Multiple Perspective of Mobile Money System Development: Action Case of e-Masary Wallet

A thesis submitted to The University of Manchester for the degree of

Doctor of Philosophy

In the Faculty of Humanities

2015

Mostafa Mohamad

Manchester Business School

University of Manchester

TABLE OF CONTENTS

CHAPTER THREE:THEORITICAL FRAMEWORK

CHAPTER FOUR: RESEARCH METHODOLOGY

CHAPTER FIVE: E-MSARY PROFILE

CHAPTER SIX: MULTIPERSPECTIVE OF E-MASARY

CHAPTER SEVEN: CONCLUSION AND RECOMMENDATIONS

Tota Word Count 120,865

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS

ANT	**Actor Network Theory**
ABWA	**Assuit Business Women Association**
BM	**Business Model**
BoP	**Base of the Pyramid**
BS	**Business Systems**
CBE	**Central Bank of Egypt**
DM	**Data Modelling**
EFSA	**Egyptian Financial Supervisory Authority**
FI	**Financial Inclusion**
FSPs	**Financial Service Providers**
HAA	**Human Activity Analysis**
HAS	**Human Activity System**
HCI	**Human Computer Interface**
ICTs	**Information & Communication Technologies**
IM	**Information Modelling**
InD	**Innovation Diffusion**
IP	**Implementing Partner**
IS	**Information System**
ISD	**Information System Development**
MIS	**Management Information System**
MMS	**Mobile Money System**
M-Finance	**Mobile Finance**
MMicro	**Mobile Microfinance Services**
MNC	**Multinational Corporation**
MNOs	**Mobile Network Operators**
MPS	**Mobile Payment Services**
MSPs	**Mega Service Providers**
M-Wallet	**Mobile Wallet**

NBFIs	**Non-Bank Finance Institutions**
NGOs	**Non-Governmental Organisations**
NFC	**Near Field Communication**
NTRA	**National Telecommunication Regulatory Authority**
OM	**Operation Manager**
OTA	**Over-The-Air**
PoS	**Point-of-Sale**
PPE	**Poorest of the Poor Entrepreneurs program**
SaaS	**Software as a Service**
SBM	**Social Business Model**
SFD	**Social Fund for Development**
SSA	**Structured System Analysis**
SSM	**Soft System Thinking**
SST	**Social Shapping of Technology**
STS	**Social-Technical System**
TOP	**Technical, Organisational, and Personal Perspectives**
TS	**Technical Specification**
U-Commerce	**Ubiquitous Commerce**
USSD	**Unstructured Supplementary Service Data**
VC	**Virtual Currency**

Parts of this thesis have been disseminated in the following publications

JOURNAL PAPERS

MOHAMAD, M. EL ALAMOUDY, S. ALNUWAIRAN, M, WOOD-HARPER, T. (FORTHCOMING 2015). How Mobile-Based Visuals Operate as Messages of Information for Different Cultures? Action case in the pilgrimage in Saudi Arabia. Action Research Journal . Special Issue for Action Researchers Engaging with New Technologies and Communicational Forms.

BADEWI, A. MOHAMAD, M. SHEHAB, E. WOOD-HARPER, T (ACCEPTED 23RD SEP 2014). Business Innovation in ERP Orchestration Theory: Multicasts from the west and East. Journal of Strategic Information System.

MOHAMAD, M. (2011). Mobile Microfinance and empowerment: the case of e-Masary for financial inclusion in Egypt, *Strategic foresight*, Vol: 2, Issue No: 11, Pp 11-16.

BOOK CHAPTERS

MOHAMAD, M.R. WOOD-HARPER, A.T & RAMLOGAN, R.R. (2014A). *Mobile Financial Services at the Base of the Pyramid: A Systemic view for Cross-Sector Governance and Embedded Innovation*. In Zhao, J. De Pablos, P. & Tennyson, R. Organizational Innovation and IT Governance in Emerging Economies. IGI Global.

MOHAMAD, M.R. WOOD-HARPER, A.T & RAMLOGAN, R.R. (2014B). *Multiview of Mobile Money System Development at the Base of the Pyramid: Case of e-Masary in Egypt after the Revolution*. In Zhao, J. De Pablos, P. &Tennyson, R. Organizational Innovation and IT Governance in Emerging Economies. IGI Global.

MOHAMAD. M, WOOD-HARPER, T. RAMLOGAN, R, R. (2015). Multiview of Mobile Money System Development at the Base of the Pyramid: Case of e-Masary in Egypt after the Revolution. In Graham, C, Strategic Management and Leadership for Systems Development in Virtual Spaces. IGI Global.

CONFRENCE PAPERS

MOHAMAD. M, WOOD-HARPER, T & RAMLOGAN, R, R. (AUGUST 2014). Embedded Innovation in Mobile Financial services at the Base of the Pyramid: An Action case to reveal enablers and mechanisms. *Proceedings of the AOM Meeting 2014*, Philadelphia, Pennsylvania, USA.

MOHAMAD, M.R & WOOD-HARPER, A.T (AUGUST 2013). Multiperspectives of Mobile Money Systems Development: Case of e-Masary in Egypt. *Proceedings of the AOM Meeting 2013*, Orlando FL, USA.

MOHAMAD, M. & WOOD-HARPER, A.T (JULY 2013). Using The Base Of The Pyramid Strategy As Lens For Cross-Sector Collaboration In Financial Inclusion: Case Of E-Masary For Mobile Financial Services, *Proceedings of the 8th International conference of Critical Management Studies; Technology-Based Classification Processes in the Global Context*. Manchester, UK.

