.

This study proposed that “perceived credibility” would have a positive direct effect on intention to participate in Mobile Crowdsourcing. In similar fashion to the trusting belief of “competence”, this hypothesis was not supported. Therefore for Mobile Crowdsourcing to be successfully deployed, “perceived credibility” cannot be considered as a sole trusting determinant of “participation intention”. In other words, peri-urban Kenyan youths sampled do not value “perceived credibility” above and beyond the trusting dimension of “integrity”, and it appears that they evaluate “perceived credibility” in more or less the same way as the dimension of “competence”. Despite suggestions in prior studies that “perceived credibility” has a significant positive effect on the intention of consumers to engage in Internet banking (Luarn and Lin, 2005), this was not reinforced in the context of this study. Upon reflection, a pattern begins to emerge whereby the trusting perceptions of peri-urban Kenyan youths revolve around the dimension of “integrity”, which further adds impetus to the ongoing debate on what definitions of trust are most significant and in what contexts (Mayer et al., 1995; McKnight et al., 2002; Li et al., 2006).

Perceptions of trust may have implications for future studies on Crowdsourcing. Findings made in the present study confirm that “integrity” has emerged as the strongest indicator of the trusting beliefs of peri-urban Kenyan youths. Nevertheless, this does not necessarily mean that the components of “competence” and “perceived credibility” must be ignored all together. A more apt measure would be to empirically observe the combined effects of all three trusting components across a wide range of contexts. Findings made in the current study are therefore more indicative than conclusive, thus suggesting that trust is indeed a sensitive component, irrespective of context. This is because it plays a crucial role in determining behavioural intention.

7.4 Socio-cognitive¹³⁸ factors

This study confirms that socio-cognitive factors such as “social influence” and “technology anxiety” have an impact on “participation intention” in Mobile Crowdsourcing. Two hypotheses were proposed for these dimensions in addition to two more hypotheses proposed

¹³⁸ The term “socio-cognitive” is used as a differentiating term to describe factors that do not stem from motivational theory (motivational factors).

to test mediation and moderation effects of the constructs of “attitude” and “community identification” respectively. This section discusses these proposed relationships in more detail.

7.4.1 Social influence

Prior studies view “social influence” as the extent to which an individual perceives that other individuals important to them believe that they should engage in a particular form of behaviour (Venkatesh et al., 2003). Conceptualised as “subjective norm” or “social norm” this construct defines social influences that determine behaviours (Hsu et al., 2010). In studies on “social psychology”, The TRA (Fishbein and Azjen, 1975) and its successor the TPB (Azjen, 1991), imply that “subjective norm” has a direct impact on behavioural intention. Additionally, empirical evidence from prior studies suggests that “social norms” has a positive effect on individual behaviour (Hsu et al., 2008). In the case of Crowdsourcing, there is additional evidence that indicates that participation may depend on the need to conform to society as a whole (Brabham, 2008b).

For this study, the underlying concept behind “subjective norm” has been adapted and defined as “social influence” referring to the extent to which peri-urban Kenyans believe that fellow members of their communities believe that they should participate in Mobile Crowdsourcing. This study proposed that “social influence” would have a positive direct effect on intention to participate in Mobile Crowdsourcing. This hypothesis was not supported. However, due to the need to empirically observe the moderating effect of “community identification”, the variable “social influence” was retained. This relationship will be discussed in the following section. This finding shows that perceived levels of “social influence” among peri-urban Kenyan youths do not necessarily affect their “participation intention” in Mobile Crowdsourcing. This is in contrast to prior literature on “social psychology”, which suggested that “social influence”, described as the notion to comply with or conform to social pressures (Venkatesh and Davis, 2000), may play a significant role in human behaviour. Venkatesh and Davis (2000) further implied that “social influence” may be both mandatory and voluntary. However, findings made in this study do not conclusively show (empirically) that “social influence” strongly affects the “participation intention” of peri-urban Kenyans, and this calls for further future exploration. In hindsight, due to the defining context of the present study, the predictive potential of “social influence” is nullified by the presence of motivational factors and trusting beliefs that may influence “participation

intention". To further explain the role "social influence" in this study, the proposed moderating effect of the related concepts of "community identification" and its empirically observed interaction effect with "social influence" are discussed next.

7.4.2 Community identification

"Community identification", refers to a situation in which individuals perceive themselves as being part of a unit, comprising other individuals (Nahaphiet and Ghosal, 1998). This study extends this definition by applying it to the context of Mobile Crowdsourcing in peri-urban Kenyan communities. In previous research, there is a focus on linkages established between individuals who are part of a network that consists of a series of defined relationships (Chiu et al., 2006).

Literature around the concept of "identification", has for the most part revolved around the domain of knowledge sharing in virtual communities (Bagozzi and Dholakia, 2002; Ardichivili and Wentling, 2003; Chiu et al., 2006), and describes individual perceptions that relate to the concept of self-inclusion in a social group.

This study takes place in a community based setting (peri-urban Kenya) and therefore examined the notion of this perceived "sense of belonging" among peri-urban Kenyan youths, and its subsequent effect on their "participation intentions". This identification may be emotional in nature (Elmers, Kortokaas and Ouwerkerk, 1999), and may explain the willingness of individuals to maintain close ties within their respective communities (Chiu et al., 2006).

This study proposed the hypothesis that the greater the level of "community identification", the more impact "social influence" would have on "participation intention". This hypothesis was fully supported. Higher levels of "community identification" were found to have a significant effect on the association between "social influence" and "community identification". In other words, increased levels of "community identification" highly correlate with intention to participate in Mobile Crowdsourcing. This adds to suggestions made in previous studies that individuals form levels of self-awareness that may influence their sense of belonging to a particular community (Bergami and Bagozzi, 2000; Dholakia, Bagozzi and Pearo, 2004). This implies that while "social influence" is not a significant predictor of "participation intention" on its own, it is more influential in the presence of "community identification".

The implication of this finding is that prospective Mobile Crowdsourcing facilitators, particularly in peri-urban communities, need to fully appreciate notions of “identification” among participants as being instrumental to their participation in Mobile Crowdsourcing. This perception is psychological in nature, and incorporates cognitive, affective and evaluative responses (Bergami and Bagozzi, 2000) among peri-urban Kenyan youths.

7.4.3 Technology anxiety

In previous studies, “technology anxiety” is defined as the extent to which emotions regarding technology use are evoked (Venkatesh et al., 2003). More specifically, “technology anxiety” describes the fear, apprehension and hopelessness felt when contemplating the use of technology or actually engaging in user behaviour (Venkatesh et al., 2003). It is believed to elicit a negative emotional response to technology use (Meuter, Ostrom, Bitner and Roundtree, 2003). “Technology anxiety” has come to be known as a determinant of “technology readiness”, explaining the use of technology and related behaviours (Parasuraman, 2000). “Computer anxiety” for instance, has been found to be a common occurrence among users (Meuter et al., 2003). In the context of this study, “technology anxiety” was empirically observed to confirm notions proposed in the literature and ascertain what effect anxiety may have on the intentions of peri-urban Kenyan youths to participate in Mobile Crowdsourcing.

Previous research has shown that studies on “technology anxiety” describe the use of personal computers. Despite this, the concept of “technology anxiety” is applicable to a variety of technology tools (Meuter et al., 2003). Additionally, “computer anxiety” has been found to be conceptually distinct from “technology anxiety”, which is more based on the state of mind of a particular user across different contexts as opposed to “computer anxiety”, specific only to computer use (Meuter et al., 2003). The current study adapted and empirically observed the construct “technology anxiety”.

This study hypothesised that “technology anxiety” would have a negative relationship with “attitude”, as a potential predictor of “participation intention” in Mobile Crowdsourcing.

The intended participation of peri-urban Kenyan youths in Mobile Crowdsourcing may be reliant upon their attitude formations (Azjen, 1991) with respect to their participation intentions. For this study, the role of “technology anxiety” cannot be fully appreciated, without explaining the mediating effect of “attitude” on the relationship between “technology

anxiety” and “participation intention”. This proposed relationship is discussed in the following section.

7.4.4 Attitude

“Attitude” as a concept, stems from the personal belief that performance of intended behaviour will result in a specific outcome, based on an individual’s evaluation of whether or not this outcome is desirable to them (Taylor and Todd, 1995). In addition, this dimension is considered to be part of an individual’s belief structure (Azjen, 1975; Azjen, 1991). Literature in the field of “psychology” suggests that a universal definition of “attitude” does not at all eliminate disagreement on its actual definition.

This study proposed the hypothesis that the more favourable the “attitude” towards Mobile Crowdsourcing, the greater the “participation intention” would be. Attitude was the intervening variable (Baron and Kenny, 1986) introduced to test the relationship between the dimension of “technology anxiety” and “participation intention”. This hypothesis was supported, and confirmed propositions made in previous studies that “attitude” predisposes individual action (Azjen, 1991), consistently favourable toward the intended behaviour. In this study, this behaviour is described as Mobile Crowdsourcing. It was found that “attitude” fully mediates the relationship between “technology anxiety” and “participation intention”.

To better understand the role “technology anxiety” plays in the current study, it is important to consider that the mediating effect of “attitude” enhances the association between “technology anxiety” and “participation intention”. Upon reflection of findings, it may be possible that due to significant mobile penetration rates in rural to peri-urban African communities (Kyem and LeMaire, 2006), and familiarity with mobile handsets (CCK, 2010), peri-urban Kenyan youths are not necessarily apprehensive towards mobile technology use for Crowdsourcing. In the absence of “attitude” as a mediator, pre-conceived notions of “technology anxiety” among peri-urban Kenyan youths may not be a restricting factor when determining their intentions to participate in Mobile Crowdsourcing. These findings are rather indicative and are not necessarily generalisable to other contexts.

7.5 Conclusion

The findings made in this study, mostly confirm theoretical arguments presented in prior Sociology, Psychology, Marketing and IS literature, as to the most significant predictors of behavioural intention in relation to “Mobile Crowdsourcing”. The motivational factors of “self-development” and “reputation” are key determinants of “participation intention” in Mobile Crowdsourcing. Conversely, the dimension of “monetary compensation” challenges conventional theory that money is the driving factor behind participation in Crowdsourcing, thus sparking future debate as to the role of “monetary compensation” relative to other motivational factors.

The trusting belief of “integrity”, emerges as the strongest trust-based predictor of “participation intention” in Mobile Crowdsourcing, above and beyond the other two trusting dimensions of “competence” and “perceived credibility”, further contributing to the existing body of knowledge, and helping explain what the most comprehensive trusting dimensions that influence individuals’ intended behaviour are.

The socio-cognitive factors of “social Influence” and “technology anxiety” have been shown to be insignificant. However, when the mediating and moderating effects of “attitudes” and “community identification” are introduced, “social influence” and “technology anxiety” can be said to play a more significant role in determining “participation intention” in Mobile Crowdsourcing.

This discussion is concluded diagrammatically, with this study proposing a simpler research model, which could be tested in future studies on Mobile Crowdsourcing. This is shown in Figure 7.1. The following chapter discusses the contributions made by the current study to both theory and practice.

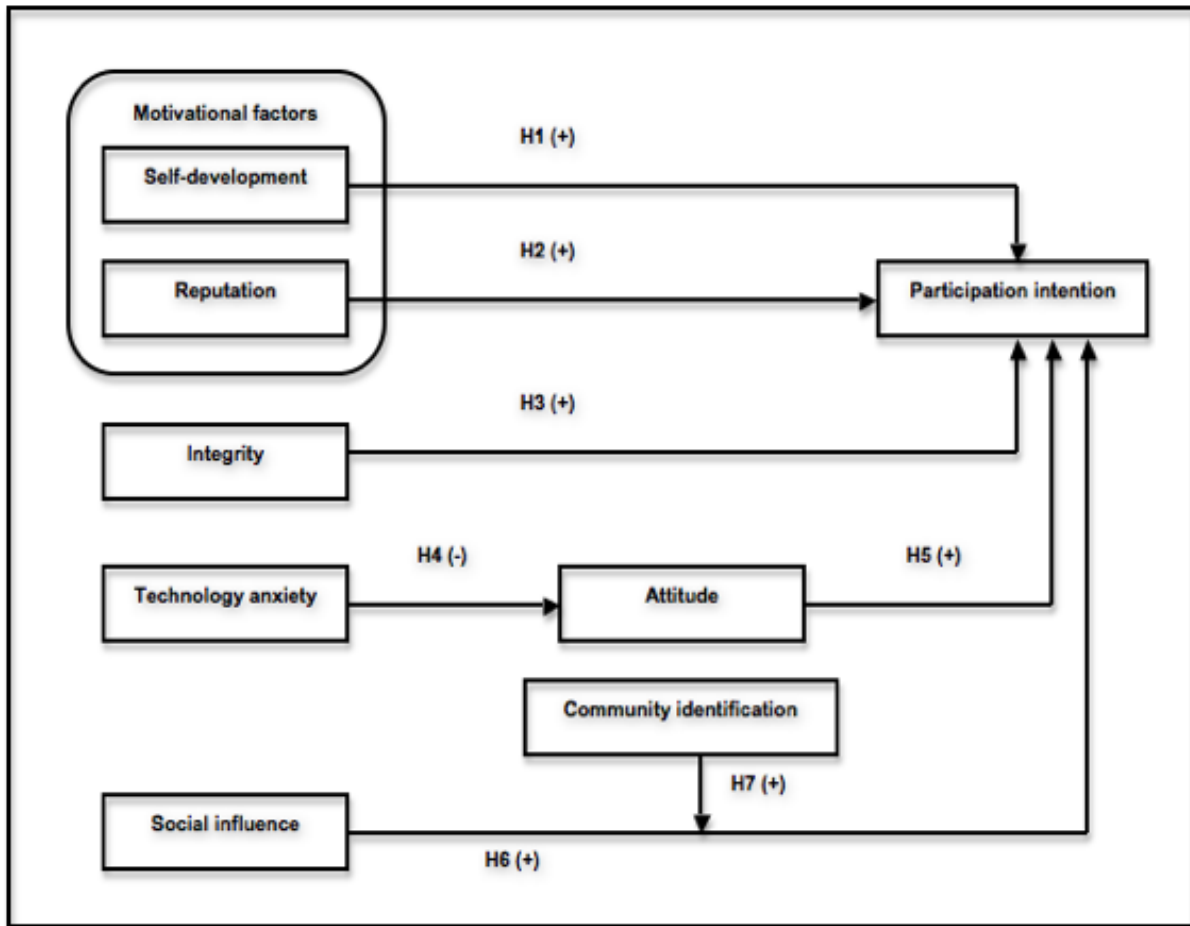


Figure 7. 1: Proposed conceptual model for future research

8. Conclusion

8.1 Introduction

This chapter provides a summary of the current study. It discusses the contributions and implications of the findings made for both research and practice. Limitations of the study are discussed, and future research opportunities identified. This study is then concluded.

8.2 Summary of key findings

This study examined the linkages between a set of motivational factors, in addition to trusting beliefs and socio-cognitive factors, proposed to influence “participation intention” in Mobile Crowdsourcing. Mobile Crowdsourcing facilitators¹³⁹ in an African context, make use of a pool of readily available workers capable of performing a set of mobile-based tasks. Prior studies on Crowdsourcing show that for participation in Crowdsourcing initiatives to occur, an appreciation for what would motivate individuals to participate is needed. This study examined the “intention” of peri-urban Kenyan youths to participate in Mobile Crowdsourcing.

The context of the current study allowed for observation of peri-urban Kenyan youths and the determination of how motivational factors, in addition to trusting beliefs and socio-cognitive factors, affected their “intention to participate” in Mobile Crowdsourcing. Data for this study was collected manually through a survey instrument, and 279 usable responses were obtained. Following testing for validity and reliability, hypotheses were tested using correlation and regression analyses. Findings made show that the most predictive factors of “participation intention” were “self-development”, “reputation” and “integrity”.

To attract peri-urban Kenyan youths to Mobile Crowdsourcing platforms as enablers of meaningful employment, platforms designed to enhance mobile-based skills, that incorporate reputation based systems (ranking for task performance), and reliably provide mobile-based work should be deployed. This is more important than the need to generate income. If the three emergent components of “self-development”, “reputation” and “integrity” are catered for, then implementation of Mobile Crowdsourcing within the context of this study is more likely to be successful in the long run.

¹³⁹ A “facilitator” is also described as an “intermediary” or “enabler”.

Findings confirm that “self-development”, “reputation” and “integrity” have the strongest associations with “participation intention”. When testing for the most significant predictors of “participation intention”, results showed that these three factors are the most significant determinants of “participation intention” in Mobile Crowdsourcing among peri-urban Kenyan youths.

In the following section, theoretical and practical implications of these results are discussed.

8.3 Contribution to practice¹⁴⁰

This study offers some powerful implementation insights to prospective Mobile Crowdsourcing facilitators, enabling them to better understand potential consumers, especially in rural and peri-urban African communities.

Practitioners who intend to design and implement Mobile Crowdsourcing platforms, in African communities must pay more attention to key human factors that would influence the “participation intention” of peri-urban Africans in Mobile Crowdsourcing. An avenue for Mobile Commerce practitioners to engage with communities so as to devise robust and reliable technology based platforms for community empowerment is provided. Micro-based task employment can be facilitated and through this unique framework, corporates and other organisations will be able to implement Mobile Crowdsourcing. This creates employment and opens up new markets. In addition, because of the role mobile money plays, potential mobile service providers would greatly benefit from this study. For instance, for marketing purposes, it would be easier to attract potential users or customers in peri-urban regions, since knowledge on factors that influence possible participation is made available. Moreover, this study affords practitioners the unique opportunity to merge the concepts of technology based employment creation, with mobile money, thereby addressing two crucial services simultaneously. Based on findings made in this study, the following recommendations for successful implementation and participation in Mobile Crowdsourcing can be made. Practitioners could:

(i). Devise community based platforms to afford peri-urban Kenyan youths the opportunity to learn and develop new skills. For example, through SMS translation tasks, these youths are provided with a platform with which to use their local knowledge to translate basic (simple

¹⁴⁰ While providing potential benefits to practitioners, “local or domestic” and “global” contributions are made.

phrase) interfaces into community based languages for software companies, and get paid for their service.

(ii). Design a platform that fosters a sense of “reputation” enhancement among peri-urban Kenyan youths. For example, Mobile Crowdsourcing platforms based on “reputation” systems (ranking of proficient users according to task performance) can be implemented, whereby more proficient performers of mobile-based tasks are encouraged to participate. This affords them the opportunity to earn more money by performing more tasks, thereby earning them recognition among fellow members of their communities.

(iii). Develop a reliable platform which creates mobile-based employment opportunities by implementing anticipated mobile based tasks as originally promised, and by giving peri-urban Kenyan youths a sense of commitment to their upliftment.

Based on findings made, in order to incentivise a peri-urban community, the above conditions must be satisfied first prior to engagement with Mobile Crowdsourcing platforms, as a money making initiative. The model used for this study may be replicable in an African context, and its level of significance may vary.

This study makes a “local” or “domestic” contribution by providing knowledge on Crowdsourcing deployment within Kenya, potentially providing useful information to service providers. This study makes a “global” contribution by providing implementation insights based on key human factors that predict participation of peri-urban Kenyan youths in Mobile Crowdsourcing. This knowledge is not only valuable in developing African countries, but also in developing countries across continents. International organisations that seek to implement Crowdsourcing platforms in a developing world context may benefit from findings made in this research study. Additionally, as part of this contribution, additional insight that aids mobile money service usage is provide to mobile phone operators in the developing world. This is possible due to the incorporation of a mobile money platform as part of Mobile Crowdsourcing. Thus, Mobile Commerce enabled employment becomes a possibility.

8.4 Contribution to theory¹⁴¹

This study makes an “academic” contribution in that it adds to the existing body of knowledge in the fields of “ICT4D”, Mobile Commerce, and Crowdsourcing.

This is ensured by demonstrating that key theories can be used concurrently to better predict “participation intention”. Additionally, empirical evidence of the significant effect of select human factors on “participation intention” in Mobile Crowdsourcing is provided.

Through the application of motivational theories in conjunction with the TRA supported by the McKnight trust model, SCT and Extended TAM, this study showed that “participation intention” of peri-urban Kenyans in Mobile Crowdsourcing could be empirically tested and predicted. As mentioned in earlier chapters, there is a clear difference between OSS Collaboration, Outsourcing, Open Innovation, User Innovation, Crowdsourcing, and subsequently Mobile Crowdsourcing, thus providing an indication of how future research models in this space can be conceptualised.

This study makes a “methodological” contribution through the development and validation of scales to measure hypotheses and conceptual models in the fields of Crowdsourcing, Mobile Commerce and Mobile Telephony. This contribution is made through the assessment of peri-urban Kenyan youths by testing an empirical model on a sample population to ascertain the explanatory and predictive capability of the model as applied to the context of this study. By demonstrating that potential participation among peri-urban Kenyan youths can be empirically observed, this study also makes a contribution to the Kenyan context¹⁴². This is in essence, a “contextual” contribution. Through this contribution, the predictive power of the model developed for this study has been ascertained.