MOHAMAD, M. (2012). Base of the Pyramid Value Chain As Lens For Cross-sector Collaboration in Mobile Financial Services, Proceedings of the AOM Meeting 2012, Boston, USA.

MOHAMAD, M. (DECEMBER 2011). Exploring Accountability and Enterprises at the Bottom of the Pyramid: Case Study for Mobile Microfinance in Egypt. *Proceedings of the 2nd International Conference on Entrepreneurial Networking and Learning within Regional Economies*; Waterford, Ireland, UK.

MOHAMAD, M. (MAY 2011). Exploring Accountability and Enterprise at Mobile Microfinance Initiatives, *Proceedings of the 4th Annual Information Studies Postgraduate Symposium*, Manchester Metropolitan University-UK.

MOHAMAD, M. (2010). Non-Bank Microfinance at the Bottom of the Pyramid: case study of "My Village" by Vodafone Egypt. Manchester Finance Conference. Manchester business School, UK.

FUNDING PROPOSALS

MOHAMAD. M, WOOD-HARPER, T. RAMLOGAN, R, R. (SEP 2014). Multiview of Virtual Currency Adoption and Systemic Risks: An Action Research on Service Businesses in the UK. Working paper for funding, The Cryptocurrency, The SWIFT Institute London, UK.

The University of Manchester
Mostafa Mohamad
PhD in Business & Management

Multiple Perspective of Mobile Money System Development:
Action Case of e-Masary Wallet
18th March 2015

ABSTRACT

This thesis highlights how the motives, utility and benefits, and challenges of *Mobile Money Systems (MMS)* shape the financial inclusion in today's dynamic environment and increase its *sustainability*. Recently, Mobile Network Operators (MNOs) have been acting as financial service providers to tap the unbanked population at the *Base of the Pyramid market (BoP)*. This approach of bankless banking requires a network of private, non-governmental, retail agents, and governmental organizations to develop and implement a sustainable MMS. Such networks are constantly changing and growing and it is vital for the successful enhancement and evolution of these systems that they adapt to these changes. Appropriate development of a correct system in accordance to different institutions' needs helps to reconcile different (sometimes conflicting) economic and social goals and maintain high level of sustainability.

The environment of MMS development represents a wicked problem situation that requires an inclusive Kantian approach to reconcile the disparate views of individuals, groups, and organizations that constitute this type of information society. "*People only see what they are prepared to see*" (Ralph Waldo Emerson cited in Holmes, 2007). Interestingly enough that it has been said long time ago and we all know it very well, yet ironically people fail to accept, digest or even see other perspectives or different point of views other than their own. Their various viewpoints are contingent by their indigenous experiences and day-to-day situations and no party can be claimed as the holder of all strands of knowledge or absolute truth.

This thesis offers the Mutlview**4** as a contingent methodology for Information System Development (ISD) to analyze the unique action case of e-Masary as an MMS from multiperspectives (i.e. from organizational, technical and personal views). We found these TOP perspectives helpful in investigating how multilayer stakeholders see the benefits and challenges of MMS being developed in the case of e-Masary and how to make it more sustainable. Multiview**4** has been developed through a mix of the Multivew**2**, a framework for MMS development, and action case study. This set of tools have been used to interpret and capture a rich picture of the Egyptian BoP context where e-Masary multidimensional system has been developed.

The financial sector in Egypt has been resilient to the global financial crises and the political unrest following the 25th of Jan revolution. However, this thesis pointed out the failure of the financial sector to provide a stable and equitable access to finance to 90% of the Egyptian population who represent the BoP. During this period of time the position of each actor in the payment and the transfer value chain remains highly awkward in the proposed mobile solutions. Macro-level actors (e.g., Central Bank) do not want to lose control, while others would like to fully control the end-user relationship (e.g., MNOs).Therefore, we found tussles facing absolute solution. Instead, we mapped contingent solutions proposed by the key stakeholders. We also explained why numerous actors failed when they have attempted to launch systems with a full control or have sought to by-pass the current incumbent (i.e., Microfinance Institutions, MNOs) have faced dismal results.

This thesis contributed to the multiperspectives theory as a theory of information society with practical evidence from the BoP context. This theory has also been used to conceptualize the BoP ICT-based initiatives. Employing action case as a design for data collection also contributed to the rising debate of engaged scholarship to offer solutions that make our lives better (Welsham, 2012). The practical value of our research offer a systematic tool kit for mobile money professionals, developers, regulators, and customers.

Keywords: *Multivew4, ISD, BoP market, S-T Systems, Action Research, Mobile Money*

DECLARATION

I declare that no portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning;

COPYRIGHT STATEMENT

ACKNOWLEDGEMENT

I would like to extend my appreciation and heartfelt gratitude to my supervisors Prof.Trevor Wood-Harper and Dr.Ronnie Ramlogan. Trevor's encouragement, direction, and patience have no equal and without whom my profile as an early career scholar would not exist. His fatherhood and expertise as one of the IS champions helped me to network with other influential academic and practitioners in the field. Ronnie's inspirational guidance and controversial discussion every Friday afternoon was an asset to justify all of my major decisions in this research. His friendship and help motivated me to investigate the innovation and business modelling disciplines as a twin to the IS domain. Both supervisors wasted no time to advise me how to proceed with my studies, my academic career, and my personal life.

Ten other academics have guided my research knowingly through chairing the AoM doctoral consortiums, leading seminars, and workshops, or unknowingly through their intellectual work: Professors David Avison, Bob Wood, Mike Newman, Geoff Walsham, Lynne Markus, Chrisanthi Avgerou, Richard Heeks, Peter Kawalek, Brian Nicholson, and Frank Geels. In addition, Professor Robert Scapens from the Accounting Division at MBS was of great help discussing alternative methodological issues of my research.

No words of appreciation are enough to express my sincere gratitude to my mother, my brother, and their families for their love and endless support. Specials thanks for my wife Shimaa, my son Ahmed, and mother-in-law, for without their support and help, I would not be able to finish this work. Special mention is made of my uncle, Ahmed Tony, who supported me during my academic journey from the first day I knew how to hold a pencil and write my first word.

CHAPTER ONE
INTRODUCTION

Area of concern

This research highlights how the motives, utility and benefits, and challenges of Mobile Money Systems (MMS) shape the financial inclusion in today's dynamic environment and increase their sustainability.

Recently, Mobile Network Operators (MNOs) have been acting as financial service providers to tap the unbanked population at the Base of the Pyramid market (BoP) in many developing countries, including Egypt (Prahalad, 2009). This approach of bankless[1] banking requires a network of private, non-governmental, and governmental organizations to develop and implement a sustainable MMS. Such networks are constantly changing and growing and it is vital for the successful enhancement and evolution of these systems that they adapt to these changes. Appropriate development of a correct system in accordance to different institutions' needs helps to reconcile different (sometimes conflicting) economic and social goals and maintain high level of sustainability.

It is argued that while the financial sector in Egypt has been resilient to the global financial crises and the political unrest following the 25th of January revolution, it has failed to provide stable and equitable access to finance (Farazi et al., 2011). During this period of time the position of each actor in the payment and the transfer value chain remains highly awkward in the proposed

[1] Mobile branchless banking includes two approaches (Ivatury & Mas, 2008; Mas, 2009): The first is bank-led in which bankers adopt mobile technology to push the services to the disenfranchised (underbanked) customers who live in the rural areas. In doing so, bankers develop the business model and hire a mobile network operator to develop and maintain an off- the- shelf mobile payment solution. The second is telecom-led (Bankless) in which mobile network operators and software vendor develop both of the business model and the mobile payment solution. In doing so, they partner with governmental and non-governmental actors and co-create the sociomateriality of the MMS. Banks in the second model are just medium of depositing the telecoms cash

mobile solutions. Macro-level actors (e.g., Central Bank and the Egyptian Financial Supervisory Authority) do not want to lose control, while others would like to fully control the end-user relationship (e.g., Multinational Telecoms). Therefore, tussles are likely in any solution, if we want to go forward. This explains why numerous actors which have attempted to launch systems with a full control or who have sought to by-pass the current incumbent (i.e. Microfinance Institutions, Telecoms) have faced dismal results.

The thesis focuses on the development of e-Masary, an Egyptian MMS in an action case study (Vidgen & Braa, 1997; Braa & Vidgen, 1999). It includes a multidimensional stakeholder network, which holds varying technical, organizational, and personal interests. Accordingly, the network has the characteristics of a naturally occurring experiment that includes changes in the information and business systems interactively.

The environment of MMS development represents a wicked problem situation that requires an inclusive Kantian approach to reconcile the disparate views of individuals, groups, and organizations that constitute this type of information society. "*People only see what they are prepared to see*" (Ralph Waldo Emerson cited in Holmes 2007). Interestingly enough, given that it has been said long time ago and we all know it very well, ironically, people fail to accept, digest or even see other perspectives or points of views other than their own (Mitroff & Linstone, 1993). Their various viewpoints are contingent on their indigenous experiences and day-to-day situations and no party can be claimed as the holder of all strands of knowledge or absolute truth.

In this research MMS, in the form of the e-Masary initiative in Egypt, has been analyzed from a multiple perspective (i.e. From organizational, technical and personal views) (Linstone, 1989). This trilogy will help to investigate how multilayer stakeholders see the benefits and challenges of MMS being developed in the case of e-Masary and how to make it more sustainable. In doing so, Multiview framework (Avison & Wood-Harper, 1990) has been adopted as a methodology for data collection and interpretation aiming to capture a rich picture of the study results and deeper understanding of the phenomenon.

1.2. Research Background

The author of this thesis had been mandated by a Multinational Corporation (MNC) called Masary.Co to help develop and implement the multifaceted Mobile Money System (MMS). Accordingly, a review of the Information System Development (ISD) literature and its underpinning systems thinking assumptions was initiated. Alternative systems development methodologies, including Information System (IS) and Business System (BS) were also explored.

The learning journey, led by his role as a system analyst and a change facilitator including drawing rich pictures of the mobile money value chain to pinpoint the problem situation from the stakeholders' perspectives. This participatory approach helped to diagnose the necessary transformation to remove the major implementation challenges and maximize the perceived benefits. It also allowed reflection on how the change has been conducted and on the sustainability warranties to maintain wider outreach and the longer project life cycle of the proposed MMS.

The development of MMS at the BoP encounters seven key trends: ***turbulent environment, inter-organizational systems, decentralization, technological advances, rising stakeholders' expectations, universal access, and big data***. Understanding these trends, should help the system analysts, developers, and owners to develop a successful Information System, including all system design and deployment activities at the Base of the Pyramid (BoP) context.

Kolk et al. (2012) emphasize that the BoP literature presents a wide variety of definitions, concepts, contexts, initiatives, impact measures, and even different approaches. The BoP literature, however, lacks a solid conceptualization model to compare and contrast success and failure case studies (Karnani, 2009). Developing MMS in this context reflects a new form of

information society. In response, **Chapter 2** proposes the multiperspectives theory to ***conceptualize the BoP and discuss how the ISD proceeds within this context*** from the technical, organizational, and personal views.