8.5 Limitations of the study

This study presents a number of limitations. Firstly, administration of a survey instrument necessitated self-reporting on the part of respondents. As a result, responses obtained may not necessarily be completely accurate. This is because there may be an element of subjective bias involved. Secondly, this study captures “intentions” as opposed to actual participation in Mobile Crowdsourcing. Thirdly, due to the use of an empirical quantitative research instrument, the nature of the current study dictates that only predictive behaviour can be

¹⁴¹ This contribution is “academic”, “methodological”, and “contextual”.

¹⁴² This study paves the way for future studies on Crowdsourcing, particularly in Kenya.

explored and tested. This means that within the scope of this study, there is no way in which social underpinnings behind Mobile Crowdsourcing can be qualitatively explored. Fourthly, the limited timespan for collection of data, it is possible that an undefined number of respondents may have been absent during the data collection phase of the current study.

Finally, since research was carried out in specific peri-urban communities, the results are not necessarily generalisable to all youth communities across Kenya, let alone the African continent, or other contexts in which Mobile Crowdsourcing is likely to be implemented. Furthermore, the PCEA supports youth from both rural and urban settings, throughout Kenya. However, this church sponsored empowerment network, may constitute an implicit limitation in terms of inclusion of the target group.

The extent of the influence of limitations on the present study cannot be quantified. Therefore it is imperative that findings made should be recognised as strong indicators of specified outcomes rather than as conclusive. This calls for careful interpretation and application of results. In order to overcome the limitations of the current study, recommendations for future studies have been made. These are discussed in the following section.

8.6 Future research opportunities

This study opens up new avenues for further progress in the areas of Mobile Crowdsourcing, Crowdsourcing in general, Mobile Commerce, and Mobile Technology. Future research should further investigate the effect of “monetary compensation” on “participation intention” in Mobile Crowdsourcing. Furthermore, the trusting beliefs of “competence” and “perceived credibility” should be examined further. The conceptual model developed for the present study should be tested in a variety of different contexts (in other African countries), to assess the predictive power of motivational and socio-cognitive factors, in addition to trusting beliefs, on “participation intention”.

Replication of this study in different countries, for further validation of the empirical model, may be useful. Additionally, different factors may emerge as a result of testing the same empirical model in a different context, to predict “participation intention” in Mobile Crowdsourcing. Testing for generalisability can also be undertaken. Alternative measures or additional constructs may be developed and validated to test “participation intention” in specific contexts. The need to improve and refine the “participation intention” construct, to

have a more refined measurement scale may be helpful for future studies on Mobile Crowdsourcing.

A qualitative study to understand the socio-economic underpinnings of “participation intention”, to provide depth and a better grasp of contexts within which Mobile Crowdsourcing occurs, can be undertaken. Further investigation of the effect of “monetary compensation” on “participation intention” in light of the findings of the current study, is necessary.

8.7 Conclusion

Due to the relative novelty of the phenomenon that is Crowdsourcing, limited research has been conducted in this field. This particular study contributes to the growing knowledge base in Crowdsourcing and related studies. This study contributes to closing the existing gap in the literature on Crowdsourcing, particularly in a peri-urban context.

A survey of peri-urban Kenyan youths drawn from specific Kenyan communities supported hypotheses related to their “intentions” to participate in Mobile Crowdsourcing. One significant contribution made in this study is the unexpected outcome that indicates that “self-development”, “reputation” and “integrity” are the most significant predictors of “participation intention”. Additionally, the opportunity to make money is not as significant as initially thought in determining the “participation intention” of peri-urban Kenyans in Mobile Crowdsourcing. In other words, it appears that there are more important considerations than money that influence initial participation in Mobile Crowdsourcing, despite the purpose of this initiative to provide a means for employment for the unemployed. This suggests that practitioners should concentrate on Mobile Crowdsourcing from the perspective of developing platforms that are first community based, reliable and user friendly, with this in turn providing an opportunity for peri-urban participants to make money.

This study made use of a cross-disciplinary, multi-faceted, theoretical approach to develop and empirically test a model to predict the “participation intention” of peri-urban Kenyan youths in Mobile Crowdsourcing. This study sheds light on the effects of key human factors on “participation intention” in Mobile Crowdsourcing. The implications are significant for both academics and practitioners in the fields of Mobile Commerce, Mobile Telephony and ICT4D. In addition, Mobile Crowdsourcing not only provides a new way in which to perceive Crowdsourcing, but may also challenge conventional wisdom around the

mechanisms which guide the way in which business firms' function. For the first time, a knowledge workforce that is distributed could eventually replace factors of production that originally stemmed exclusively from the firm. This challenges conventional theory. This suggests that Mobile Crowdsourcing may have unlimited potential both in the short term and in the long run.

Upon embarking on this study, the researcher sought to contribute to the notion of how ICTs may benefit developing countries (Walsham and Sahay, 2006). It can now be ascertained, that through the use of Mobile Telephony to perform mobile tasks, described as Mobile Crowdsourcing, technology use in the developing world opens up new possibilities.

Moreover, there is no doubt that the phenomenon that is Mobile Crowdsourcing provides a glimpse into the future and power of Mobile Telephony.

References

- Agerfalk, P. and Fitzgerald, B. (2008) 'Outsourcing to an Unknown Workforce: Exploring Opensourcing as a Global Sourcing Strategy', *MIS Quarterly*, vol. 32, no.2, pp. 385-409.
- Aiken, L.S. and West, S.G. (1991) *Multiple Regression: Testing and Interpreting Interactions*, Newbury Park, California: Sage.
- Aker, J. and Mbiti, I. (2010) 'Mobile Phones and Economic Development in Africa', *Journal of Economic Perspectives*, vol.24, no.3, pp.207-232.
- Ardichvilli, A., Page, V. and Wentling, T. (2003) 'Motivation and Barriers to Participation In Virtual Knowledge-Sharing Communities Of Practice', *Journal of Knowledge Managemen*, vol.7, no.1, pp. 64-77.
- Avgerou, C. (2008) 'Information Systems in Developing Countries: A Critical Research Review', *Journal of Information Technology*, vol.23, no.3, pp. 133-146.
- Avgerou, C. (2010) 'Discourses on ICT and development', *Information Technologies and International Development*, vol.6, no.3, pp. 1-18.
- Azjen, I. and Fishbein.M. (1980) *Understanding Attitudes and Predicting Social Behaviour*, Englewood-Cliffs, NJ: Prentice Hall.
- Azjen, I. (1991) 'Theory Of Planned Behaviour', *Organisational Behaviour and Human Decision Processes*, vol.50, pp.179-211.
- Azjen, I. and Madden, T.J. (1986) 'Prediction of Goal-Directed Behaviour: Attitudes, Intentions, and Perceived Behavioural Control', *Journal of Experimental Social Psychology*, vol.22, pp.453-474.
- Ba, S. and Pavlou.P (2002) 'Evidence of the Effect of Trust Building Technology in Electronic Markets: Price Premiums and Buyer Behaviour', *MIS Quarterly*, vol.26, no.3, pp.243-268.
- Babbie, E.R. (2004) *The Practice of Social Research*, Belmont, CA: Thomson/Wadsworth.
- Bagozzi, R.P. and Dholakia, U.M (2002) 'Intentional Social Action in Virutal Communit'es', *Journal of Interactive Marketing*, vol.16, no.2, pp.2-18.
- Bailey, K.D. (1982) *Methods of Social Research: 2nd edition*. London: The Free Press.
- Bandura, A. (1977) 'Self-Efficacy: Toward A Unifying Theory of Behavioural Change', *Psychological Review*, vol.84, pp.191-215.
- Bandura, A. (1982) 'Self-Efficacy Mechanism in Human Agency', *American Psychologist*, vol.37, no.2, pp.122-147.

- Bandura, A. (1986). *Social Foundations of Thought and Action: A Social Cognitive Theory*, Englewood Cliffs, NJ: Prentice-Hall.
- Bandura, A. (2009) 'Socio Cognitive Theory of Mass Communication', *Media Psychology*, vol.3, no.3, pp.265-299.
- Baron, R. and Kenny, D. (1986) 'The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Consideration. *Journal of Personality and Social Psychology*, vol.51, no.6, pp. 1173-1182.
- Benabou, R. and Tirole, J. (2003) 'Intrinsic and Extrinsic Motivation', *Review of Economic Studies*, vol.70, pp.489-520.
- Benkler, Y. (2006) *The Wealth of Networks: How Social Production Transforms Markets and Freedom*, Yale University Press.
- Bergami, M. and Bagozzi, R.P. (2000) 'Self-Categorisation, Affective Commitment and Group Self-Esteem as Distinct Aspects of Social Identity In The Organisation', *British Journal of Social Psychology*, vol.39, 555-577.
- Bhavnani, A., Chiu, R.W., Janakiram, S. and Silarszky, P. (2008) *The Role of Mobile Phones in Sustainable Rural Poverty Reduction*, World Bank.
- Bitzer, J., Schrettl, W. and Schroder, P. (2007) 'Intrinsic Motivation in Open Source Software Development' *Journal of Comparative Economies*, vol.35, pp. 160-169.
- Brabham, D. (2008a) 'Crowdsourcing as a Model for Problem Solving', *The International Journal of Research into New Media Technologies*, vol. 14, no.1, p.75-90.
- Brabham, D.C. (2008b) 'Moving the Crowd at iStockphoto: The Composition of the Crowd at Motivations for Participation in a Crowdsourcing Application', *First Monday*, vo.13, no.6, [Online], Available: <http://journals.uic.edu/fm/article/view/2159/1969> [last accessed 18th December 2011].
- Brabham, D.C. (2010) 'Moving the Crowd at Threadless', *Information, Communication and Society*, vol.13, no.8, pp. 1122-1145.
- Brace, N., Kemp, R. and Snelgar, R. (2006) *SPSS For Psychologists*, McMillan.
- Cambre, M.A. and Cook, D.L. (1985) 'Computer Anxiety; Definitions, Measurement, Correlates', *Journal of Educational Computing Research*, pp.37-54.
- Cameron, J. and Pierce, W. (1994) 'Reinforcement, Reward, and Intrinsic Motivation: A Meta-Analysis', *Review of Educational Research*, vol.64, no.3, pp.363-423.
- Cameron, J. and Pierce, W.D. (2002) *Rewards and Intrinsic Motivation: Resolving the Controversy*, Westport, CT, Greenwood: Bergin and Garvey.
- Carter, D.C. (2009) *Quantitative Psychological Research: The Complete Student's Companion*, New York: Psychology Press.

Chabossou, A., Stork, C., Stork, M. and Zahongo, Z. (2008) 'Mobile Telephony Access and Usage in Africa', *The South African Journal of Information and Communication*, vol.9, no.1, pp. 1-25.

Chesbrough, H. (2003) 'The Era of Open Innovation', *Sloan Management Review*, vol.44, no.3, p.35-31.

Chesbrough, H. (2006) *Open Innovation: Researching a New Paradigm*, Oxford: Oxford University Press.

Chiu, C.M., Hsu, M.H. and Wang, T.G. (2006) 'Understanding Knowledge Sharing In Virtual Communities: An Integration of Social Capital and Socio Cognitive Theories', *Decision Support Systems*, vol.42, pp.1872-1888.

Cohendet, P. and Simon, L. (2006) 'Knowledge Intensive Firms, Communities and Creative Cities', Proceedings of the DIME Conference on Communities of Practice, Durham, October 27th-28th.

Communications Commission of Kenya (CCK). (2010) 'Quarterly Sector Statistics Report', [Online] Available: http://cck.go.ke/resc/downloads/SECTOR_STATISTICS_REPORT_Q4_2010-11.pdf [last accessed 18th December 2011].

Creswell, J.W. (2009) *Research Design: Qualitative Quantitative, and Mixed Methods Approaches*, Thousand Oaks, California: Sage Publications.

Daniel, J. (2012) *Sampling Essentials: Practical Guidelines For Making Sampling Choices*, Thousand Oaks, California: Sage Publications.

Davis, F.D. (1989) 'Perceived Usefulness, Perceived Ease of Use and User Acceptance of Information Technology', *MIS Quarterly*, vol.13, no.3, pp. 319-340.

Davis, F.D., Bagozzi, R.P. and Warsaw, P.R. (1989) 'User Acceptance of Computer Technology: A Comparison of Two Theoretical Models', *Management Science*, vol.35, no.8, pp. 982-1003.

Deci, E.L. and Ryan, R.M. (1985) 'The General Causality Orientations Scale: Self-Determination in Personality', *Journal of Research in Personality*, vol. 19, p.109-134.

Deci, E.L. and Ryan, R.M. (1991) 'A Motivational Approach to Self: Integration in Personality', *Perspectives on Motivation*, vol.38, pp.237-288.

Deci, E.L., Egrahi, H., Patrick, B.C. and Leone, D.R. (1994) 'Facilitating Internalisation: The Self-Determination Theory Perspective', *Journal of Personality*, vol.62, no.1, pp.119-142.

Deci, E.L., Koestner, R. and Ryan, R.M. (1999) 'A Meta-Analytic Review of Experiments Examining the Effects of Extrinsic Rewards on Intrinsic Motivation', *Psychological Bulletin*, vol. 125, pp.627-668.

Dholakia, U.M., Bagozzi, R.P. and Pearo, L.K. (2004) 'A Social Influence Model of Consumer Participation in Networks', *International Journal of Research In Marketing*, vol.21, pp.241-263.

Dibbern, J., Goles, T., Hirscheim, R. and Jayatilaka. (2004) 'Information Systems Outsourcing: A Survey and Analysis of the Literature', *The DATABASE for Advances in Information Systems*, vol.35, no.4, pp.6-102.

Dickinson, A.M. (1989) 'The Detrimental Effects of Extrinsic Reinforcement on Intrinsic Motivation', *Behaviour Analyst*, vol.12, pp.1-15.

Djiofack-Zebaze, C. and Keck, A. (2009) 'Telecommunications Services in Africa: 'The Impact of WTO Commitments, and Unilateral Reform on Sector Performance and Economic Growth', *World Development*, vo. 37, no.5, pp.919-940.

Eagle, N. (2005). 'Machine Perception and Learning of Complex Social Systems by Machine Perception and Learning of Complex Social Systems', *Ph.D Thesis, Masachusettes Institute of Technology (MIT)*.

Eagle, N. (2009). 'Txteagle: Mobile Crowdsourcing', [Online] Available: http://reality.media-mit.edu/pdfs/hcii_txteagle.pdf [last accessed 18th December 2011].

Economist. (2008) 'Following the Crowd', *Economist*, vol. 388, no.8596, pp.10-11.

Ellmers, N., Kortekaas, P. and Ouwerkerk, J.W. (1999) 'Self-Categorisation, Commitment to the Group, and Group Self-Esteem as Related By Distinct Aspects of Social Identity', *European Journal of Social Psychology*, vol.29, pp.371-389.

Etzo, S. and Collender, G. (2010) 'The Mobile Phone Revolution in Africa: Rhetoric or Reality?', *African Affairs*, vol.109, no.437, pp. 659-668.

Fishbein, M. and Azjen, I. (1975) *Belief, Attitude, Intention and Behaviour: An Introduction to Theory and Research*, Reading, MA: Addison-Wesley.

Fornell, C. and Larcker, D.F. (1981) 'Evaluating Structural Equations with Unobservable Variables and Measurement Error', *Journal of Marketing Research*, vol.18, no.1, pp. 39-50.

Frey, B. and Oberholzer-Gee, F. (1997) 'The Cost of Price Incentives: An Empirical Analysis of Motivation Crowding-Out', *The American Economic Review*, vol. 87, no.4, pp. 746-755.

Gagne, M. and Deci, E.L. (2005) 'Self-Determination Theory and Work Motivation', *Journal of Organisational Behaviour*, vol.26, pp.331-362.

Gale, S. F. (2008) 'A Closer Look: Film Riot: PM Network Project Management Institute', vol.22, pp. 30-32.

Ganesan, S. (1994) 'Determinants of Long-Term Orientation in Buyer-Seller Relationships', *Journal of Marketing*, vol.58, no.2, pp.1-19.

Gefen, D. and Straub, D.W. (1997) 'Gender Differences in The Perception And Use Of E-Mail: An Extension To The Technology Acceptance Model', *MIS Quarterly*, vol.21, no.4, pp.389-400.

Gefen, D., Karahana, E. and Straub, D.W. (2003) 'Trust and TAM in Online Shopping: An Integrated Model', *MIS Quarterly*, vol. 27, no.2, pp. 51-90.

Gillwald, A. and Esselaar, S. (2005) 'A Comparative Analysis of ICT Access and Usage in 10 African Countries', *Towards an African e-Index*.

Grazioli, S. and Jarvenpaa, S. (2000) 'Perils of Internet Fraud: An Empirical Investigation of Deception and Trust with Experienced Internet Consumers', *IEEE Transactions on Systems, Man, and Cybernetics, Systems and Humans*, vol. 30, no.4, pp.395-410.

GSMA. (2011) 'Mobile Money for the Unbanked: Annual Report 2011', [Online] Available: http://mmublog.org/wp-content/files_mf/mmu_report98.pdf [last accessed 18th December 2011].

Hair, J.F., Black, W.C, Babin, B.J. and Anderson, R.E. (2010) *Multivariate Data Analysis: A Global Perspective: Seventh Edition*, New York, Pearson.

Hars, A. and Ou, S. (2001) 'Working for Free? – Motivations of Participating in Open Source Projects', Proceedings of the 34th Hawaii International Conference on System Sciences, Hawaii, USA.

Heeks, R. (2010) 'Do Information And Communication Technologies (ICTs) Contribute To Development?', *Journal of International Development*, vol.22, pp.625-640.

Henry, G.T (1990) *Practical Sampling*, Newbury Park, Sage Publications.

Hertel, G., Niedner, S. and Herrmann, S. (2003) 'Motivation of Software Developers in Open Source Projects: An Internet-based Survey of Contributors to the Linux Kernel'. *Research Policy*, vol.32, no.1, pp.1159-1177.

Hoff, K. and Stiglitz, J. (2000) *Modern Economic Theory and Development*, The World Bank.

Howe, J. (2006). 'The Rise of Crowdsourcing', *Wired*, [Online] Available: <http://www.wired.com/wired/archive/14.06/crowds.html> [last accessed 18th December 2011].

Howe, J. (2008) *Crowdsourcing: How the Power of the Crowd is Driving the Future of Business*, New York: Random House.

Hsu, C.L. and Lin.J. (2008) 'Acceptance of Blog Usage: The Roles of Technology Acceptance, Social Influence and Knowledge Sharing Motivation', *Information and Management*, vol.45, pp. 65-74.

Hughes, N. and Lonie, S. (2007) 'M-Pesa: Mobile Money for the "Unbanked": Turning Cellphones into 24-Hour Tellers in Kenya', *Innovations*, pp.63-81.

Human Development Report (2011) *Making New Technologies Work for Human Development*, New York: Oxford University Press.

Hussey, J. and Hussey, R. (1997) *Business Research*, New York: Palgrave.

International Telecommunication Union. (2009) 'Information Society Statistical Profiles 2009 Africa, [Online] Available: http://www.itu.int/ITU-D/ICT/material/ISS_PO9-AFR_final-en.pdf [last accessed 18th December 2011].

Irwin, J.R. and McClellan, G.H. (2001) 'Misleading Heuristics and Moderated Multiple Regression Models', *Journal of Marketing Research*, vol. 38, no.1, pp. 100-115.

Jain, R. (2010) 'Investigation of Governance Mechanisms for Crowdsourcing Initiatives', Proceedings of the 16th Americas Conference on Information Systems, Lima, Peru, August 12th-15th.

Jimoh, R.G., Jurhriyansyah, D. and Olagunju, M. (2011) 'Quantitative Instrument for Measuring the Acceptability of Iris Biometric Authentication Approach in Public Places', *International Journal of Science and Advanced Technology*, vol.1, no.2, pp.22-27.

Jones, C., Hesterly, W.S. and Borgatti, S.P. (1997) 'Motivation of Software Developers in Open Source Projects: An Internet Based Survey of Contributors To The Linux Kernel', *Research Policy*, vol.32, pp.1159-1177.

Karvonen (1999). 'Enhancing Trust Online', Proceedings of the 2nd International Workshop on Philosophy of Design and Information Technology (PhDIT99): Ethics in Information Technology Design' Saint-Ferreol, Toulouse, France, December 16th-17th.

Kenya National Bureau of Statistics (KNBS) (2011) [Online] Available: <http://www.knbs.org.ke/> [last accessed 18th December 2011].

Kenya Population Data Sheet (2011) Population Reference Bureau.

Kenya Population and Housing Census (2009) Kenya National Bureau of Statistics.

Kern, T. (1997). 'The Gestalt of an Information Technology Outsourcing Relationship: An Exploratory Analysis', Proceedings of the 18th International Conference on Information Systems, Atlanta, Georgia, USA.

Kimenyi, M. and Ndungu, N. (2009) 'Expanding the Financial Services Frontier: Lessons From Mobile Phone Banking in Kenya', *Brookings*, pp.1-7.

Kitchenham, B.A. and Pfleeger, S.L. (2002) 'Principles of Survey Research Part 3: Constructing A Survey Instrument', *Software Engineering Notes*, vol.27, no.2, pp. 20-24.

Kollock, P. (1999) *The Economics of Online Cooperation: Gift and Public Goods In CyberSpace*, London: Routledge.

Korpela, M., Montealegre, R. and Poulymenakou, A. (2003) *Organisational Information Systems in the Context of Globalisation*, Springer.

Kostner, R., Bernieri, F. and Zuckerman, M. (1992) 'Self-Determination and Consistency Between Attitudes, Traits, and Behaviours', *Personality and Social Psychology Bulletin*, vol.18, pp. 52-59.

Krishnamurthy, S. (2005) 'The Launching of Mozilla Firefox – A Case Study in Community-Led Marketing', *Version 1.0*, vol.1, no.1, pp.1-38.

Kyem, P. and LeMaire, P. (2006) 'Transforming Recent Gains in the Digital Divide into Digital Opportunities: African and the Boom in Mobile Phone Subscription', *Electronic Journal on Information Systems in Developing Countries*, vol.19, no.5, pp.1-16.

Lakhani, K. and von Hippel, E. (2003) 'How Open Source Software Works: Free User-To-User Assistance', *Research Policy*, vol. 32, no.6, pp.923-943.

Lakhani, K. and Wolf, R. (2005) *Why Hackers Do What They Do: Understanding Motivation and Effort in Free/Open Source Software Projects*, Cambridge, MIT.

Lakhani, R. and Panetta, J. (2007) 'The Principles of Distributed Innovation', *Innovations*, pp.97-112.

Lakhani, K., Jeppesen., Lohse, P. and Panetta, J. (2007) 'The Value of Openness in Scientific Problem Solving', *Working Paper*, pp.2-57.

Leedy, P.D. and Ormrod, J.E. (2005) *Practical Research: Planning and Design. 8th Edition*. New Jersey: Pearson-Prentice-Hall.

Lerner, J. and Tirole, J. (2005) 'The Scope of Open Source Licensing', *Journal of Law, Economics and Organisation*, vol.21, pp.20-56.

Li, X., Hess, T.J. and Valacich, J.S. (2006) 'Using Attitude and Social Influence to Develop An Extended Trust Model for Information Systems' *The DATABASE for Advances In Information Systems*, vol. 37, no. 2, pp.108-124.

Lindenberg, S. (2001) 'Intrinsic Motivation in a New Light', *KYLOS*, vol. 54, pp. 317-342.

Livingston, S. (2001) 'Africa's Evolving Infosystems: A Pathway to Security and Stability', *Africa Centre for Strategic Studies, Research Paper*, no.2, pp. 1-53.

Loh, L. and Venkatraman, N. (1992) 'Diffusion of Information Technology Outsourcing: Influence Sources and the Kodak Effect', *Information Systems Research*, vol.4, no.3, pp. 334-358.

Luarn, P. and Lin, H.H. (2005) 'Toward An Understanding of the Behavioural Intention to Use Mobile Banking', *Computers in Human Behaviour*, vol.21, pp.873-891.

Majchrzak, A., Cherbakov, L. and Ives, B. (2009) 'Harnessing the Power of Crowds with Corporate Social Networking Tools: How IBM Does It', *MIS Quarterly Executive*, vol.8, no.2, pp. 103-108.

Markus, M.L., Manville, B., and Agnes, C. (2000) 'What Makes A Virtual Organisation Work? *Sloan Management Review*, vol.42, no.1, pp. 13-26.

- Mayer, R.C., Davis, J.H. and Schoorman, F.D. (1995) 'An Integrative Model of Organisational Trust', *The Academy of Management Review*, vol.20, no.3, pp. 709-734.
- McKington, H. and Chervany, N.L. (2001) 'Conceptualising Trust: A Typology and E-commerce Customer Relationship Model Proceedings of the 34th Hawaii International Conference, Hawaii, 2001.
- McKnight, H., Cummings, L.L. and Chervany, N.L. (1998) 'Initial Trust Formation In New Organisational Relationships', *The Academy of Management Review*, vol.23, no.3, pp.473-490.
- McKnight, D.H., Choudhury, V. and Kacmar, C. (2002) 'Developing and Validating Trust Measures for e-Commerce: An Integrative Typology', *Information Systems Research*, vol.13, no.3, pp. 334-359.
- McLure-Wasko, M. and Faraj, S. (2005) 'Why Should I Share? Examining Social Capital And Knowledge Contribution in Electronic Networks Of Practice', *MIS Quarterly*, vol.29, no.1, pp.35-57.
- Meso, P., Musa, P. and Mbarika, V. (2005) 'Towards A Model of Consumer Use Of Mobile Information and Communication Technology in LDCs: The Case of Sub-Saharan Africa', *Information Systems Journal*, vol.15, pp.119-146.
- Meuter, M.L., Ostrom, A.L., Bitner, M.J. and Roundtree, R. (2003) 'The Influence of Technology Anxiety on Consumer Use and Experiences With Self-Service Technologies', *Journal of Business*, vol.56, no. 899-906.
- Myers, M.D. and Newman, M. (2007). 'The Qualitative Interview in IS Research', *Information and Organisation*, vol.17, pp.2-26.
- Nahapiet, J. and Ghosal, S. (1998) 'Social Capital, Intellectual Capital, and the Organisational Advantage', *The Academy of Management Review*, vol.23, no.242-266.
- National Coordinating Agency for Population and Development (NCAPD) (2008) [Online]: <http://www.ncapd-ke.org> [last accessed 18th December 2011].
- National Coordinating Agency for Population and Development (NCAPD) (2010) *Facts and Figures On Population And Development*, Nairobi: UNFPA.
- Neuman, W.L. (2003) *Social Research Methods: Qualitative and Quantitative Approaches*. Boston: Allyn and Bacon.
- Ngugi, B., Pelowski, M. and Ogembo, G. (2010) 'M-Pesa: A Case Study of the Critical Early Adopters Role' in the Rapid Adoption of Mobile Banking in Kenya', *The Electronic Journal of Information Systems in Developing Countries*, vo.15, no.33, pp. 1-31.
- Oliver, R.L. and Linda.G. (1981) 'Effect of Satisfaction and Its Antecedents On Consumer Preferences and Intention', *Advances In Consumer Research*, Vol.8, pp.88-93.

Oreg, S. and Nov.O. (2007) 'Exploring Motivations for Contributing to Open Source Initiatives: The Roles of Contribution Context and Personal Values', *Computers in Human Behaviour*, vol.24, pp.2055-2073.

Osterloh, M., Rota, S. and Kuster, B. (2003) 'Open Source Software Production: Climbing On The Shoulders Of Giants', *Institute for Research In Business Administration*, pp.2-34.

Oxford English Dictionary (OED). (2005) [Online] Available: <http://www.oed.com> [last accessed 18th December 2011].

Parasuraman (2000) 'Technology Readiness Index (TRI): A Multiple-Item Scale to Measure Readiness to Embrace New Technologies', *Journal of Service Research*, vol.2, no.4, pp. 307-320.

Penin, J. (2008) 'More Open Than Innovation? Rethinking the Concept of Openness in Innovation Studies, *Working Paper*.

Perkins, G. (1999) 'Culture Clash and The Road Of Word Dominance', *IEEE Software*, vol.16, no.1, pp.80-84.

Picolli, G., Ahmad, R. and Ives, B. (2001) 'Web-based Virtual Learning Environments: A Research Framework and a Preliminary Assessment of Effectiveness in Basic Information Technology Skills Training', *MIS Quarterly*, vol.25, no.4, pp. 401-426.

Pierce, D.W., Cameron, J., Banko, K.M. and So, S. (2003) 'Positive Effects of Rewards on Performance Standards on Intrinsic Motivation', *The Psychological Report*, vol.53, pp.561-579.

Pierce, R. (2008) *Research Methods In Politics: A Practical Guide*, London: Sage Publishers.

Polatoglu, V. and Ekin, N. (2001) 'An Empirical Investigation of the Turkish consumers' acceptance of Internet banking services', *International Journal of Bank Marketing*, vol.19, no.4, pp.156-165.

Raasch, C., Herstatt, C. and Balka, K. (2009) 'On the Open Design of Tangible Goods', *R and D Management*, vol. 39, no.4, pp. 382-393.

Rajulton, F. (2001) 'The Fundamentals of Longitudinal Research: An Overview', *Special Issue on Longitudinal Methodology, Canadian Studies in Population*, vol.28, no., pp.169-185.

Rashid, A. and Elder, L. (2009). 'Mobile Phones and Development: An Analysis of IDRC Supported Projects', *Electronic Journal on Information Systems in Developing Countries*, vol.36, no.2, 1-16.

Raymond, E. (1999) *The Cathedral and The Bazaar. Musings on Linux and Open Source By an Accidental Revolutionary*, Sebastapol, CA: O'Reilly.

Riley, M., Roy, C., Clark, M., Wilkie, E. and Scivas, E. (2000) *Researching and Writing Dissertations in Business Management*, London: Thomas Learning.

- Ryan, R.M. (1982) 'Control and Information in the Intrapersonal Sphere: An Extension of Cognitive Evaluation Theory', *Journal of Personality and Social Psychology*, vol.43, pp.450-451.
- Ryan, R. and Deci, E.L. (2000) 'Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions', *Contemporary Educational Psychology*, vol.25, pp. 54-67.
- Ryan, R.M. and Deci, E.L. (2002) 'On Assimilating Identities to the Self: A Self-Determination Theory Perspective on Internalisation and Integrity Within Cultures', *Handbook of Self and Identity*, pp. 255-273.
- Safaricom. (2009) 'Industry Update' Proceedings of Industry Update Serena Hotel 2009, Nairobi, Kenya, March 12th.
- Sahay, S. (2001)'Special Issue on "IT and Health Care in Developing Countries", *The Electronic Journal on Information Systems in Developing Countries*, vol.5, no.0, pp. 1-6.
- Sahay, S. and Avgerou, C. (2002) 'Introducing the Special Issue on Information and Communication Technologies in Developing Countries', *The Information Society*, no.18, pp. 73-76.
- Schenk, E. and Guittard, C. (2009) 'Towards a Characterisation of Crowdsourcing Practices', *Archives Ouvertes.fr*, [Online] Available: <http://halshs.archives-ouvertes.fr/halshs-00439256/> [last accessed 18th December 2011].
- Schenk, E. and Guittard, C. (2011) 'Towards a Characterisation of Crowdsourcing Practices', *Journal of Innovation Economics*, vol. 1, no. 7, pp. 93-107.
- Schwartz, S. (1992) 'Universals in the Content and Structure of Values: Theoretical Advances and Empirical Tests in 20 Countries', *Advances in Experimental Social Psychology*, vol.25, pp.1-65.
- Scott, C.R. and Rockwell. SC. 'The Effect of Communication, Writing, and Technology Apprehension on Likelihood To Use New Communication Technologies', *Communication Education*, vol.46, pp.44-62.
- Shah, N., Dhanesha, A. and Seetharam, D. (2009) 'Case Study: Crowdsourcing for e-Governance', Proceedings of ICEGOV 2009, Bogota, Colombia, November 10th – 13th.
- Sheppard, B.H., Hartwick, J. and Warshaw, P.R. (1988) 'The Theory of Reasoned Action: A Meta-Analysis of Past Research with Recommendations for Modifications and Future Research', *Journal of Consumer Research*, vol. 15, no.3, pp. 325-343.
- Sobel, M.E. (1982) 'Asymptotic Confidence Intervals for Indirect Effect in Structural Equation Models', *Sociological Methodology*, pp.290-312.
- Stewart, O., Huerta, J. and Sader, M. 'Designing Crowdsourcing Community for the Enterprise', Proceedings of KDD-HCOMP 2009, Paris, France, June 28th.

Straub, D.W. (1989) 'Validating Instruments In MIS Research', *MIS Quarterly*, vol.13, no.2, pp. 147-169.

Straub, D., Boudreau, M. and Gefen, D. (2004) 'Validation Guidelines for IS Positivist Research', *Communications of the Association for Information Systems*, vol.1, no.1, pp. 380-417.

Stump, R., Gong, W. and Li, Z. (2008) 'Exploring the Digital Divide in Mobile Phone Adoption Levels Across Countries', *Journal of Macromarketing*, vol.28, no.4, pp.397-412.

Surowiecki, J. (2004) *The Wisdom of Crowds*, New York: Doubleday.

Tapscott, D. and Williams, A. (2008) *Wikinomics: How Mass Collaboration Changes Everything*, London: Penguin Publishers.

Taylor, S. and Todd, P. (1995) 'Decomposition and Crossover Effects in The Theory of Planned Behaviour: A Study of Consumer Adoption Intentions', *International Journal of Research In Marketing*, vol.12, pp. 137-155.

Terre Blance, M., Durrheim, K., Painter, D. (2008) *Research in Practice: Applied methods for the social sciences*, Cape Town: Juta Press.

Vanderstoep, S.W. and Johnston, D.D. (2009) *Research Methods For Everyday Life: Blending Qualitative and Quantitative Approaches*, San Francisco, California, Jossey-Bass.

Van Dijk, D. and Kluger, A.N (2004) 'Feedback Sign Effect on Motivation Is It Moderated By Regulatory Focus?', *Applied Psychology: An International Review*, vol.53, no.1, pp.113-135.

Venkatesh, V. (2000) 'Determinants of Perceived Ease of Use: Integrating Control, Intrinsic Motivation, and Emotion Into The Technology Acceptance Model', *Information Systems Research*, vol.11, no.4, pp. 342-365.

Venkatesh, V. and Davis, F.D. (2000) 'A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies', *Management Science*, vol.45, no.2, pp. 186-204.

Venkatesh.V, and Morris, M.G. (2000) 'Why Don't Men Ever Stop To Ask For Directions? Gender, Social Influence, and Their Role in Technology Acceptance and Usage Behaviour', *MIS Quarterly*, vol.24, no.1, pp.115-139.

Venkatesh, V., Morris, M.G., Davis, G.B, Davis, F.D (2003) 'User Acceptance of Information Technology: Toward A Unified View', *MIS Quarterly*, vol.27, no.3, pp.425-478.

Vodafone (2005). 'Africa: The Impact of Mobile Phones', *Policy Paper3* [Online] Available: http://www.vodafone.com/content/dam/vodafone/about/public_policy/policy_papers/public_policy_series_2.pdf [last accessed 18th December 2011].

Vodafone. (2007) 'The Transformational Potential of M-Transactions', *The Policy Paper Series*, no.6, pp. 1-48.

von Hippel, E. (1988) *The Sources of Innovation*, Oxford University Press.

von Hippel, E. and von Krogh, G. (2003) 'Open Source Software and the "Private-Collective" Innovation Model: Issues for Organisation Science', *Organisation Science*, vol.14, no.2, pp.209-221.

von Krogh, G. (2002) 'The Communal Resource and Information Systems', *Journal of Strategic Information Systems*, vol.11, no.2, pp.85-107.

Walmsley, A. (2009) *The Art of Delegation*, Haymarket Business Publications Ltd.

Walsham, G. and Sahay, S. (2006) 'Research on Information Systems in Developing Countries: Current Landscapes and Future Prospects', *Information Technology For Development*, vol.12, no.1, pp.7-24.

Walsham, G., Robey, D. and Sahay, S. (2007) 'Foreword: Special Issue on Information Systems in Developing Countries', *MIS Quarterly*, vol.31, no.2, pp. 317-326.

Wang, Y.S., Wang, Y.M., Lin, H.H and Tang, T.I (2003) 'Determinants of User Acceptance of Internet Banking: An Empirical Study', *International Journal of Industry Management*, vol.14, no.5, pp. 501-519.

Wasko, M.M. and Faraj, S. (2005) 'Why Should I Share? Examining Social Capital and Knowledge Contribution in Electronic Networks of Practice', *MIS Quarterly*, vol.29, no.1, pp.33-57.

Whitla, P. (2009) 'Crowdsourcing and Its Application in Marketing Activities', *Contemporary Management Research*, vol.5, no.1, pp.15-28.

Appendices

Appendix A: Types¹⁴³ of Crowdsourcing

Table A 1: Examples of Integrative Crowdsourcing		
Platform or organisation	Service	Year of inception
Txteagle/JANA	A Mobile Crowdsourcing platform which allows people to earn incremental amounts of money by completing simple tasks on their mobile handsets, for corporations who compensate them directly on their mobile phones (via mobile money services). Deployed in Kenya, Rwanda, and developing Asian countries.	2007
Ushahidi	A website designed in the aftermath of Kenya's disputed national elections, that gathers citizen news reports sent in by text message and email, then uses "Google map" interface to display these reports. An open source software application has been designed to achieve this, and has since been used for international disaster relief efforts, such as that of the Haitian earthquake.	2008
Samasource	A social platform that provides computer-based work opportunities to poor people around the world. It uses technology to help alleviate global poverty. This is achieved by providing small chunks of work known as microtasks, completed by a distributed workforce.	2008
Microtask	A company that has deployed a software platform that enables the distribution of microtasks to an online global workforce. It incorporates automated quality control mechanisms, including the provision of Service Level Agreements (SLAs) for completed task assurance.	2009
Mechanical Turk	A platform that allows for Human Intelligence Tasks (HITs) to be performed online. Task performers are paid for execution of tasks. As of 2011, it is still a beta ¹⁴⁴ platform.	2005
OpenStreetMap	A global map that can be edited by users worldwide. Geographical data is created and maintained.	2004
CloudCrowd	An online work portal that breaks down work into a series of projects. Tasks are made available to a distributed workforce.	2009
CrowdSpring	Provides intellectual capital and Crowdfunding ¹⁴⁵ services.	2010

¹⁴³ Sources: Schenk and Guittard (2011), www.ushahidi.com, www.samasource.org, www.crowdspring.com, www.microtask.com.

¹⁴⁴ Experimental. Not yet fully deployed.

¹⁴⁵ The application of Crowdsourcing for funding.

Table A 2: Examples of Selective Crowdsourcing		
Platform or organisation	Service	Year of Inception
Innocentive	Crowdsources scientific research and development for pharmaceutical companies, and many other organisations. Consists of over 185,000 registered members who provide specialised solutions to companies that need them most. Problem solvers are qualified individuals with specialised skill sets.	2001
iStockphoto	Web-based provider of microstock photography, based on the micropayment ¹⁴⁶ business model. Acquired by Getty Images for \$50 million.	2000
CrowdFlower	The largest online provider of Crowdsourcing solutions for organisations. Has over 1.5 million contributors, and over 250 million tasks are successfully completed.	2007
CrowdIPR	A technology and patent research Crowdsourcing firm.	2011

Table A 3: Examples of Creative Crowdsourcing		
Platform or organisation	Service	Year of Inception
Zoopa	Crowdsources scientific research and development for pharmaceutical companies, and many other organisations. Consists of over 185,000 registered members who provide specialised solutions to companies that need them most. Problem solvers are qualified individuals with specialised skill sets.	2001
Threadless	Web-based provider of microstock photography, based on the micropayment business model. Acquired by Getty Images for \$50 million.	2000
Evly	A Crowdsourcing based Social Media, Crowdfunding and Collaboration platform.	2010

¹⁴⁶ A financial transaction whereby very small amounts of money are paid. Typically online.

Appendix B: Crowdsourcing for social empowerment

Samasource

Samasource¹⁴⁷ is a non-profit organisation that provides computer-based work activities to people in the developing world. Its mission is based on the premise that poverty can be alleviated by tapping into the potential of underprivileged citizens and empowering them as producers of goods and services as part of a global community. Samasource secures contracts from enterprises to provide data entry, content digitisation and moderation, and other outsourcing services. This work is broken up into smaller tasks described as “micro-work”, and completed by a distributed workforce. This workforce is supported by Samasource, which is based in San Francisco, California, USA.

Ushahidi

Ushahidi¹⁴⁸ is a non-profit, open-source software company that designed and developed a web-based platform that makes it easy for people all over the world to disseminate and collect crisis information and map it. Users are able to submit reports in real-time via text messaging, email or Web postings. Mapping software computes all data and organises it into a map or timeline. Additionally, Ushahidi has launched a product called “Swift River”, that uses machine-learning algorithms to extract accurate data from all emails, text messages blog posts and tweets that may be overwhelming during the initial stages of a crisis.

Ushahidi’s mapping software was first deployed in early 2008 to track violence related to the disputed Kenyan elections of 2007. It has since been used to coordinate disaster relief efforts globally, such as in the case of the Haiti earthquakes in January 2010, to the cleanup of snow in New-York City during winter. Ushahidi uses the concept of Crowdsourcing for social activism and public accountability, serving as a model for what is described as “activist mapping”. This is a combination of social activism, citizen journalism and geospatial informatics. Ushahidi offers products that enable local networks of individuals to submit reports on their mobile handsets and upload these reports to the Internet. At the same time, Ushahidi’s mapping software creates an archive or chronology of events as they occur.