The "*Multiperspectives Theory*" developed by Harold Linstone in the late seventies provides a concrete Kantian view that forces us to distinguish "*how we are looking*" from "*what we are looking at*" (Linstone, 1989; 321). This theory shifted our attention from "*What are the challenges, uses and sustainability features of MMS development*" toward "*How different stakeholders see these features from different technical, organizational, and personal view*". These three perspectives naturally present varying attributes and offers insights on a system that is unattainable with the others. Each perspective offers different archetype through which humans experience the world (and themselves) and order the world of phenomena, so that they are able to have the experience (Mitroff & Linstone, 1993: 84).

The "*Technical view*" (T) diagnoses the variances between the targeted and realized "*design of jobs and technology use*". In specific, it covers the activities of system design, data specification languages and structures. This view regards an information system as a technical artifact, and assumes cause and effect linkages with its organizational environment in terms of inputs and outputs (Iivari, Hirschheim & Klein, 2004). In doing so, it secures methodological rigor and practical accuracy of the ISD process. However, developing MMS exhibit openness and high interdependence and if reduced to causal relationships, lose their meaning and the ability to be explained (Wood-Harper & Fitzgerald, 1982; Watson & Wood-Harper, 1995).

Accordingly, the "*Organizational perspective*" (O) is needed to address other social realities such as adaptation to the surrounding organizational and political environment. Such a view focuses on the dynamic relationships, intra and inter-organizational boundaries. This helps constructing and maintaining a broader systematic whole.

Other intuitive and reactive issues such as perception of risk and inability to plan for low probability / high-impact events are tackled by the "*Personal view*" (P). In contrast with the O perspective, this view thinks more about the self and their sectional interest rather than multiple issues.

The multiperspectives theory has been revisited and used to explore messy problems of information society (see Linstone, 2010, Mitroff & Silvers, 2010; Mitroff, Alpaslan, Mason, 2013; Mitroff, Alpaslan & O'Connor, 2014). It has been proposed as a theory of critical research that enhances the theory-in-use and human learning (Mason & Mitroff, 2015).

We are motivated to analyze the unique case of e-Masary for mobile money services from multiperspectives (i.e. From organizational, technical and personal views) to explore how the multilayer stakeholders involved see the system development processes and tasks from these lenses (Linstone, 2010). Putting these views together offers a plausible Kantian view of how stakeholders benefit from this new system and reveals the challenges they face. In doing so, Multiview**2** as a methodology (Avison & Wood-Harper, 1998) has been integrated with a customized framework for MMS development. This framework has been developed through systematic review of the mobile money literature based on Welsham (2012) to reveal the unifying vision, research settings, goals and objectives, methodology, and multi-disciplinarity as main elements of interpretative research (see Figure 2.14).

These two parts (i.e. Multiview**2** & the MMS development framework) led to our Multiview**4** that helped the researcher to draw a relevant root definition and rich picture of the problems emerged study results and deeper understanding of the phenomenon.

The mobile money and payment literature lacks an appropriate ***systematic typology of the MMS based on the relationships among the main economic agents and the possible services rendered*** in each transaction type (Ramada-Sarasola, 2012). This quest motivated researchers such as Kent (2012), Donovan (2012a&b), and Cernev, Diniz & Albuquerque (2012) to offer updated reviews of the key payment models, key stakeholders, delivery challenges of mobile money and payment. Ironically, the mobile money and payment literature still lacks a systematic

analysis of how to develop a MMS from multiperspectives. Yet, analysts of these types of system tend to answer "*what are the factors experienced by a particular group of people*", rather than exploring "*how different stakeholders see the factors they experience from technical, organizational, and personal perspectives*". In doing so, the researcher conducted an updated review of the mobile money and payment literature to highlight the key challenges, benefits, and sustainability factors in developing an MMS and to locate the appropriate methodology for approaching different stakeholders and see how they see these issues from the TOP perspectives (see **Appendix 2** ***a-c***).

This thesis reflects a learning journey, where we reviewed the relevant literature concerning the MMS and how different systems thinking schools might help understanding how such system can be developed at the BoP (see **Chapter 2**). In **Chapter 3**, we conducted a detailed review of the candidate theories that might explain the processes of MMS development. The *Information System (IS) theories* and *Business Model (BM) theories* have been found to be significant. The IS theories such as the Actor Network Theory (ANT), Innovation Diffusion theory, and Socio-technical theories have also been found to be significant in the MMS literature (see Table 3.7). BM theories like *Social network theory*, *Embedded Innovation*, and *Social Business Model* have also been discussed in previous MMS studies. In discussing each theory, we justified why none of them has been adopted as a main theoretical framework for the current study. Both disciplines led the researcher to Multiview**4** as a candidate ISD methodology that incorporates the multiperspectives theory. Multiview**4** employs the strategic business systems thinking as well as the socio-technical IS thinking.

The story of Multiview started in the mid-eighties then went through different revisions to study a wide variety of phenomena in public and private organizations (Wood-Harper et al., 1985; Avison et al., 1998; Bennetts et al., 2000; Wood-Harper & Avison, 2003; Wood-Harper & Wood, 2005; Bell & Wood-Harper, 2007 & 2014a&b; Mohamad, Wood-Harper & Ramlogan, 2015c).

The initial Multiview**1** framework covers five areas of system development: "*Human Activity Analysis (HAA), Data Modelling (DM), Socio-Technical Analysis (STA), Technical Specifications (TS), and Human Computer Interface (HCI)*" (Wood-Harper, Antill & Avison**,** 1985). Bennetts et al. (2000) emphasized that Multiview is a methodological framework of analyzing computer systems design that takes into consideration varying (sometimes conflicting) views of multiple stakeholders in the development and use of a computer system. The original version of Multiview represented a new socio-technical analysis of ISD that captures both of social and technical objectives. Later, it has been developed as a methodology which structures the tasks for the analysts and users during these analyses and design activities (Wood-Harper, 1985). Multiview is a hybrid process involving computer specialists who build the system, and users for whom the system is being built. Multiview**1** aimed to answer five questions by conducting five types of analysis as shown in Appendix 2 (a & b).

Multiview**2** offers a systematic guide (including a combination of reflective learning methodologies) to ISD analysts and professionals. It provides a basis for constructing a situation-specific methodology that will be very useful for this research study as the organizational and human element of the MMS changes at a rapid pace with the change in dynamic environments that it operates in. The cornerstone of Multiview methodology is that it jointly recognizes the demands of computer artifacts, organization and individuals. As this current study focuses on the MMS from a technical, organizational and personal perspective, Multiview**2** supports the methodological requirements of the study. According to Vidgen et al. (2002), the ISD generates technical artifacts that support the organization's purposeful activities as well as taking into account the individuals' needs. As the current study is studying the interaction between technological, organizational and personal aspects of MMS the underlying fundamental concepts and foundation of Multiview**2** are appropriate for the methodological requirements.

Multiview**2** methodology demonstrates multiperspectives of a complex political, social and the technical problem situation constructed by a network of multi-stakeholders. Wood-Harper and Avison developed many versions of Multiview**2** to fit within different problem situations in different industries and services (e.g. e-Health, e-Education, and e-commerce) (see **Figure 3.13**).

In our study, we help develop a new version of Multiview to build a sustainability framework for MMS that can be useful in guiding a programme of practitioner research into the complex relationship between policy, financial service delivery, development of mobile payment solution, and the emergence of successful financial inclusion methodologies.

1.3. Research Objectives

Our research aims to achieve the following objectives:

- Conducting a ***systematic review of the relevant literature*** and identify the mobile money and payment systems dominating in the financial inclusion industry.
- Exploring the ***benefits and uses of the MMS*** and its impact on a network of multi-stakeholders at the BoP.
- Identifying the ***challenges faced by these stakeholders*** in maintaining and using the MMS at the BoP.
- Understanding how the ***Multiperspectives theory*** helps ***understanding system development in a networked information society*** full of non-traditional multi-stakeholders environment.
- Developing a contingent ***methodology of ISD that incorporates both information systems and business systems***.
- Conduct ***a systematic analysis of the MMS*** development and implementation at the BoP context.
- Constructing ***a theoretical framework for sustainable implementation of the MMS at the BoP context***. This framework illustrates the perceived challenges and benefits and introduces a transformation plan to enhance the system sustainability. Our framework serves as a toolkit for MMS policy makers, developers, practitioners and customers who live in the Egyptian BoP.

1.4. Research Questions

This study probes into the complex and multilayered nature of the MMS and its impact on financial inclusion. To investigate the e-Masary initiative for mobile money and payment service, the research study includes assessment of MMS, relating to development and implementation for MNOs, State officials, MFIs, retail agents, and clients. In addition, the study tries to identify the main benefits and barriers of implementing MMS at the BoP. These aims are accomplished by addressing three research questions.

RQ: How can a Socio-Technical Model (e.g. Multiview4 model) improve our understanding of a complex Mobile Money System Development initiative at the BoP?

- **Sub-RQ1:** *How can Multiview4 improve our understanding of the information system development at the BoP?* **(see Chapter 2)**
- **Sub-RQ2:** *How can Multiview4 model improve our understanding of MMS design & diffusion?* **(see Chapter 3)**
- **Sub-RQ3:** *How can Multiview4 help aligning between the area of concern, framework, and methodology to understand the development of MMS?* **(see Chapter 4)**
- **Sub-RQ4:** *How can Multiview4 improve our understanding of the expected challenges, impacts, benefits, and sustainability of implementing MMS?* **(see Chapter 5)**
- **Sub-RQ5:** *How can Multiview model improve our understanding of the perceived challenges, impacts, benefits, and sustainability of implementing MMS?* **(see Chapter 6)**
- **Sub-RQ6:** *How can Multiview model help understand the S-T gaps in the MMS and propose the best-fit transformation?* **(see Chapter 6)**

The link between the above mentioned research questions and the thesis chapters is explained in Figure 1.1

1.5. Research Approaches

This section reflects upon the learning journey between different typologies of "*Information System philosophical paradigms"*. Developing a typology of IS methodologies, however, is a complex process that might require a comprehensive literature survey in IS methodologies (Nickerson, Varshney & Muntermann, 2013). In contrast, the researcher pinpoints the key taxonomies such as Burrell & Morgan (1979), Galliers & Land (1987), Hirschheim & Klein (1989), and Geels (2010) that have been adopted in the development of the alternative theoretical frameworks and the proposed Multiview**4** model discussed in **Chapter 3**.

In this research, we tended to avoid the generalization of a particular typology rather, we provided a purposeful evidence to justify the choice of research methodology in the following sections. The methodological contribution in **Chapter 7** shows the links between the aforementioned typologies of IS methodologies, the alternative theoretical frameworks, and the proposed framework of Multiview**4**.

The interpretative action case study approach has been followed to design our research (Braa & Vidgen, 1997; Benbasat, Goldstein & Mead, 1987; Myers & Klein, 2011; Myers, 2013). Qualitative interviewing (Myers & Avison, 1997; Myers & Newman, 2007), Focus groups (Krueger, 2009; O'hEocha, Wang & Conboy, 2012), Participant Observation (Mingers, 2001) have been used as methods for data collection. **Table 4.3 & 4.4**; show the variety of data sources, their sampling, and justification. Before taking the aforementioned decisions (the qualitative approach, action case study design, and the proposed set of collection methods) we explored different other alternatives and written a justification of why we followed this path. In summary this set of methods aimed to collect a socially structured (inclusive) account of varying stakeholders' experience.