¹⁴⁷ Information obtained from official website i.e. www.samasource.org

¹⁴⁸ Sources: www.ushahidi.com and www.technologyreview.com/tr50/ushahidi/

Appendix C¹⁴⁹: Advantages and disadvantages of Crowdsourcing mechanism

Table C 1: Crowdsourcing: Pros and Cons

Advantages	
Cost	Costs vary based on applications of Crowdsourcing. However, Crowdsourcing is relatively cost effective. Crowdsourcing costs range from micro-payment to thousands of dollars in payment.
Quality	Like cost, quality depends on the application of Crowdsourcing. It is defined as a measure of tasks performed or problems solved. For creative tasks, quality is based on the originality of the proposed solution.
Use of a network	A diversified pool of contributors or problem solvers provides a distributed advantage.
Motivation	Both intrinsic and extrinsic motivation can be realized. Through Crowdsourcing, contributors may find enjoyment or opportunities for personal skill enhancement. Additionally, Crowdsourcing presents a form of payment for work.
Disadvantages	
Perceived lack of expertise	Specialisation may be limited in instances where opportunists or amateurs participate or contribute solutions. This however, can be addressed because Crowdsourcing can supplement professional work and is not a replacement per se.
Limited contributions	If a critical mass for participation is for some reason unfulfilled, this may limit overall number of proposed solutions or tasks performed by potential contributors.
Evaluation of contributions	There may be a failure to correctly define solutions, and this may lead to unsatisfactory contributions. In some cases, there is a lack of evaluation mechanisms across various Crowdsourcing applications, for problems solved. This may present a limitation.

Appendix D¹⁵⁰: Payment continuum for Crowdsourcing

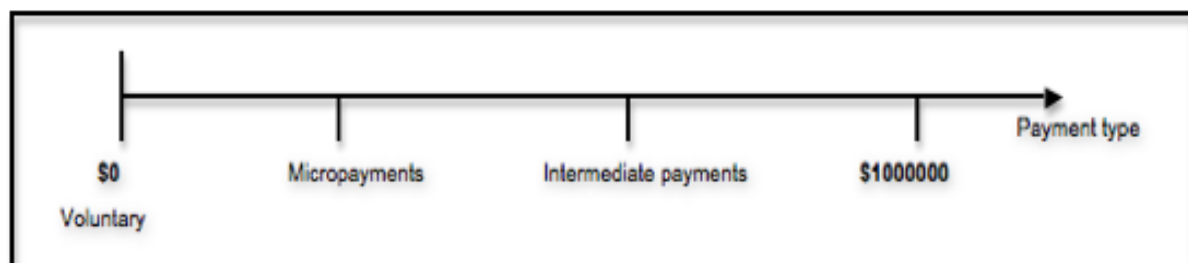


Figure D 1: Payment continuum for Crowdsourcing

¹⁴⁹ Source: Schenk and Guittard (2009).

¹⁵⁰ Source: Schenk and Guittard (2011).

Appendix E¹⁵¹: M-Pesa mechanism

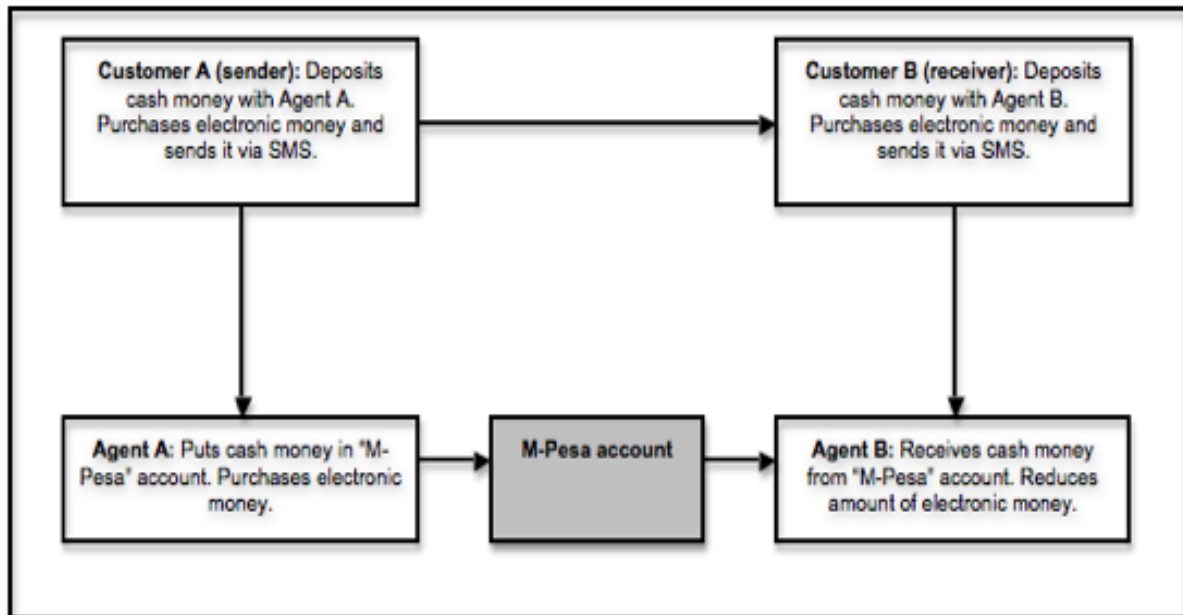


Figure E 1: M-Pesa mechanism

¹⁵¹ Source: Hughes and Lonie (2007).

Appendix F: The Self-Determination Continuum: A detailed overview

Intrinsic motivation, influenced by personal interest in an activity, is typically independent. However, Self-Determination Theory proposes that “extrinsic” motivation differs based on the extent to which it is “autonomous” or “controlled”. Disinteresting activities require “extrinsic” motivation, meaning that their performance is dependent on the perceived relationship between the behaviour and an intended outcome such as “approval” or “monetary reward”. Furthermore, when an action is externally motivated, is regulated by components external to an individual. This is the essence of “extrinsic” or “controlled” motivation and it can further be argued that individual’s act extrinsically based on their desire to obtain a desired consequence or avoid an unwanted outcome. To this end, Self-Determination Theory proposes a “controlled-to-autonomous continuum” to assess the extent to which external regulations have been internalised. The more regulations are internalised by the individual, the more independent will be their extrinsically motivated behaviour (Gagne and Deci, 2005).

“Autonomous extrinsic motivation” demands that individual’s identify with value accrued from specific behaviour and align it with their personal goals. Individuals therefore enjoy greater freedom due to their behaviour being in line with their personal objectives. The most complete type of “internalisation”, which enables autonomy in extrinsic motivation, involves the harmonisation of personal identification with personal values and interests (Gagne and Deci, 2005). Hence, in the case of “integrated regulation”, individuals have a sense of self that results in “self-determined” behaviour. Integrated regulation represents the most evolved form of “extrinsic motivation” and has similar attributes to types of “autonomous” motivation such as “intrinsic” motivation. Integrated regulation, despite having an autonomous component, is still classified as a form of “extrinsic motivation”. The individual involved is said to partake in an activity because of its perceived personal goals and not due to the utility of the activity. In essence, “intrinsic motivation” and “extrinsic integrated motivation” are both “autonomous” in nature.

Self-Determination Theory does not necessitate a step-by-step progression through every stage of the motivation “continuum”, but rather provides a measure of the degree to which individuals integrate regulation of behaviours. Individuals can, under any circumstance, completely integrate a new or existing regulation that has been semi-internalised. In summary, this “self-determination continuum” extends from “amotivation”, which is purely

“extrinsic”, to “intrinsic motivation”, with is constantly “self-determined”. Between these two extremes are the four aspects of “extrinsic motivation”, with external motivation being highly controlled (less self-determined), and dimensions such as “introjection”, “identification” and “integration” being progressively more independent (Gagne and Deci, 2005, p.334.).

Figure F 1 below illustrates this theory, and its key components.

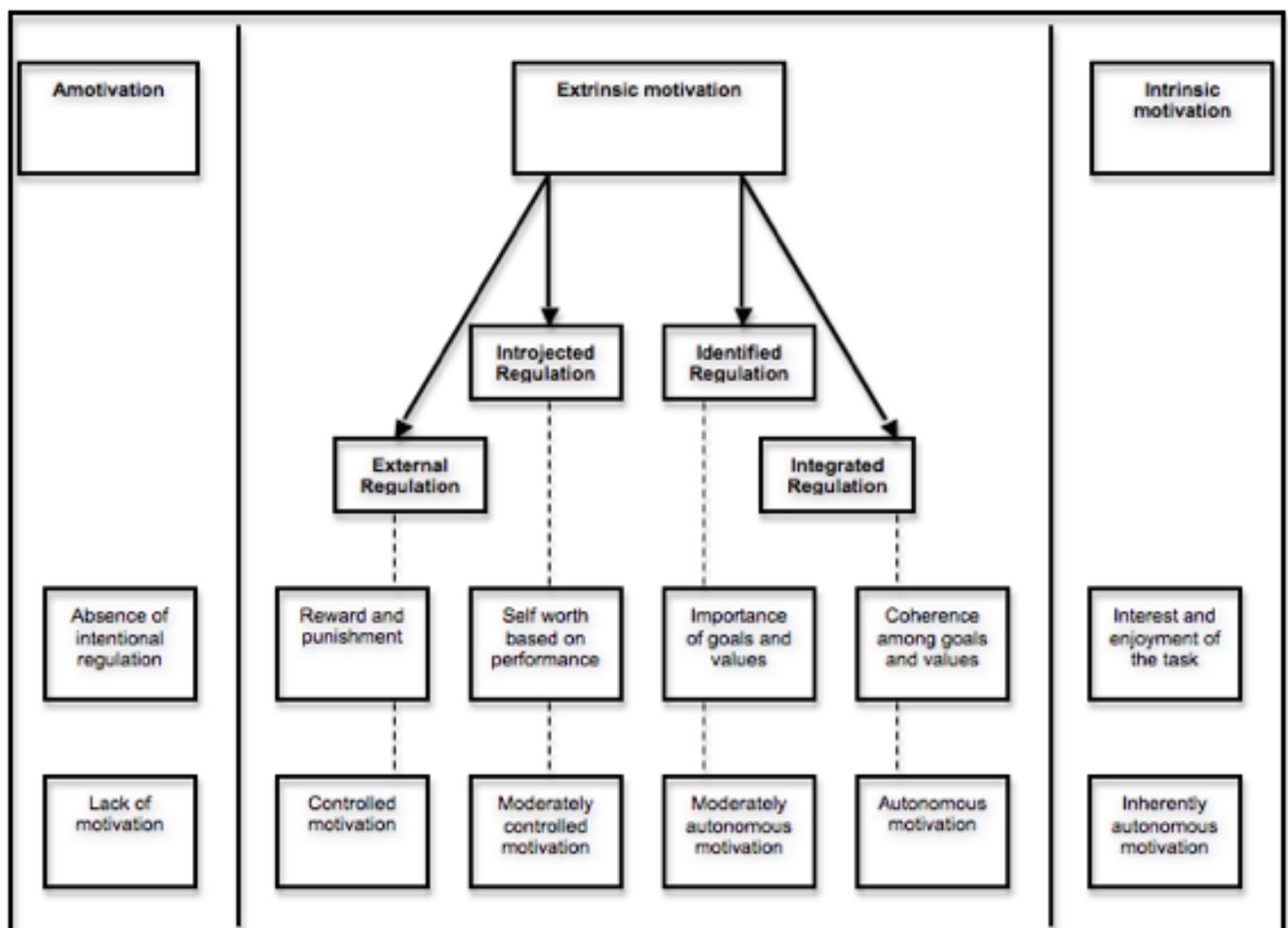


Figure F 1: The self-determination continuum: Adapted from Gagne and Deci (2005).

Dimensions of Self-Determination Theory

A clear distinction has been made between “amotivation” and “motivation”. Amotivation entails the lack of individual intention to perform certain behaviours, as opposed to “motivation”, which involves intentional behaviour. Within the dimension that is motivation, Self-Determination Theory draws a line between “independent” or “autonomous” motivation and “controlled” motivation. Autonomy incorporates “intrinsic” motivation, in addition to internalised “extrinsic” motivation. Therefore, “autonomous” motivation is driven by personal interest in an activity or because the value of the activity has been integrated into an individual’s personality. “Controlled” motivation entails “external regulation” and “introjected extrinsic motivation”. The level of “controlled” motivation is a reflection of the extent to which an individual feels pressured by “external” or “introjected” components (Gagne and Deci, 2005).

The concepts of “autonomy”, “control” and “amotivation” relate to individual interaction with a particular activity. These are predicted by aspects of the social surroundings, and the degree of individual “autonomy”. For instance, the extent to which an individual is independently motivated is based on the context of their work environment and their personal orientation. By the same token, “amotivation” is determined by an individual’s work context and their impersonal orientation. Lastly, for an activity to support individual autonomy, psychological needs such as competence and relatedness are crucial. This is what determines whether or not there is “autonomy”, “control” or “amotivation” (Gagne and Deci, 2005, p.340).

Appendix G: Theoretical framework: Detailed overview¹⁵²

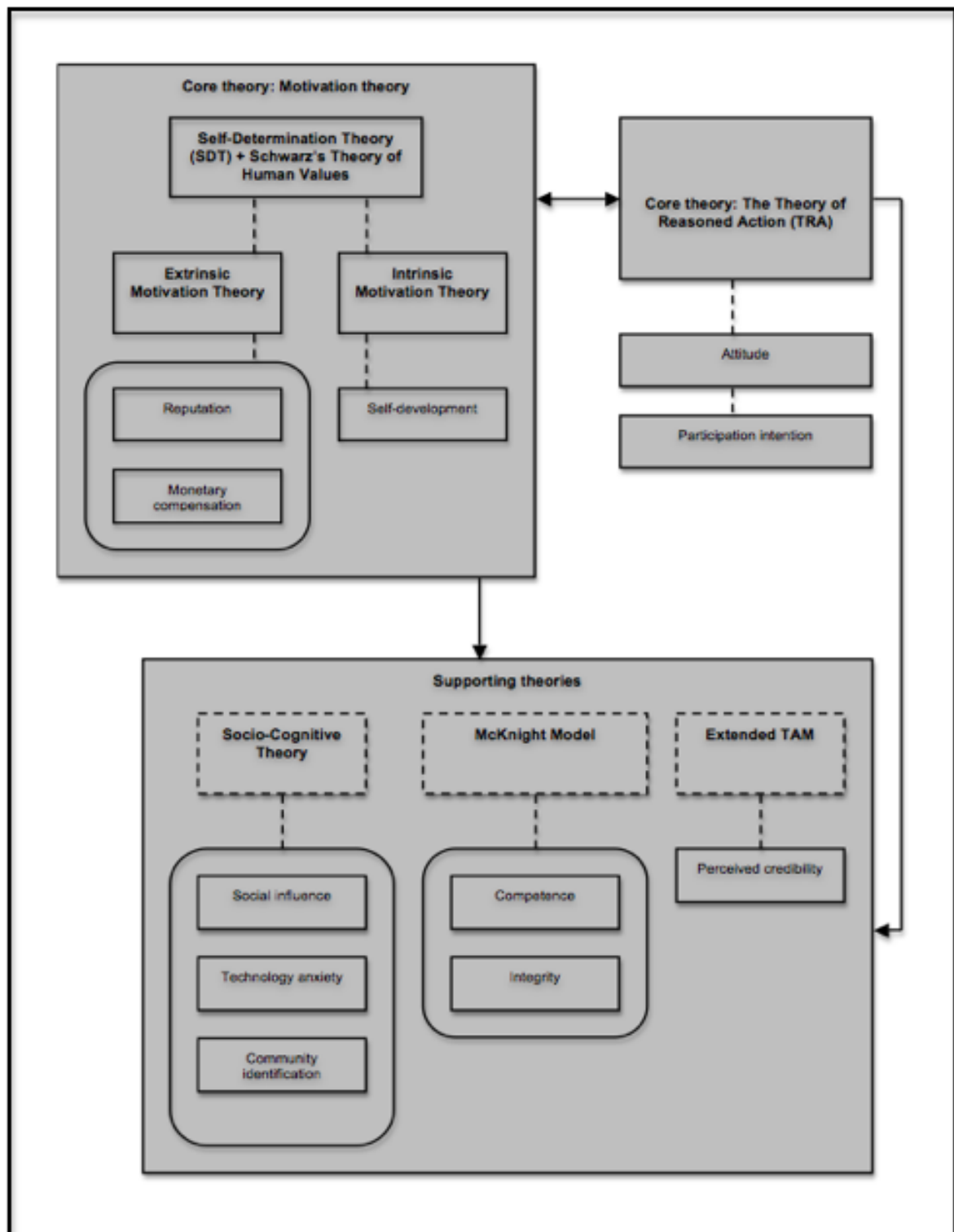


Figure G 1: Theoretical framework (with variables for each theory)

¹⁵² Dependent variable is “participation intention”. Mediator variable is “attitude”, and moderator variable is “community identification”.

Appendix H: Research approaches

Table H 1: Characteristics of different research approaches ¹⁵³			
Quantitative (2 types)		Qualitative (5 types)	Mixed ¹⁵⁴ methods (3 types)
1. Experimental design 2. Non-experimental design		1. Narrative research 2. Phenomenology. 3. Ethnography 4. Grounded theory 5. Case study	1. Sequential 2. Concurrent 3. Transformative
Quantitative vs. Qualitative research			
		Quantitative research	Qualitative research
Purpose		To understand	To explore/explain
Researcher's role		Impersonal/objective	Personal/subjective
Knowledge type		Constructed/approximated	Discovered
Paradigm		Positivist/positivistic	Interpretivist
Different world views			
Post-positivism	Constructivism	Advocacy/Participatory	Pragmatism
1. Determination. 2. Reductionism. 3. Empirical observation and measurement. 4. Theory verification.	1. Understanding. 2. Multiple participant meanings. 3. Social construction ¹⁵⁵ .	1. Political. 2. Empowerment oriented. 3. Collaborative 4. Change oriented	1. Consequences of individual action(s). 2. Problem-centric. 3. Pluralism. 4. Real world oriented (practical).

Source: Creswell (2009), Daniel (2012)

Appendix I: Additional demographics

Table I 1: Proportion of those aged 15-34 years in the total population		
Age	Population (as of 2009 census)	Percentage
15-19	4,169,543	10.8%
20-24	3,775,103	9.78%
25-29	3,201,226	8.29%
30-34	2,519,506	6.53%
TOTAL	13,665,378	35.4%

Table I 2: Distribution of youths aged 15-29 years					
Age	Population per area (as of 2009 census)				
	National	Nairobi	Dagoretti	Kayole/Umoja	Kikuyu
15-19	4,169,543	270,064	28,596	18,236	14,016
20-24	3,775,103	477,396	45,810	36,365	30,037
25-29	3,201,226	462,753	46,063	33,477	30,375

¹⁵³ Source(s): (Stake, 1995; Creswell, 2009).

¹⁵⁴ Combines quantitative and qualitative techniques, either used sequentially (at the same time), concurrently (at different times) or transformatively.

¹⁵⁵ May be historical.

Appendix J: Survey instrument



Cover letter

Good day,

My name is Maradona Gataru, and I am a Masters student in Information Systems (IS) at the University of the Witwatersrand (Wits), Johannesburg. As part of my degree programme at Wits, I am conducting a study on the intention of peri-urban Kenyan youths to participate in Mobile Crowdsourcing. Crowdsourcing refers to the outsourcing of jobs or tasks to a large group of individuals. Mobile Crowdsourcing refers to the use of mobile phones to perform these tasks. If Mobile Crowdsourcing were to be adopted, then it would be provided through Mobile Crowdsourcing platforms, easily accessible through your mobile phone.

Community based facilitators would also provide guidance on mobile phone tasks to be performed. For every task performed, you would be paid via mobile money (through M-Pesa for example) or mobile airtime. This study will not only contribute to knowledge, but will also help gain insights into what may influence peri-urban Kenyan youths to participate in Mobile Crowdsourcing in the near future.

You are invited to take part in this study by completing this questionnaire. There are no right or wrong answers. Participation in this questionnaire is completely voluntary and involves no risk, penalty or loss of benefits, whether or not you participate. You can stop participating at any time.

You do not have to give your personal details or reveal your identity while answering the questionnaire. This survey is both confidential and anonymous, and the data collected will only be used for the study and no other purpose. In addition, the data collected will be destroyed once the survey is done and the University requirements are met.

This survey consists of 40 statements. Please circle the number that reflects the extent to which you agree or disagree with each statement. The entire questionnaire should take 10-15 minutes to complete.

This survey has been approved unconditionally by the Wits University Human Research Ethics Committee (Non-Medical), Protocol Number: **H110703**

Should you have any questions, or wish to obtain a copy of the results of the survey in aggregate form, please contact me on +27 83 571 9400 or at maradonagataru@gmail.com

Thank you for considering your participation

Kind regards,

Maradona Gataru

Master of Commerce (MCOM) student: Division of Information Systems (IS)

School of Economic and Business Sciences (SEBS)

University of the Witwatersrand (Wits), Johannesburg

Crowdsourcing is the outsourcing of jobs or tasks to a large group of individuals. Mobile Crowdsourcing refers to the use of mobile phones to perform these tasks.