Following Strauss (1987) & Flick (2008), the researcher constructed a framework of data analysis and shows how Multiview, as a socially constructed methodology adds a hermeneutic dimension to the analysis process (see **Figure 4.10**). To illustrate our thinking, we constructed and drawn a set of 'rich pictures' within a Soft Systems approach (Bell & Morse, 2013; Berg & Pooley, 2013). Such pictures have been revising via a follow up interviews and focus groups with the key interested groups. This method helped in demonstrating the three perspectives (Technical, Organisational, and Personal) highlighted by Mitroff & Linstone (1993).

Sensing and modelling each picture has been developed using the so called CATWOE analysis. Checkland (1999), explained six components (*Customer, Actors, Transformation Process, World view, Ownership, and Environment*) based on which the researcher constructed root definitions of proposed MMS. In doing so, critics and challenges of CATWOE analysis have been reviewed to avoid recreating the wheel (Basden & Wood-Harper, 2006).

The third element of our data analysis process includes template analysis of the key themes arising from the data. Our templates have been developed further and compared to the theoretical themes drawn in our systematic literature review. Using NVivo 10, we developed more reflective advanced templates (see **Appendix 7**) than the primitive templates (see **Appendix 1**).

1.6. Research Justification and Significance

Our research has empirical, theoretical, and empirical significance (Van de Ven, 2007a&b). The BoP is a dynamic, complex, and rapidly changing environment where newly emerging actors such as mobile telecoms and business developers improve their competitive edge through developing a sustainable MMS to bank the unbanked long disenfranchised market that represents more than 80% of the world population. Within two years of operations, e-Masary MMS served 15 million Egyptian users located in 26 cities in Egypt. With 200 million L.E investments, Masary.Co built a multidimensional platform that includes three MNOs (including Vodafone

Egypt, Mobinil, and Etisalat), 40 Mega Service Providers (including utilities providers and fast moving consumer goods). This system is regulated by the Central Bank of Egypt, National Telecommunication Authority, and the Social Found for Development). The Central Bank of Egypt (CBE) reported that e-Masary contributed to 1.36% of the Gross Domestic Product by including the unbanked in a bankless financial system (CBE, Jan 2015). Through partnership with intermediaries such as Microfinance Institutions (MFIs) and retail agents the company helped founding 489,000 start-ups and access to finance using their mobile phones.

Following the participatory Multiview**4** led to new business models, innovative services, and financial big data platform that enhance the socioeconomic impact to the BoP population (see **Chapter 6**). The new system facilitated building a cross-sector value chain that mixed between the commercial mobile payment services and philanthropic microfinance system (see **Figure 7.2**). It also led to new forms of powers among the economic actors in the Egyptian market (see **Figure 7.18**). Our research tends to offer the telecommunication practitioners and business developers a better understanding of functional issues, business models, benefits, challenges, and sustainability features of MMS. In doing so, we provide them with a guide for understanding of the complexity in the design stage, implementation and deployment stages and reconcile the multiperspectives of multistakeholders.

The MMS is the largest networked Near Field Communication (NFC) System, implemented as a paralleled banking system where macro, meso, and micro-level partners dedicate a considerable commitment of their various resources. This review refers to studies such as Donner & Tellez (2008), Dermish et al. (2011), Duncombe (2011 & 2012), Mas & Radcliffe (2011), Donovan (2012), Anong & Kunovskaya, 2013, Mwangi (2013), Mohamad, Wood-Harper & Ramlogan (2014a) that emphasised the lack of primary research that consider a multisided mobile finance system as compared to single provided mobile payment system. Recently, MMS has been replicated in a many sub-Saharan and south Asian countries and led to innovative digital financial services including micro-insurance, microfinance, virtual currency exchange. Adopting MMS requires involved institutions entrench their activities and processes, including administration, finance, quality controls, system control, and customer relationship management etc. to improve the efficiency and effectiveness of routine work.

The common challenge facing the service providers (i.e. Masary.Co and the three MNOs serving the Egyptian market) is the system's ability to change and modify according to the varying (sometimes conflicting) requirements and growth of the partners, intermediaries, regulators, and end-users). Our research findings shed light on the change of views before and after the system implementation and maps transformation plans that help them narrow the gap between their view of the system development process and how the stakeholders actually see its dynamics. The research also offers strategic foresight for the potential challenges, benefits, sustainability features associated with the new proposed system after our transformation has taken place.

Our study is concerned with the benefits, uses, challenges, and sustainability of MMS at the BoP in Egypt. In order to explore and understand how MMS works with different public and private institutions and how the multistakeholders collaborate and communicate with each other using these systems, it is essential to adopt a socially constructed framework that helps reaching to more sensible findings. As argued by Wood-Harper & Wood (2005), in using Multiview, the analyst can engage with different users to capture different views of the same situation depending on the users' education levels, cultures and backgrounds. Wastell (1996) sees Multiview as a strong foundation to construct a situation-specific method that results from the iterative engagement of the analyst with the problem situation. Avison (2012b) argues that this methodology offers a more ethical interpretation that enables practitioners to identify the right way to change. ***This ethical approach flows consistently from soft system thinking, multiperspectives theory, the BoP business model, and Multiview4***. Thus, using Multiview**4** is expected to provide us with a distinguished systematic conceptualization of the problem situation.