Please circle the number that reflects the extent to which you agree or disagree with each statement. For example:

Scale

Example:

No	Question	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	I enjoy using mobile phones.	1	2	3	4	5

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	Mobile Crowdsourcing will provide me with a means of developing my skills with a mobile phone.	1	2	3	4	5
2	Mobile Crowdsourcing will give me an opportunity to learn new mobile phone tasks.	1	2	3	4	5
3	Mobile Crowdsourcing will give me an opportunity to improve my mobile phone skills.	1	2	3	4	5
4	I am likely to earn more respect from fellow members of my community after earning airtime or mobile money for performing mobile phone tasks.	1	2	3	4	5
5	By participating in Mobile Crowdsourcing, I am likely to earn respect in my community	1	2	3	4	5
6	Participating in Mobile Crowdsourcing is likely to improve my social standing in my community.	1	2	3	4	5
7	I am likely to make money by participating in Mobile Crowdsourcing.	1	2	3	4	5
8	I am likely to receive mobile money or airtime for participating in Mobile Crowdsourcing.	1	2	3	4	5

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
9	My participation in Mobile Crowdsourcing can be profitable.	1	2	3	4	5
10	Mobile Crowdsourcing is a better option than work alternatives available to me.	1	2	3	4	5
11	People important to me think that I should participate in Mobile Crowdsourcing.	1	2	3	4	5
12	People important to me encourage my participation in Mobile Crowdsourcing.	1	2	3	4	5
13	Mobile Crowdsourcing facilitators in my community should be helpful to me.	1	2	3	4	5
14	In general, Mobile Crowdsourcing facilitators in my community will support my participation.	1	2	3	4	5
15	Mobile Crowdsourcing platforms are likely to be reliable.	1	2	3	4	5
16	Mobile Crowdsourcing facilitators will perform their roles very well.	1	2	3	4	5
17	In general, my participation in Mobile Crowdsourcing will help with knowledge creation and sharing in my community.	1	2	3	4	5
18	Overall, Mobile Crowdsourcing would be a reasonable way to provide work in my community.	1	2	3	4	5
19	Mobile Crowdsourcing facilitators would truthfully provide information on mobile tasks.	1	2	3	4	5
20	Mobile Crowdsourcing facilitators would be honest in their dealings with the community.	1	2	3	4	5
21	Mobile Crowdsourcing facilitators would do what they promised.	1	2	3	4	5
22	Mobile Crowdsourcing facilitators would be sincere.	1	2	3	4	5
23	My personal details will be safe when I participate in Mobile Crowdsourcing.	1	2	3	4	5
24	I trust Mobile Crowdsourcing facilitators to pay me securely (using services such as “M-Pesa”).	1	2	3	4	5

		Strongly disagree	Disagree	Neutral	Agree	Strongly agree
25	I am uncomfortable with Mobile Crowdsourcing.	1	2	3	4	5
26	I feel that I will not be able to use my mobile phone to perform mobile phone tasks properly.	1	2	3	4	5
27	I am hesitant about using my mobile phone to perform tasks.	1	2	3	4	5
28	Mobile Crowdsourcing is likely to be difficult for me.	1	2	3	4	5
29	Participation in Mobile Crowdsourcing is likely to be a good idea.	1	2	3	4	5
30	Participation in Mobile Crowdsourcing is likely to be a bad idea.	1	2	3	4	5
31	I like the idea of participating in Mobile Crowdsourcing.	1	2	3	4	5
32	Participating in Mobile Crowdsourcing would be unpleasant.	1	2	3	4	5
33	Participating in Mobile Crowdsourcing will give me a sense of belonging in my community.	1	2	3	4	5
34	I feel a strong bond to fellow members of my community.	1	2	3	4	5
35	I am likely to have a strong positive feeling towards Mobile Crowdsourcing in my community.	1	2	3	4	5
36	I am a proud mobile phone owner in my community.	1	2	3	4	5
37	I am likely to participate in Mobile Crowdsourcing.	1	2	3	4	5
38	I predict I will participate in Mobile Crowdsourcing in the near future.	1	2	3	4	5
39	I plan to use my mobile phone to perform mobile phone tasks in the near future.	1	2	3	4	5
40	I will perform mobile tasks if I have access to a Mobile Crowdsourcing platform.	1	2	3	4	5

Please indicate your age with an **X**

18-20	
21-23	
24-26	
27-29	

Please indicate your gender with an **X**

Female	
Male	

Please indicate your highest educational level with an **X**

Primary school certificate	
Secondary school certificate	
Diploma	
University degree	
Other (Please specify)	

Please indicate your current occupation with an **X**

Self-employed	
Formally employed	
Currently unemployed	
Currently in school	
Other (Please specify)	

Do you own a mobile phone? Mark with an X

Yes	
No	

Please indicate your estimated daily income in Kenya Shillings (KES) with an X

<500 KES	
500-750 KES	
750-1000 KES	
> 1000 KES	

Please indicate by marking with an X, what mobile-based tasks you would be comfortable performing.

SMS transcription	
Language translation	
News translation	
Search relevancy	
Sentiment analysis	
Opinion surveys (market research)	
Citizen reporting	
Other (Please specify)	

Thank you for your participation in this survey

Appendix K: Mixed methods sampling

Table K 1: Mixed methods sampling¹⁵⁶

Design	Approach
Mixed non-probability sampling	
Concurrent equivalent non-probability sampling	Two or more sampling designs with target populations that are comparable are selected at the same point in time (approximately).
Concurrent nested non-probability sampling	A subset of a non-probability sample is selected using an alternate non-probability sampling design. This occurs at the same time (approximately) that the first sample is selected i.e. One design is nested within a non-probability sample.
Concurrent multilevel non-probability sampling	Samples are selected from different levels of a targeted population at the same time (approximately), using more than one non-probability sampling design.
Sequential equivalent non-probability sampling	Two or more non-probability samples, which are comparable, are selected at different times.
Sequential nested non-probability sampling	A subset of a non-probability sample is selected using an alternate non-probability sampling design. This happens after the initial (dominant) sample has been selected.
Sequential multilevel non-probability sampling	Samples are selected from different levels of a targeted population, sequentially, and using more than one non-probability sampling design.
Mixed probability sampling	
Concurrent equivalent probability sampling	Multiple probability sampling methods with comparable target populations are selected simultaneously.
Concurrent nested probability sampling	A subset of a probability sample is selected using an alternate probability sampling design, at the same time (approximately) that the first sample is selected
Concurrent multilevel probability sampling	Samples are selected from different levels of a targeted population at the same time (approximately), using more than one probability sampling design.
Sequential equivalent probability sampling	Two or more probability samples, which are comparable, are selected at different times.
Sequential nested probability sampling	A subset of a probability sample is selected using an alternate probability sampling design. This happens after the initial (dominant) sample has been selected.
Sequential multilevel probability sampling	Samples are selected from different levels of a targeted population, sequentially, and using more than one probability sampling design.

¹⁵⁶ See table 2 in chapter 5 on pg 79 for classification of probability and non-probability sampling designs.

Mixed methods sampling: Continued ¹⁵⁷	
Design	Approach
Mixed non-probability-probability sampling	
Concurrent equivalent non-probability-probability sampling	A subset of a non-probability sample is selected using a probability sampling method (or vice-versa), at the same time (approximately). Both methods used have equal dominance.
Concurrent nested non-probability-probability sampling	A subset of a non-probability sample is selected using a probability sampling method (or vice-versa), at the same time (approximately). However, methods used do not have equal dominance.
Concurrent multi-level non-probability-probability sampling	A sample is selected from different levels of a target population, at the same time (approximately), and using both non-probability and probability sampling (in any order).
Sequential equivalent non-probability-probability sampling	A subset of a non-probability sample is selected using a probability sampling method (or vice-versa), at different points in time (i.e. sequentially).
Sequential nested non-probability-probability sampling	A subset of a non-probability sample is selected using a probability sampling method (or vice-versa), at different points in time (sequentially). If two sampling methods are used, one is dominant, and the other plays a supporting role. In addition, sampling occurs at different points in time (i.e. sequentially).
Sequential multi-level non-probability-probability sampling ¹⁵⁸	A sample is selected from different levels of a target population, at different points in time (i.e. sequentially) and using both non-probability and probability sampling (in any order).

¹⁵⁷ Original source of tabulated information: Daniel (2012).

¹⁵⁸ Blue shading indicates this technique was selected.

Appendix L: Instrument items

Table L 1: Instrument constructs			
Variable	Hypothesis (H)	Number of scale items ¹⁵⁹	Original source in prior literature
Independent variables			
Self-Development	H1	3	Oreg and Nov (2007)
Reputation	H2	3	Hsu and Lin (2008)
Monetary Compensation	H3	4	Hars and Ou (2002)
Social Influence	H4	4	Venkatesh, Morris, Davis, G.B. and Davis, F.D (2003)
Competence	H5 a	4	Li, Hess and Valacich (2006)
Integrity	H5 b	4	Li, Hess and Valacich (2006)
Perceived Credibility	H6	2	Wang, Y.S., Wang, Y.M., Lin and Tang (2003)
Technology Anxiety	H7	4	Venkatesh, Morris, Davis, G.B. and Davis, F.D (2003)
Mediator variable			
Attitude	H8	4	Taylor and Todd (1995)
Moderator variable			
Community Identification	H9	4	Chiu, Hsu and Wang (2006)
Dependent variable			
Participation Intention	N/A ¹⁶⁰	4	Venkatesh, Morris, Davis, G.B. and Davis, F.D (2003); Jimoh, Juriyansah, Olagunju (2011)

¹⁵⁹ 5 point Likert scale instrument used.

¹⁶⁰ Not applicable (no proposed hypothesis).

Table L 2: Constructs and hypotheses		
Construct	Hypothesis	Instrument item (question)
Independent variables		
Self-development	H1	1,2,3
Reputation	H2	4,5,6
Monetary compensation	H3	7,8,9,10
Social influence	H4	11,12,13,14
Competence	H5 a	15,16,17,18
Integrity	H5 b	19,20,21,22
Perceived credibility	H6	23,24
Technology anxiety	H7	25,26,27,28
Mediator variable		
Attitude	H8	29,30 (RS), 31,32 (RS)
Moderator variable		
Community identification	H9	33,34,35,36
Dependent variable		
Participation intention	N/A	37,38,39,40

Appendix M: Ethical clearance certificate

 Research Office	
HUMAN RESEARCH ETHICS COMMITTEE (NON MEDICAL) R14/49 Gatara	
CLEARANCE CERTIFICATE	PROTOCOL NUMBER H110703
PROJECT TITLE	Predicting intention to participate in mobile crowdsourcing initiatives: a study of local Kenyan communities
INVESTIGATOR(S)	Mr M Gatara
SCHOOL/DEPARTMENT	Economics and Business Science/Information Systems
DATE CONSIDERED	15/07/2011
DECISION OF THE COMMITTEE	Approved unconditionally
EXPIRY DATE	19/07/2013
DATE 20/07/2011	CHAIRPERSON  (Professor R Thornton)
cc: Supervisor : Dr J-M Bancillon	
DECLARATION OF INVESTIGATOR(S)	
To be completed in duplicate and ONE COPY returned to the Secretary at Room 10005, 10th Floor, Senate House, University.	
I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. <u>I agree to completion of a yearly progress report.</u>	
Signature _____	Date <u> / / </u>
PLEASE QUOTE THE PROTOCOL NUMBER ON ALL ENQUIRIES	

Appendix N: Letter of permission from National Youth Coordinator (PCEA)

1st July 2011

DVCs office-PUEA

RE: RESEARCH ON USE MOBILE PHONES AMONGST THE YOUTH

Receive greeting from PCEA Youth Department.

The above subject refers.

Following our numerous conversations and discussions in regard to this particular research, I would wish to confirm that the Presbyterian Church of East Africa (PCEA) – Youth Department will be grateful to participate in the process.

Mr. Gatara.M should be assured of our support and encouragement over the duration of the exercise. We hope that he can engage and interact with our youths in Nairobi city and its environs. If need be we shall introduce Mr. Gatara to our wider youth fraternity scattered all over the East African Region.

I would be glad to be informed of the progress of this exercise, particularly once it reaches completion.

Thank you.

Yours faithfully,

Rev.Simon Githiora Niuguna

YOUTH SECRETARY/DIRECTOR (PCEA)

Appendix O: Photographs¹⁶¹ of sample sites



Figure O 1: Peri-urban area: Dagoretti sample site.

¹⁶¹ Field photographs taken between the 29th of August and 11th of September (2011). Site areas used for study were Dagoretti, Kayole, Umoja, and Kikuyu. Permission was granted by the PCEA national coordinator and youth volunteers to take snapshots of sample sites for research purposes. Participants gave consent for their photographs to be taken.



Figure O 2: Peri-urban youth: Youth leader in Dagoretti area.



Figure O 3: Peri-urban area: Kikuyu sample site.



Figure O 4: Peri-urban area: Kayole sample site¹⁶².

¹⁶² The Umoja sample site is in close proximity to Kayole and resembles similar characteristics. Urbanisation experienced in this area, but still retains rural elements. Hence, peri-urban attributes are exhibited.

Appendix P: Statistical results

Table P 1:Frequency distribution per item (independent variables)							
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total	Missing
Item	1	2	3	4	5		
(n=279)							
Self development							
SD1	9	9	36	134	84	272	7
SD2	8	8	17	130	112	275	4
SD3	6	14	42	121	90	273	6
Reputation							
Rep1	30	48	88	59	50	275	4
Rep2	27	44	92	73	37	273	6
Rep3	6	34	58	111	64	273	6
Monetary compensation							
MonC1	5	14	60	104	92	275	4
MonC2	11	21	82	87	75	276	3
MonC3	6	5	45	146	76	278	1
MonC4	27	72	91	57	28	275	4
Social Influence							
Soc1	31	61	110	49	23	274	5
Soc2	18	60	101	62	30	271	8
Soc3	9	10	50	140	68	277	2
Soc4	11	23	109	96	38	277	2
Competence							
Com1	10	20	87	109	48	274	5
Com2	8	25	106	98	41	278	1
Com3	7	15	34	125	97	278	1
Com4	8	9	49	136	73	275	4
Integrity							
Int1	15	28	107	84	44	278	1
Int2	25	26	125	70	31	277	2
Int3	19	30	141	52	34	276	3
Int4	12	19	132	78	28	279	0
Perceived credibility							
PerC1	23	45	102	71	37	278	1
PerC2	20	20	74	88	77	279	0
Technology anxiety							
TechA1	59	92	70	39	18	278	1
TechA2	71	126	43	29	8	277	2
TechA3	58	110	52	46	8	274	5
TechA4	86	115	46	25	5	277	2

Table P 2: Frequency distribution per item (mediator variable)							
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total	Missing
Item	1	2	3	4	5		
(n=279)							
Attitude							
Att1	7	8	38	134	91	278	1
Att2	9	11	46	110	102	278	1
Att3	1	10	37	137	92	277	2
Att4	7	10	55	108	96	276	3

Table P 3: Frequency distribution per item (moderator variable)							
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total	Missing
Item	1	2	3	4	5		
(n=279)							
Community Identification							
Commu1	22	37	87	91	42	279	0
Commu2	19	25	67	106	59	276	3
Commu3	10	19	57	124	68	278	1
Commu4	22	15	41	100	99	277	2

Table P 4: Frequency distribution per item (dependent variable)							
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Total	Missing
Item	1	2	3	4	5		
(n=279)							
Participation intention							
Pint1	13	12	49	126	76	276	3
Pint2	7	9	65	123	74	278	1
Pint3	7	10	46	126	88	277	2
Pint4	10	5	50	111	103	279	0

Table P 5: Missing values per construct			
Construct item	Missing value cases	Construct item	Missing value cases
Self D1	7	Att 1	1
Self D2	4	Att 2	1
Self D3	6	Att 3	2
Rep 1	4	Att 4	3
Rep 2	6	Commu 1	0
Rep 3	6	Commu 2	3
Mon C1	4	Commu 3	1
Mon C2	3	Commu 4	2
Mon C3	1	Pint 1	3
Mon C4	4	Pint 2	1
Soc I1	5	Pint 3	2
Soc I2	8	Pint 4	0
Soc I3	2		
Soc I4	2		
Com 1	5		
Com 2	1		
Com 3	1		
Com 4	4		
Int 1	1		
Int 2	2		
Int 3	3		
Int 4	0		
Per C1	1		
Per C2	0		
Tech A1	1		
Tech A2	2		
Tech A3	5		
Tech A4	2		

Note: N = 279, total number of cases with missing values = 109

Table P 6: Descriptive statistics per item (independent variable)

Scale items	Range	Minimum	Maximum	Mean	Standard deviation	Variance	Skewness		Kurtosis	
							Stat	Std.Error	Stat	Std.Error
n=279										
Self development										
SD1	4.00	1.00	5.00	4.01	0.92	0.85	-1.265	0.146	2.051	0.291
SD2	4.00	1.00	5.00	4.20	0.89	0.80	-1.627	0.146	3.351	0.291
SD3	4.00	1.00	5.00	4.01	0.93	0.87	-1.032	0.146	1.084	0.291
Reputation										
Rep1	4.00	1.00	5.00	3.19	1.23	1.50	-0.124	0.146	-0.837	0.291
Rep2	4.00	1.00	5.00	3.18	1.44	1.31	-0.214	0.146	-0.604	0.291
Rep3	4.00	1.00	5.00	3.71	1.02	1.04	-0.574	0.146	-0.286	0.291
Monetary compensation										
MonC1	4.00	1.00	5.00	3.96	0.95	0.91	-0.773	0.146	0.303	0.291
MonC2	4.00	1.00	5.00	3.70	1.07	1.14	-0.549	0.146	-0.191	0.291
MonC3	4.00	1.00	5.00	4.01	0.84	0.70	-1.094	0.146	2.157	0.291
MonC4	4.00	1.00	5.00	2.95	1.12	1.25	0.110	0.146	-0.663	0.291
Social Influence										
Soc1	4.00	1.00	5.00	2.90	1.08	1.16	0.680	0.146	-0.412	0.291
Soc2	4.00	1.00	5.00	3.10	1.06	1.12	0.250	0.146	-0.487	0.291
Soc3	4.00	1.00	5.00	3.90	0.92	0.85	-1.068	0.146	1.533	0.291
Soc4	4.00	1.00	5.00	3.46	0.96	0.92	-0.371	0.146	0.128	0.291
Competence										
Com1	4.00	1.00	5.00	3.60	0.97	0.94	-0.554	0.146	0.236	0.291
Com2	4.00	1.00	5.00	3.50	0.95	0.90	-0.307	0.146	-0.024	0.291
Com3	4.00	1.00	5.00	4.04	0.95	0.91	-1.160	0.146	1.315	0.291
Com4	4.00	1.00	5.00	3.93	0.91	0.82	-1.062	0.146	1.583	0.291
Integrity										
Int1	4.00	1.00	5.00	3.41	1.04	1.08	-0.327	0.146	-0.181	0.291
Int2	4.00	1.00	5.00	3.20	1.05	1.11	-0.302	0.146	-0.067	0.291
Int3	4.00	1.00	5.00	3.19	1.01	1.02	-0.072	0.146	-0.078	0.291
Int4	4.00	1.00	5.00	3.29	0.94	0.88	-0.184	0.146	-0.180	0.291
Perceived credibility										
PerC1	4.00	1.00	5.00	3.19	1.11	1.24	-0.171	0.146	-0.538	0.291
PerC2	4.00	1.00	5.00	3.65	1.16	1.36	-0.669	0.146	-0.224	0.291
Technology anxiety										
TechA1	4.00	1.00	5.00	3.49	1.16	1.34	-0.453	0.146	-0.593	0.291
TechA2	4.00	1.00	5.00	3.81	1.02	1.05	-0.835	0.146	0.198	0.291
TechA3	4.00	1.00	5.00	3.60	1.08	1.16	-0.502	0.146	-0.569	0.291
TechA4	4.00	1.00	5.00	3.91	0.99	0.99	-0.813	0.146	0.143	0.291

Table P 7: Descriptive statistics per item (mediator variable)										
Scale items	Range	Minimum	Maximum	Mean	Standard deviation	Variance	Skewness		Kurtosis	
							Stat	Std.Error	Stat	Std.Error
Attitude										
Att 1	4.00	1.00	5.00	4.06	0.90	0.80	-1.202	0.146	1.959	0.291
Att 2	4.00	1.00	5.00	4.03	0.99	0.98	-1.102	0.146	1.096	0.291
Att 3	4.00	1.00	5.00	4.12	0.79	0.63	-0.823	0.146	0.783	0.291
Att 4	4.00	1.00	5.00	4.00	0.96	0.91	-0.946	0.146	0.833	0.291

Table P 8: Descriptive statistics per item (moderator variable)										
Scale items	Range	Minimum	Maximum	Mean	Standard deviation	Variance	Skewness		Kurtosis	
							Stat	Std.Error	Stat	Std.Error
Community identification										
Commu1	4.00	1.00	5.00	3.34	1.13	1.27	-0.388	0.146	-0.483	0.291
Commu2	4.00	1.00	5.00	3.58	1.12	1.26	-0.682	0.146	-0.114	0.291
Commu3	4.00	1.00	5.00	3.80	1.00	1.01	-0.852	0.146	0.513	0.291
Commu4	4.00	1.00	5.00	3.86	1.19	1.41	-1.065	0.146	0.367	0.291

Table P 9: Descriptive statistics per item (dependent variable)										
Scale items	Range	Minimum	Maximum	Mean	Standard deviation	Variance	Skewness		Kurtosis	
							Stat	Std.Error	Stat	Std.Error
Participation intention										
Pint1	4.00	1.00	5.00	3.87	1.01	1.01	-1.072	0.146	1.086	0.291
Pint2	4.00	1.00	5.00	3.89	0.92	0.84	-0.820	0.146	0.873	0.291
Pint3	4.00	1.00	5.00	4.00	0.92	0.85	-1.057	0.146	1.339	0.291
Pint4	4.00	1.00	5.00	4.05	0.97	0.94	-1.160	0.146	1.482	0.291

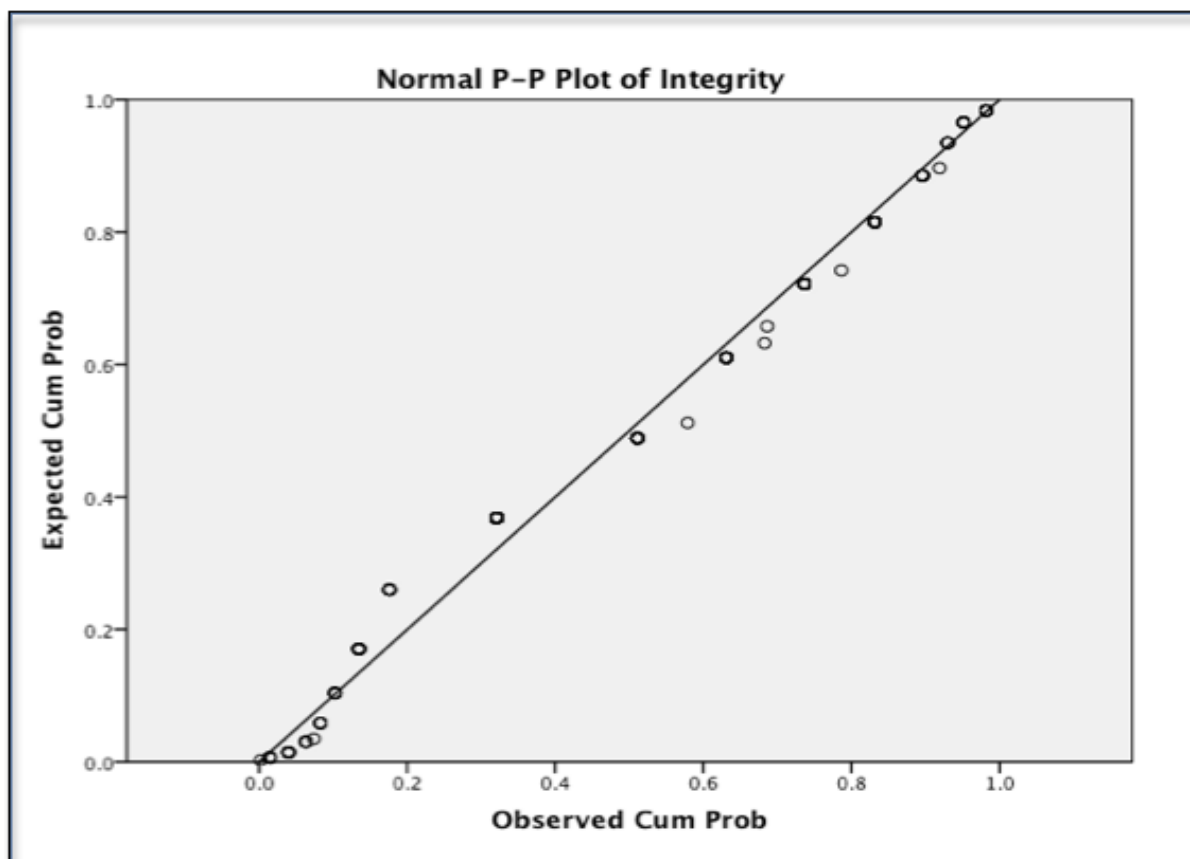


Figure P 1: Normal probability plot - Integrity

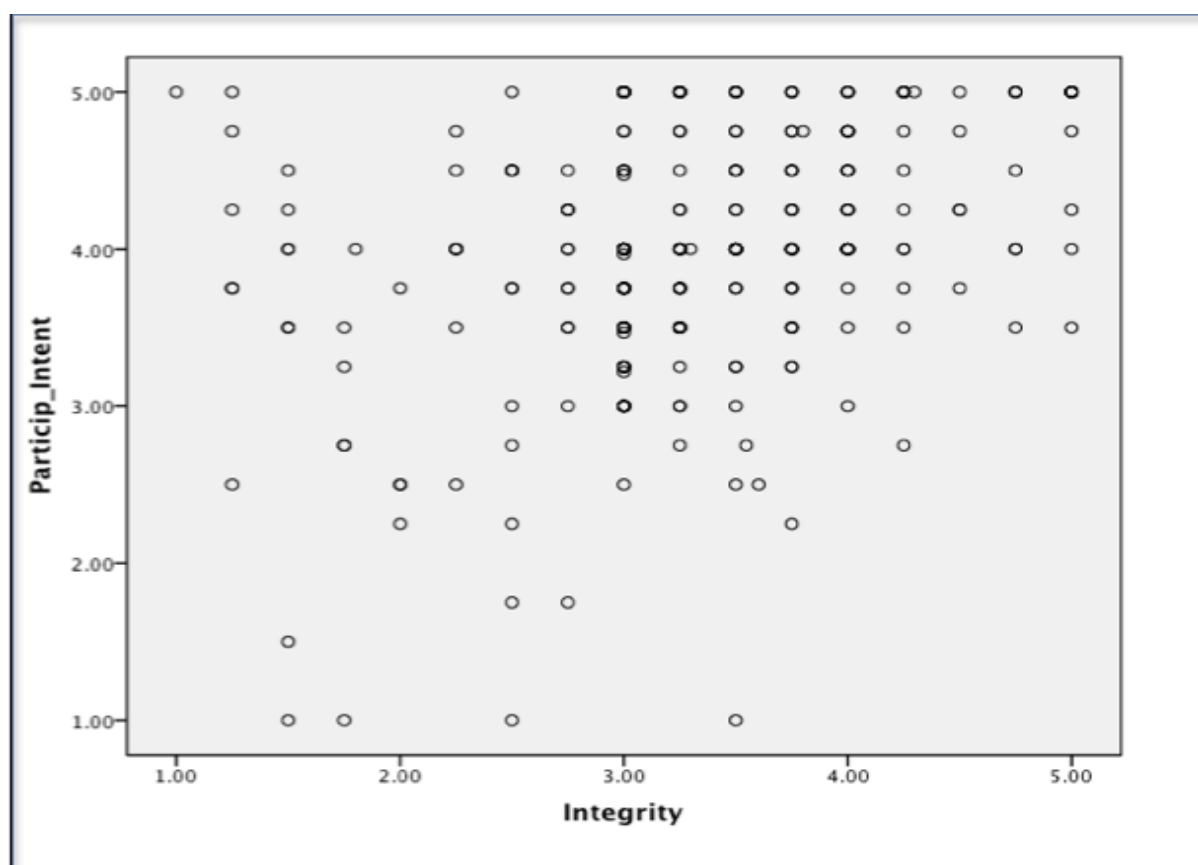


Figure P 2: Scatterplot – Integrity

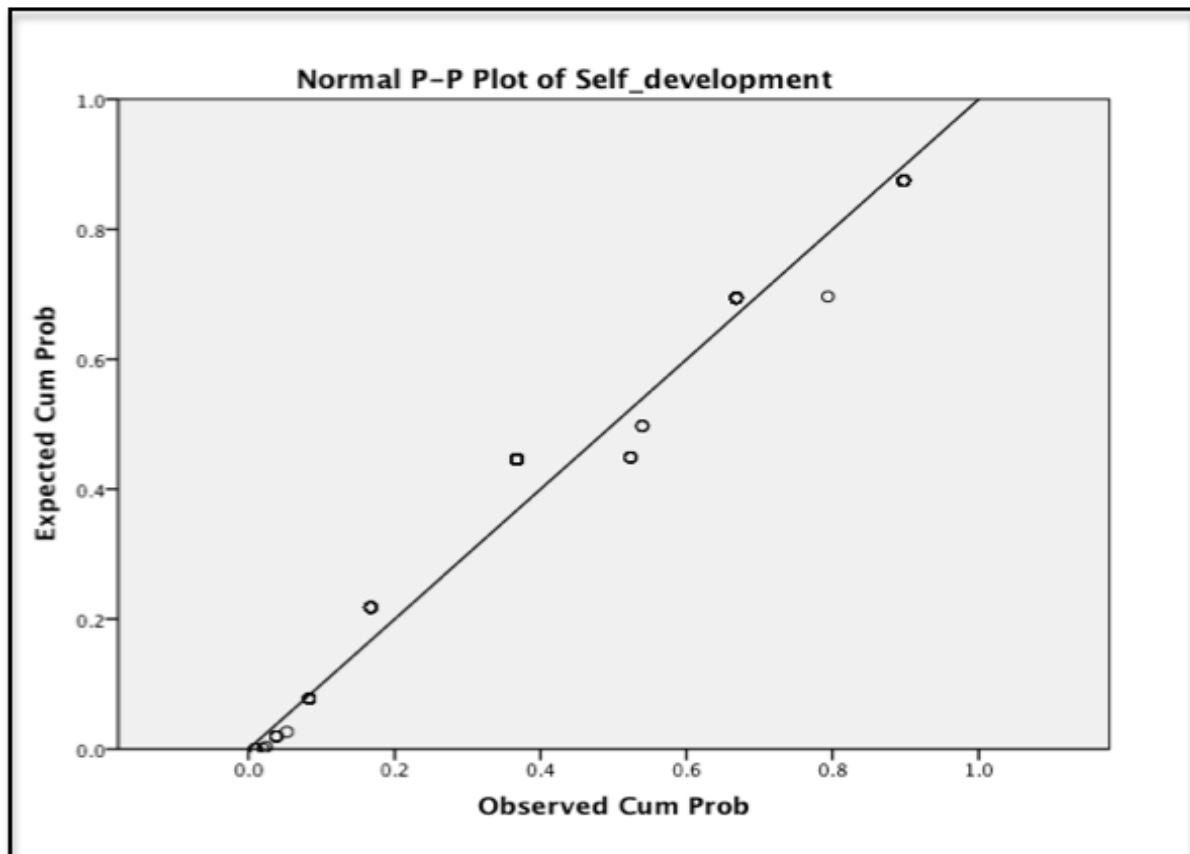


Figure P 3: Normal probability plot – Self-development

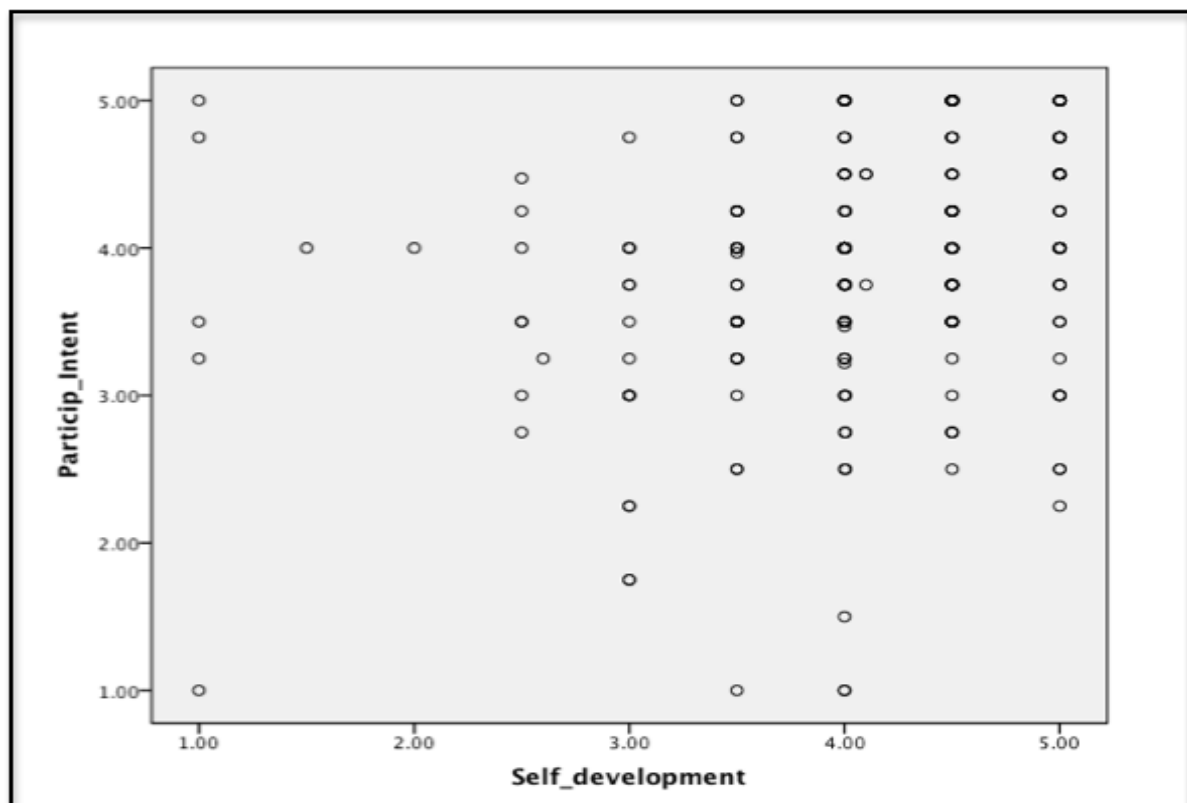