Different stakeholders within a mobile money network should work in coordination with each other. Multiview**4** methodology provides a detailed and structured view of how these stakeholders should be working within a network, thus covering various functions of the service. The use and impact (cause and effect) of the MMS in the financial inclusion context provide the technical system while the various stakeholders that use the MMS provide insight into the organizational and personal view on the benefits and utility, challenges, and sustainability of the system.

Multiview**4** methodology was found helpful as it can be used to propose suggestions to the financial service providers (in this case MNOs and mobile solution vendors) for making optimal use of technology (i.e. Mobile telecommunication, mobile cloud computing, software as a service) by the various users. The benefits and utility of the system, its challenges and sustainability are all the factors have been taken into consideration while assessing the use of the latest technology is within a case of financial inclusion at the BoP.

Using the above mentioned evidence drawn from the unique Egyptian case of e-Masary we also respond to the continuous calls of systems thinking scholars such as Peter Checkland, Ian Mitroff, and David Avison & Guy Fitzgerald.

1.7. Potential Contribution

1.7.1. Theoretical Contribution

This study bridges between ISD, financial inclusion, and development studies. In the field of ISD, our research offers the Multiperspectives theory (Linstone, 2010; Mitroff, 2012; Mitroff, Alpaslan & O'Connor, 2014) as a promising lens for illustrating emerging networked information societies. In doing so, we positioned the Multiperspectives theory among other philosophical inquiries, namely, the network society (Castells, 2011a&b), Public Sphere (Habermas, 1991), the Information Society (Webster, 2014), and the Socio-technical view (Al-Gore, 2013). At a lower theoretical level, we offer a new conceptualization for the BoP and ISD in this context to work as a benchmark to compare and contrast between successful and failure of BoP case studies. At the bottom theoretical level, offer a systematic review of the MMS literature to fill the existing literature gap.

1.7.2. Methodological Contribution

This research situated within the MMS takes the form of 'engaged scholarship' (Van de Ven, 2007a&b), conducted from practitioner perspectives in financial inclusion, information systems and complex systematic change. The methodological contribution is also presented into different levels as follows:

- *First,* in using the Soft system thinking to discuss important philosophical assumptions by Al-Gore (2011), Habermas (1991), Castells (1997), Webster. This reflects how this methodology is a valid system of inquiry for more wicked situations in the information society.

- *Second,* Images within the views of the Multiview methodology were interpreted and selected depending upon the BoP context in general and the Egyptian market in specific. Further, the application of the Multiview methodology in financial inclusion and specifically in mobile money services offer a new path for this methodology in more wicked situations full of multistakeholders.

- *Third,* e-Masary case study is the only case for mobile money in the Middle East and North Africa that need to be documented and replicated in similar contexts. Filling this gap, this research tended to offer "a coherent plausible story which other people could go away and try to apply to their areas of concern, or on their examples with my area of concern" (Checkland, 2010).

- *Fourth,* the set of data resources used and particularly focus groups are missing from the mobile money and payment literature as shown in appendix 1c. Focus groups found useful to reflect multiperspectives of participants and shows how MFIs' senior managers and retail agents intentionally misinterpret the customer's needs.

- Fifth, adding a hermeneutic element to the transcription, interpretation, and analysis activities reflects a new (undiscoverable) advantage of using the Multiview2 as a methodological framework (See Appendix 6).

All the above mentioned methods have been summarised in **Tables 4.3 & 4.4**, including justification and detailed non-representative sampling techniques.

1.7.3. Practical Contribution

We propose a sustainability framework that can be a useful guide (or toolkit) for mobile money professionals and policy makers to understand the complex relationship between policy, system development and diffusion, and use of MMS. This guide will help them understand the challenges facing different stakeholder and maximize their benefits from the MMS. Being aware of both will assure the going concern of the MMS in Egypt and help professionals draw the right policy in the post-implementation process. Despite the results being in an Egyptian context, some replication features will be identified to enable professionals in similar MENA countries to adopt the best practices.

Our research shows technical challenges such as "*friendly interface for illiterate users*" at the BoP. Customers of mobile payment and transfer found the service "*not suitable for livestock trading*" that usually take place far from the mobile coverage. It also shows "*security*" and "*universal access to real time data processing*" as key challenges for the integration between Vodafone, Masary.Co, and the Central Bank of Egypt in the MMS. "*Training*", "*installation and maintenance costs*", and "*affordable internet connected handset*" are the key challenges facing intermediaries (MFIs and retail agents). The "*shift from prepaid policy to credit policy*", "*transaction cost*", and "*customer services performance*" have been found crucial to the collaboration between Vodafone and Masary.Co. Further, designing "*aligned compensation system*" was challenging for both of Masary, retail agents, and MFIs to assure "*staff satisfaction and motivation*".