Figure P 4: Scatterplot – Self-development

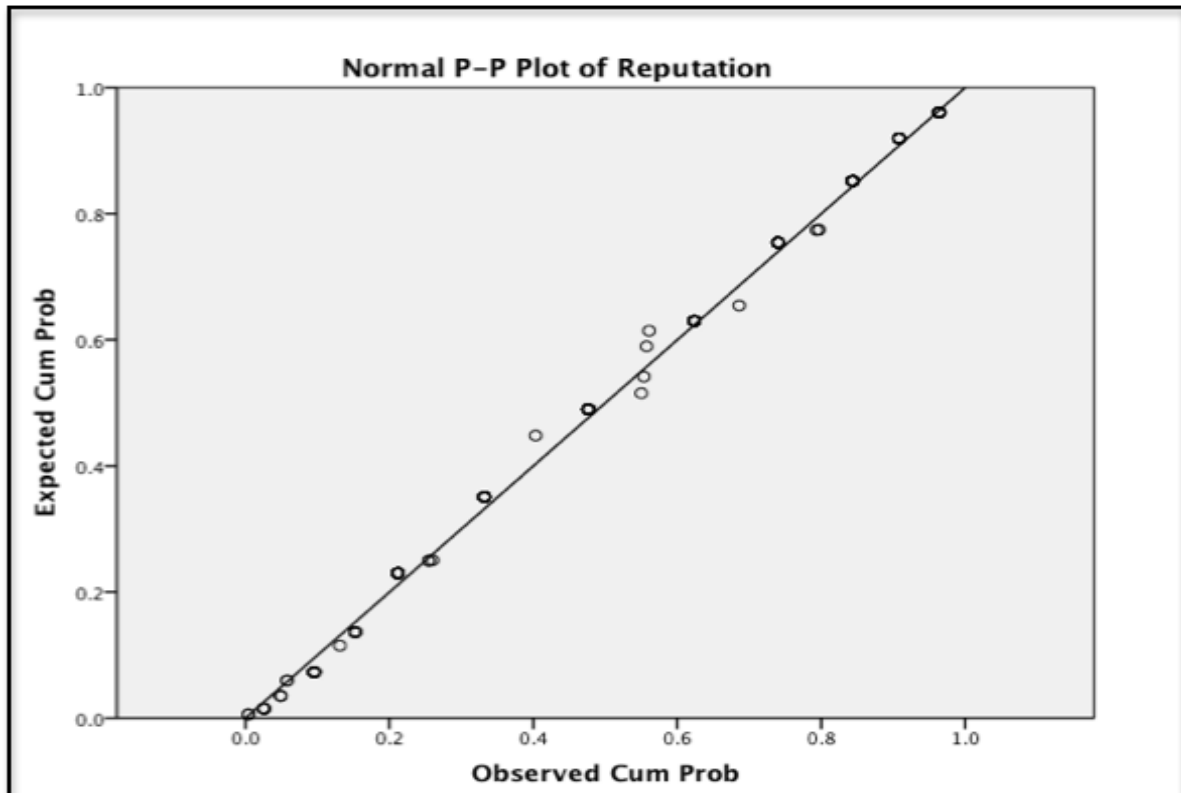


Figure P 5: Normal probability plot – Reputation

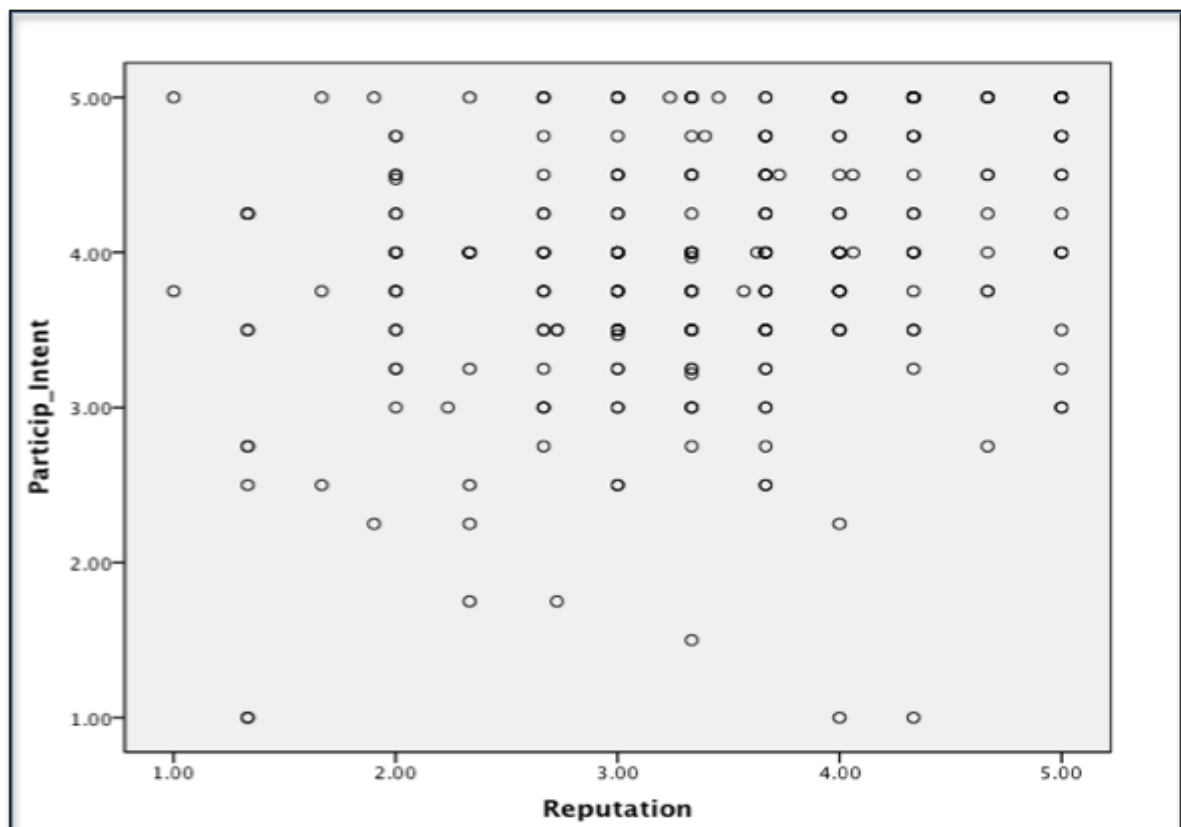


Figure P 6: Scatterplot – Reputation

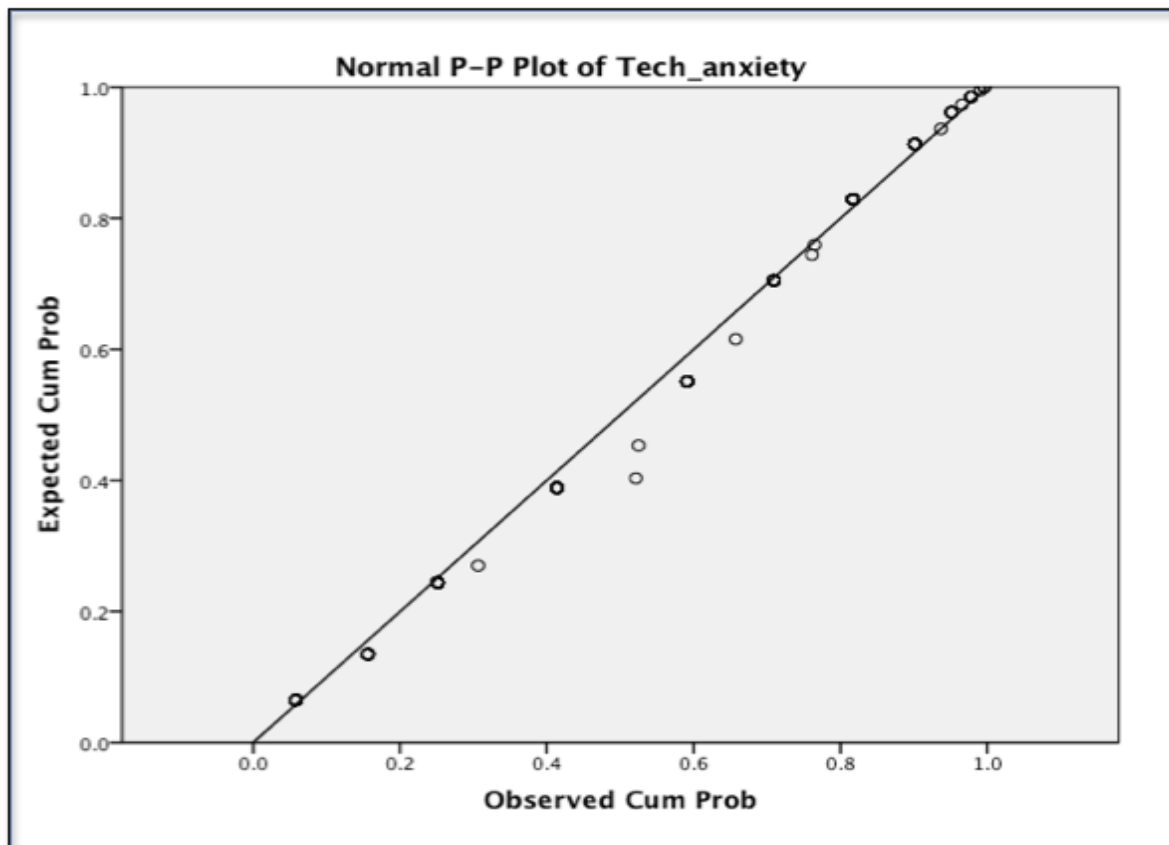


Figure P 7: Normal probability plot – Technology anxiety

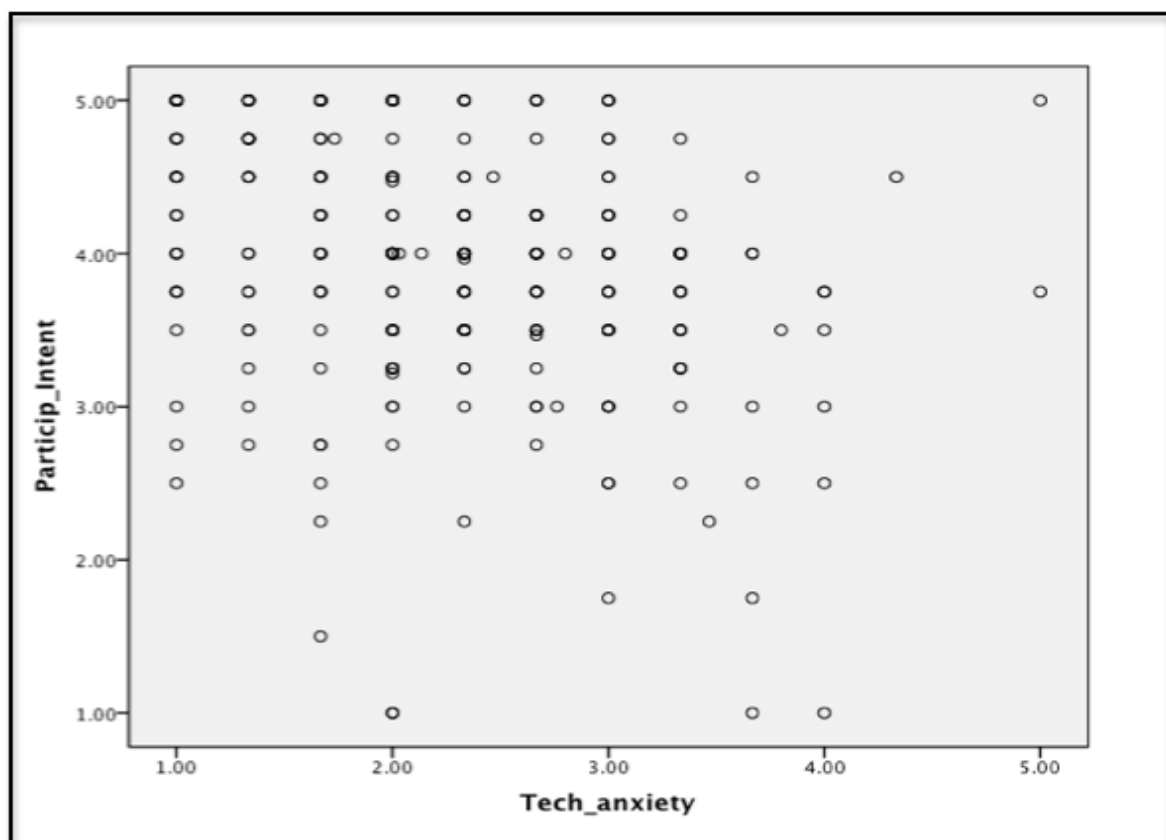


Figure P 8: Scatterplot – Technology anxiety

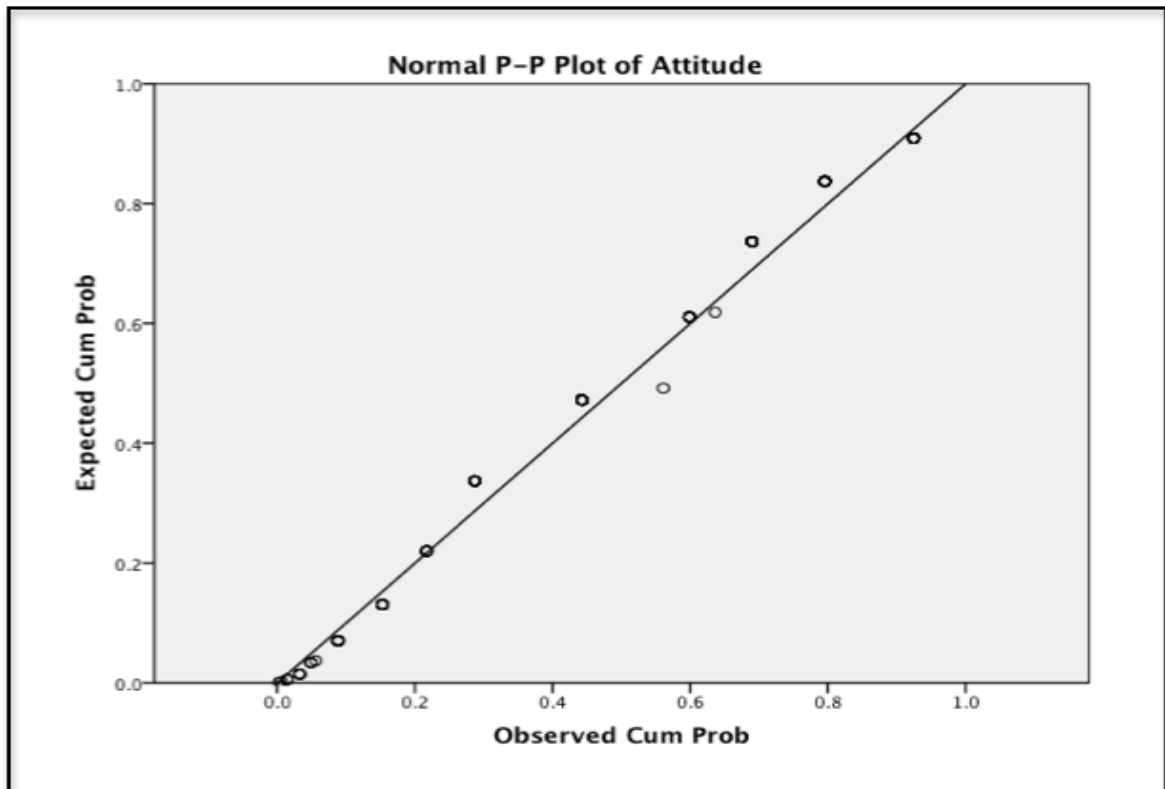


Figure P 9: Normal probability plot – Attitude

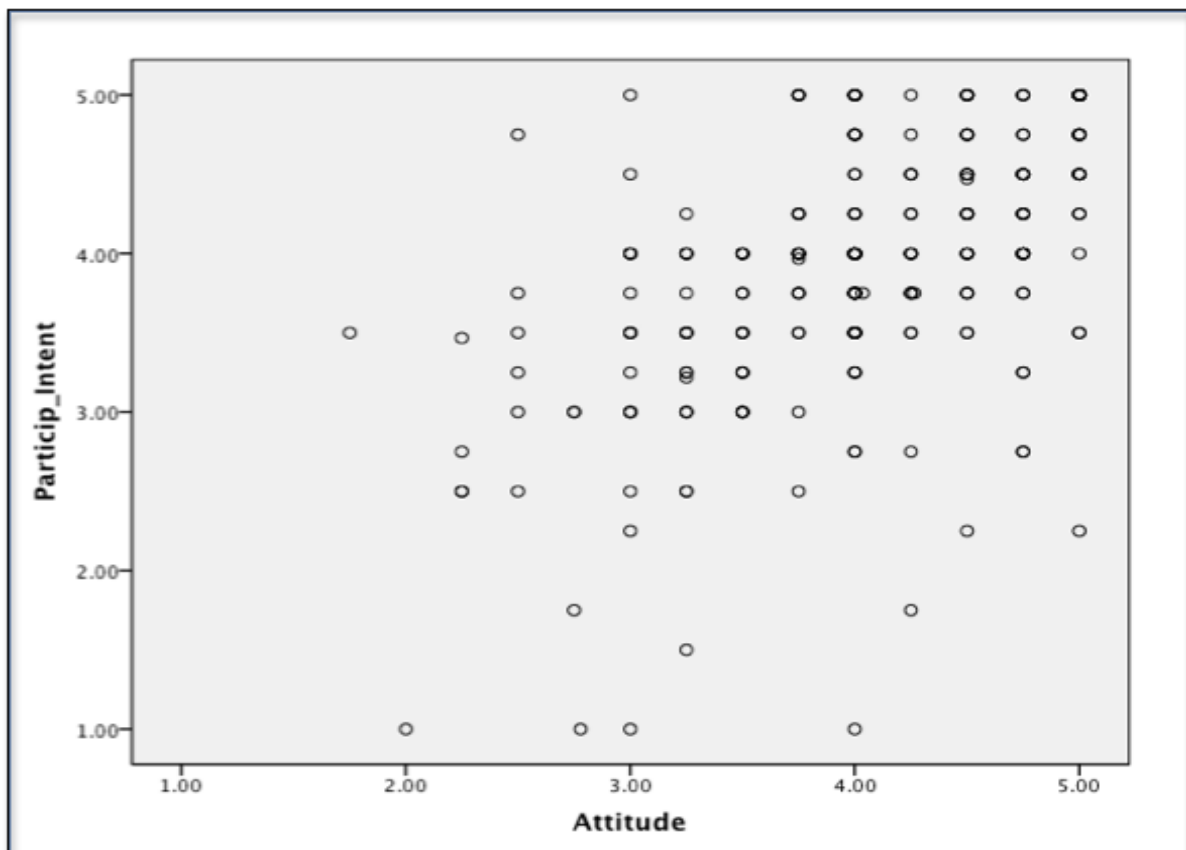


Figure P 10: Scatterplot - Attitude

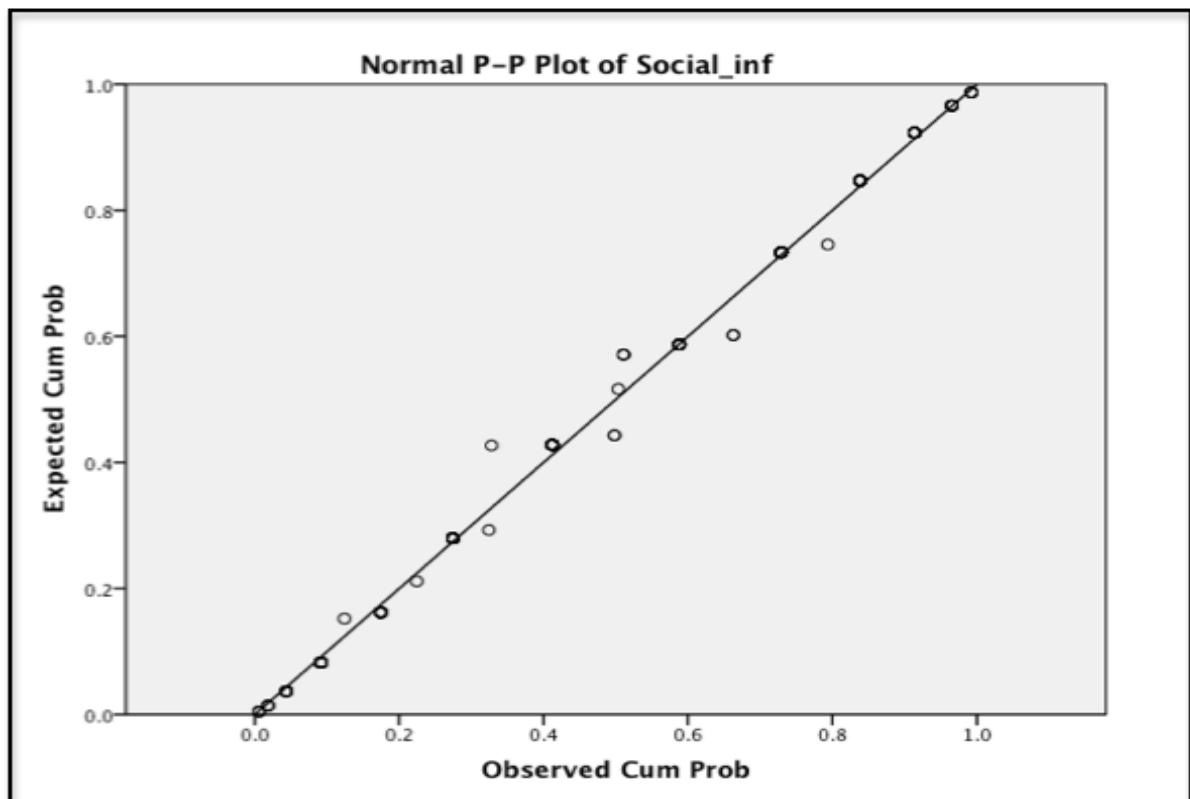


Figure P 11: Normal probability plot – Social influence

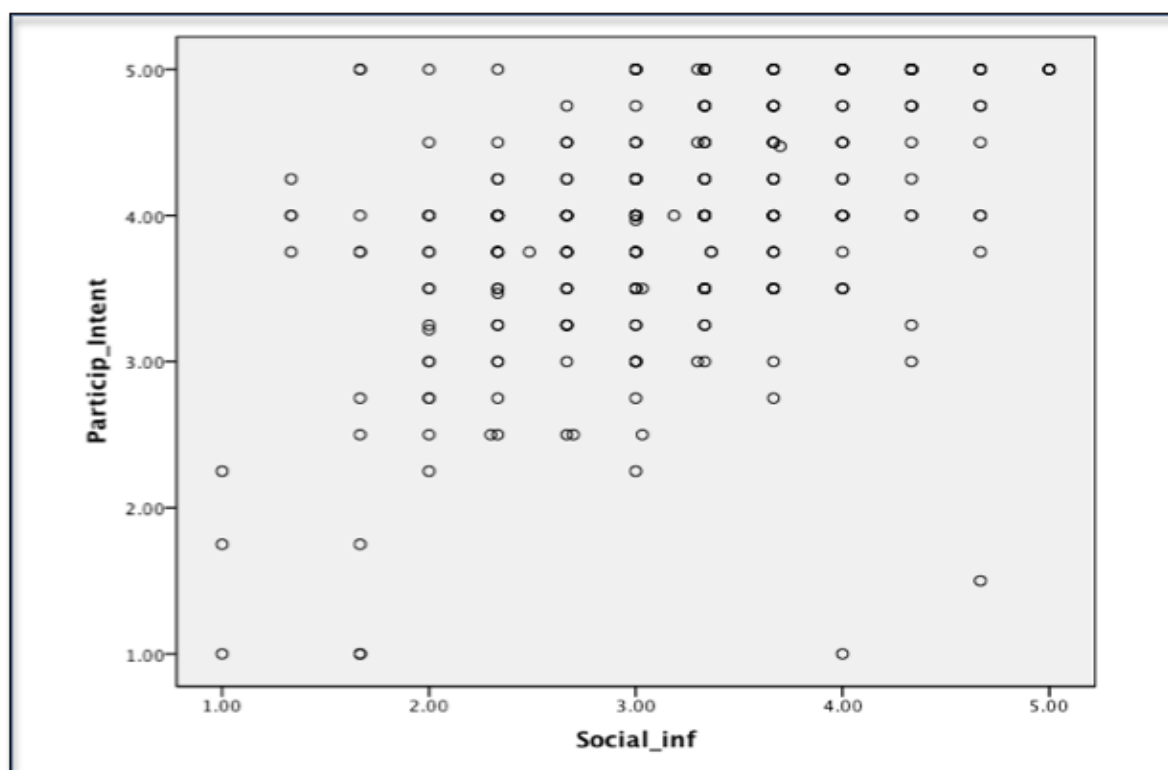


Figure P 12: Scatterplot – Social Influence

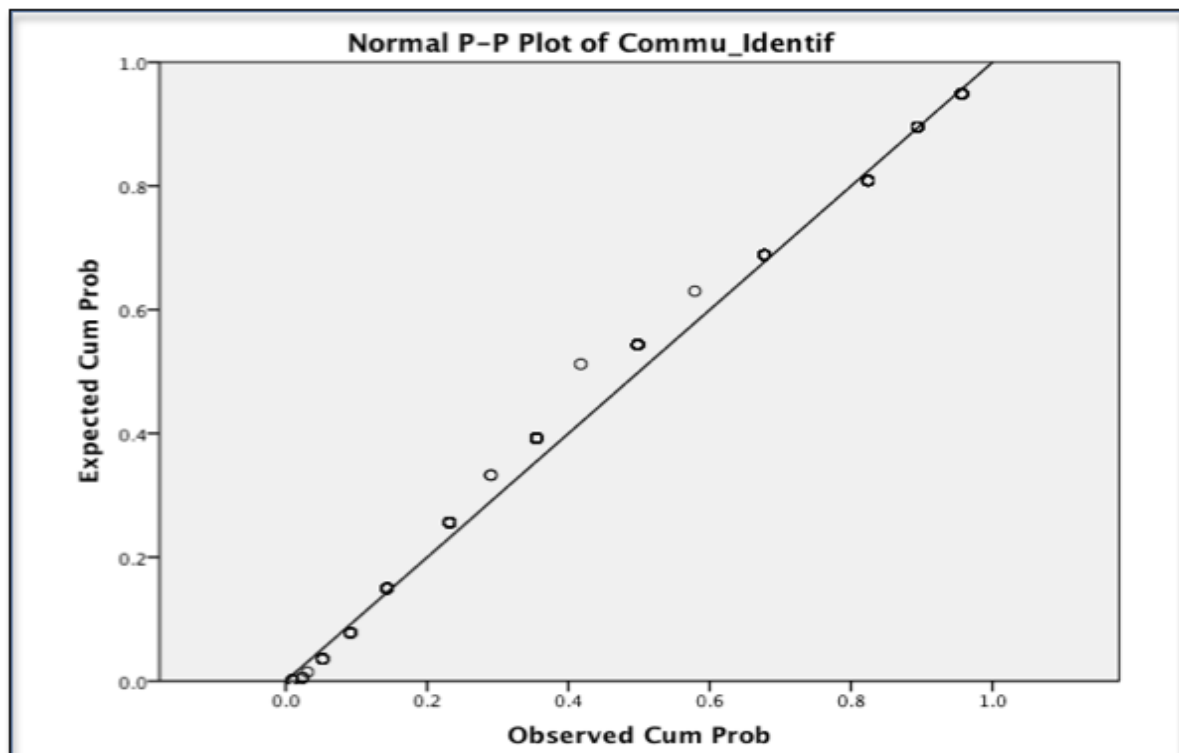


Figure P 13: Normal probability plot – Community identification

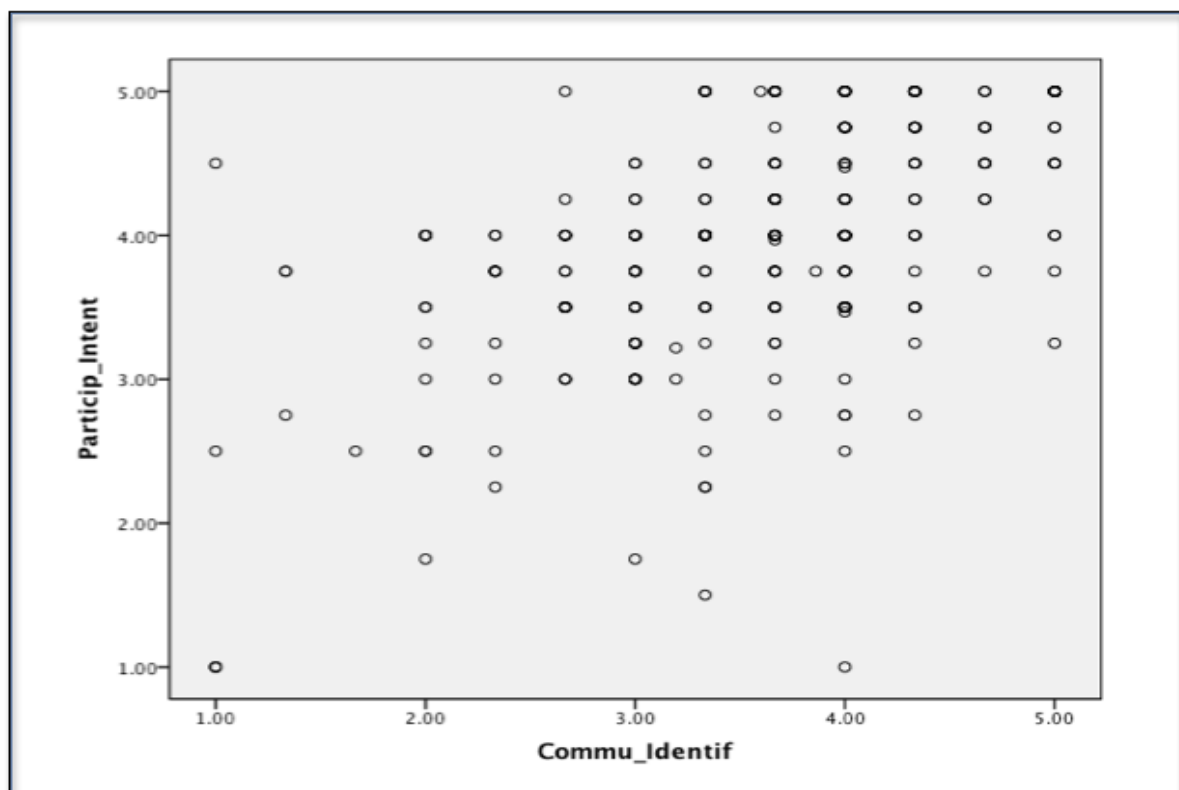


Figure P 14: Scatterplot – Community identification

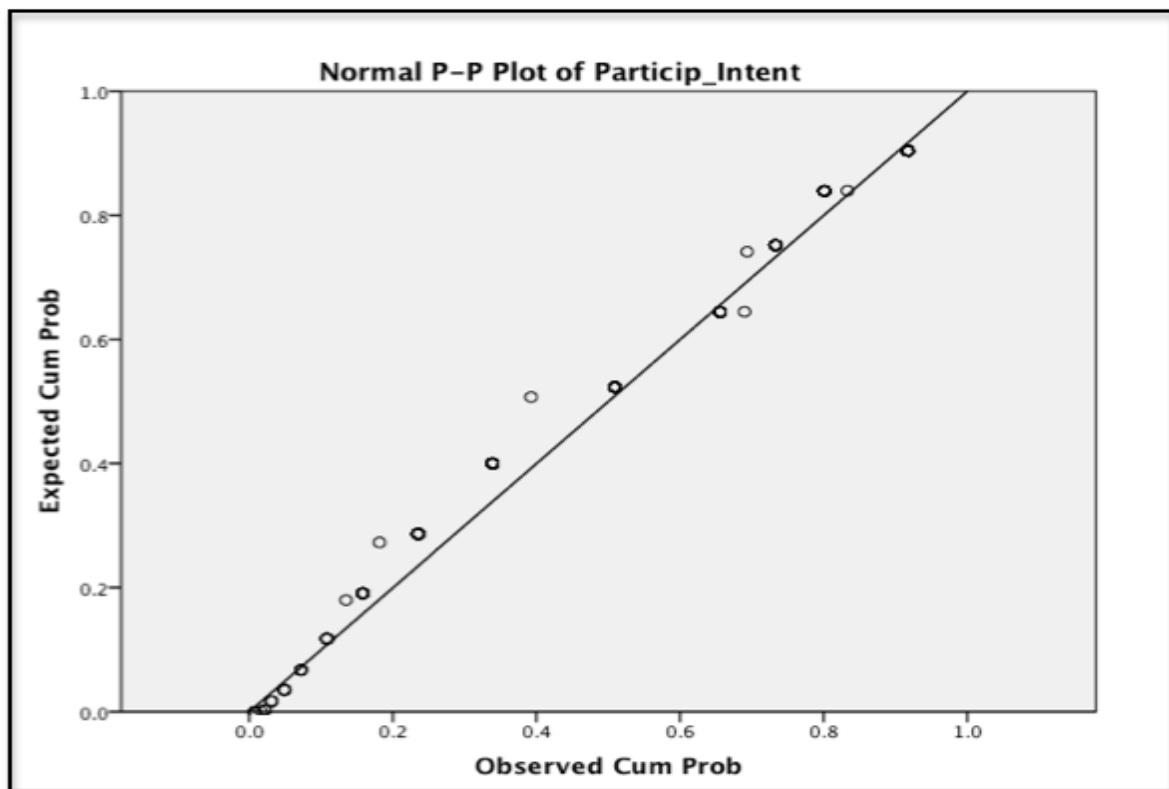


Figure P 15: Normal probability plot – Participation intention

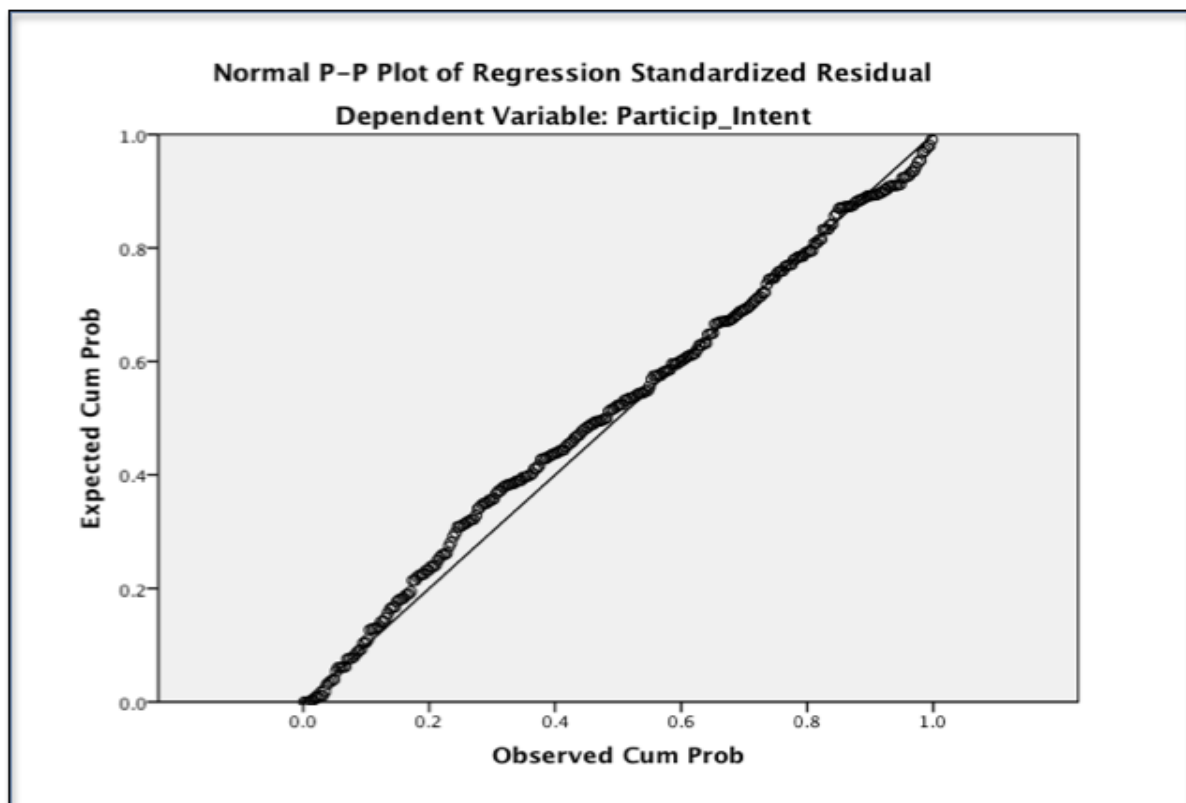


Figure P 16: Standardised residual – Normal probability plot

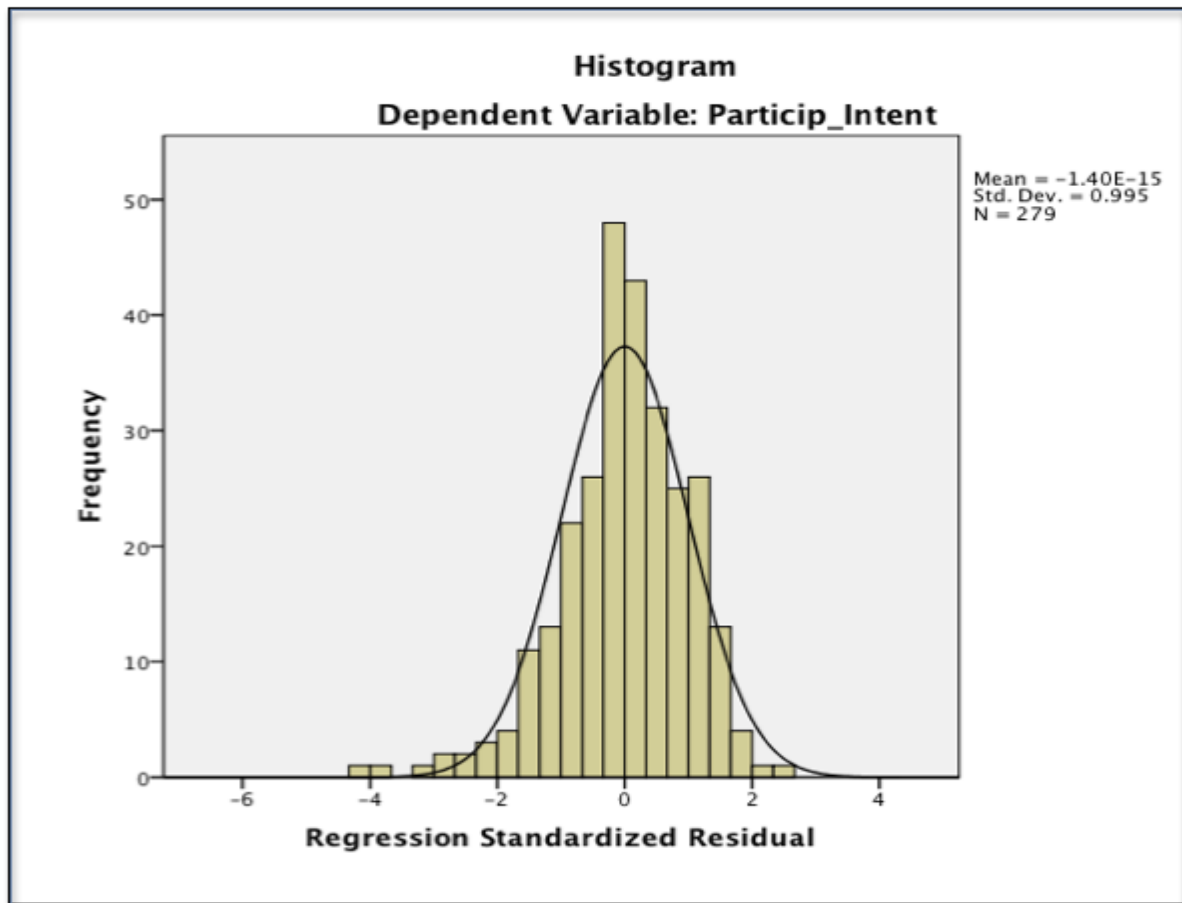


Figure P 17: Standardised residual: Histogram

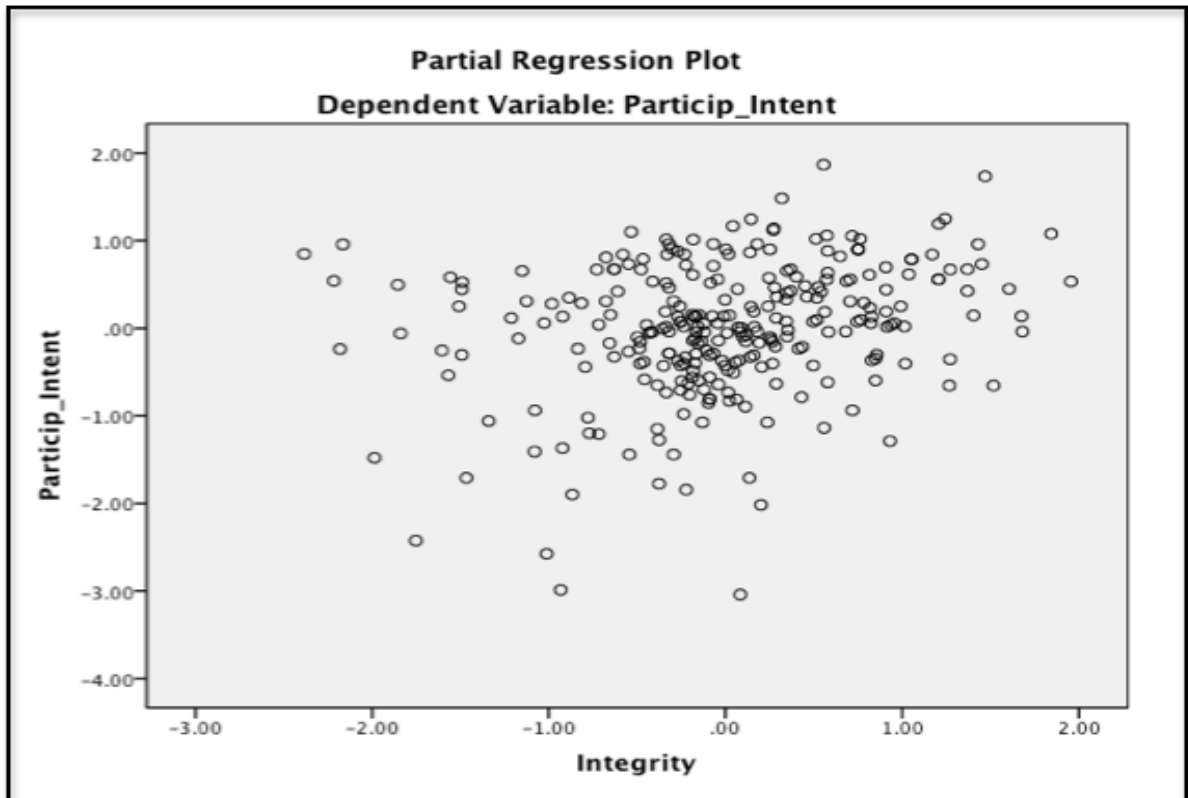


Figure P 18: Partial regression plot: Integrity

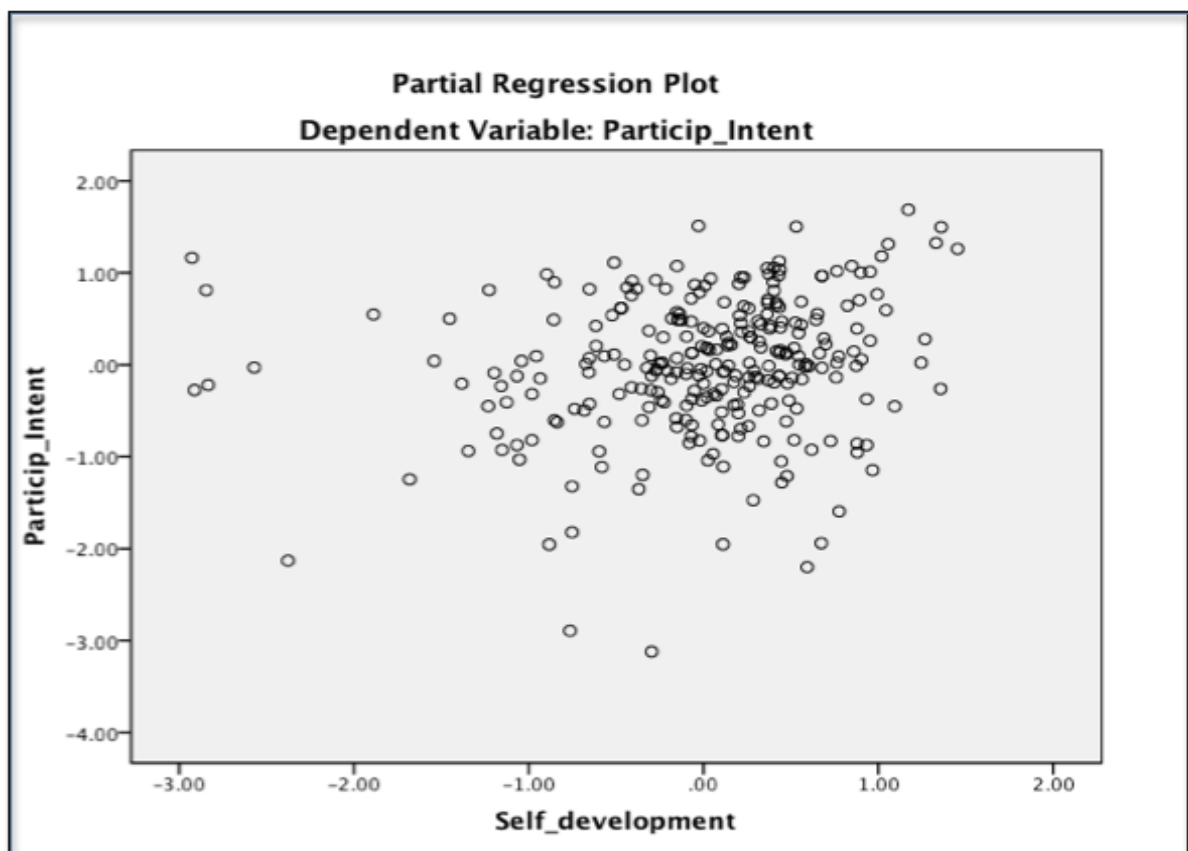


Figure P 19: Partial regression plot: Self-development

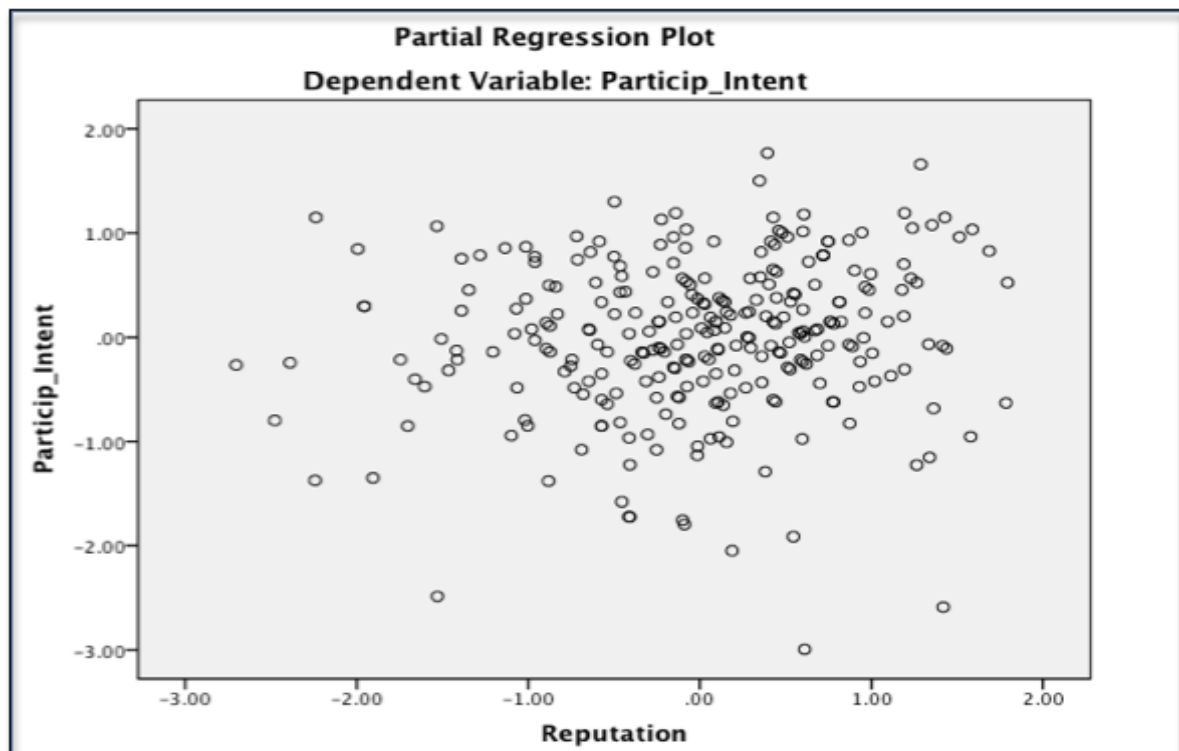


Figure P 20: Partial regression plot: Reputation