1.8. Thesis Structure

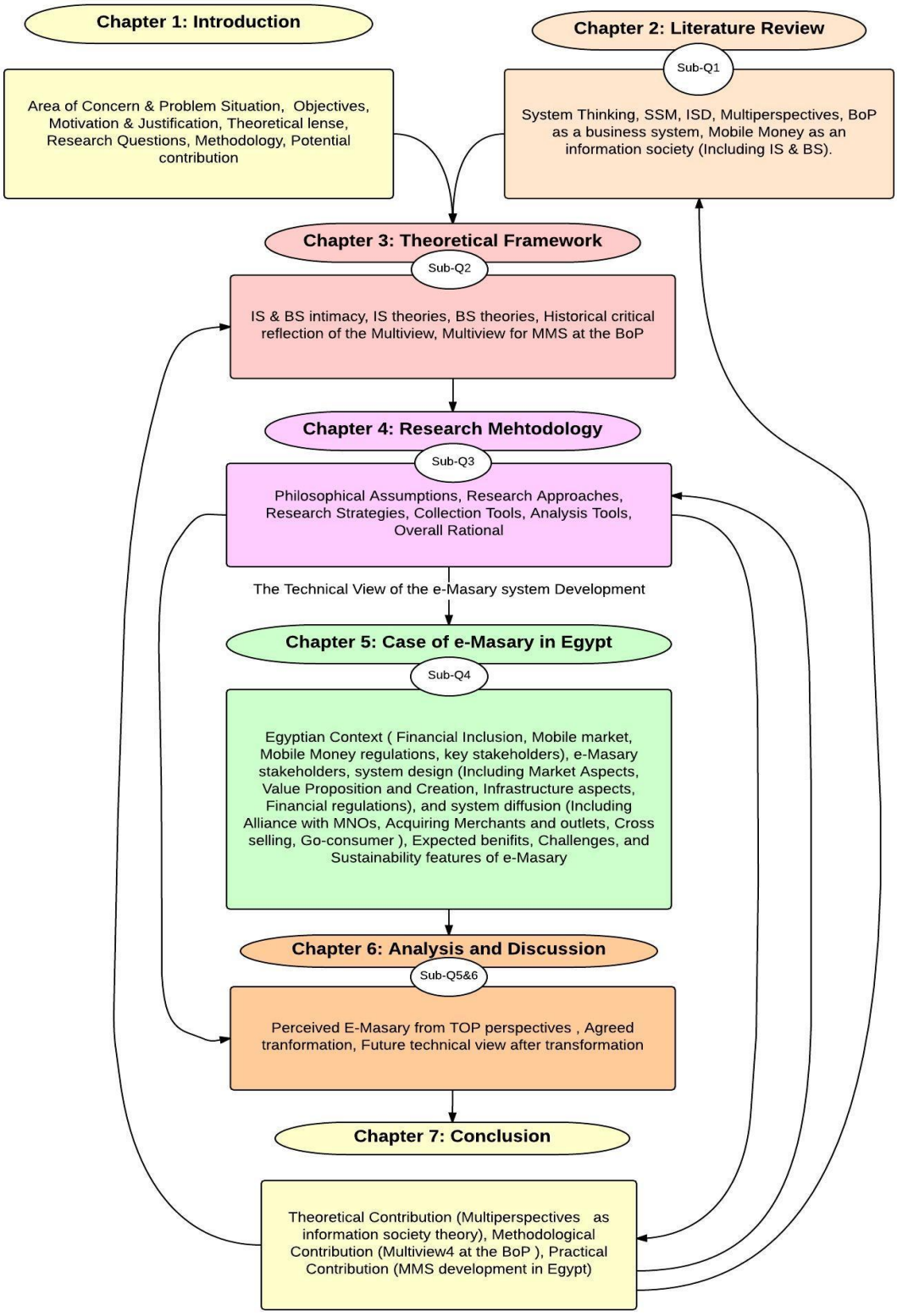
Chapter One introduces our area of concern, the research background, and the rationale behind the research approach. It also clarifies the potential contribution out of this research.

Chapter Two provides an extended systematic literature review to investigate the problem situation (i.e. Developing MMS in the multi-sided dynamic environment at the BoP). In doing so, the chapter covers the key foundation of the systems thinking and justifies why soft systems thinking has been adopted. Then it discusses the unity between systems thinking and ISD. Another section in this chapter discusses the BoP as a business model and how to develop IS in such a context. The last section of this chapter, offers a systematic review of the mobile money and payment literature based on the SSM and multiperspectives theory.

Chapter Three offers three sections. In the first section we define the meaning of a theoretical framework in the Information System domain and described how it will help explain the issues of benefits, challenges, sustainability of MMS development. In system thinking, frameworks are useful to help the researcher to organise and integrate the various elements of the problem situation in a simple and consistent way. In the second section, we discuss candidate theories of the information system and business system domains and justify why such theories are limited to explain the issues under investigation in MMS development. Avison, Fitzgerald & Wood-Harper (1988) argued that a competent systems analyst develops a tailored methodology for every project s/he undertakes rather than following a preset methodology. In response, section three audits our proposed model – Multiview**4**– as a methodological framework and justify why it might be useful for this research. In doing so, we offer a historical record of Multiview refining during the last two decades and its recent applications in ICT-enabled projects. We also identified factors from literature linked to Multiview **1**, **2**, and **3** models to organise and integrate the various elements of the problem situation in a simple and consistent way. Then we explain and justify the merger between Multiview and the mobile money system development designed in **Chapter 2**.

Chapter Four explains alternative philosophies, methodologies, and methods of information system research to justify our proposed approach to investigate the research problem. Based on our proposed framework and approach we express the problem situation and conduct root definition.

Figure 1.1: Thesis Structure



Chapter Five discusses the natural view of the system owner, Masary.Co, and how they intended to develop the system. In doing so, we explore the Egyptian context where e-Masary system was being developed. Then we discussed different financial inclusion services supplied to the BoP market in Egypt. Afterward, the chapter offers a technical/rational view of how e-Masary system was supposed to be designed and delivered.

Chapter Six explores the problem of splitting e-Masary system into two unsynchronized systems. The TOP perspectives have been employed to highlight the problem. Rich pictures have been drawn to highlight the stakeholders' points of view and propose a transformation that might fix the system. The latest view of the new fully operating system has been explained at the end of the chapter.

Chapter Seven explains the theoretical, methodological, and empirical contribution produced in this research.

CHAPTER 2
LITERATURE REVIEW

Introduction

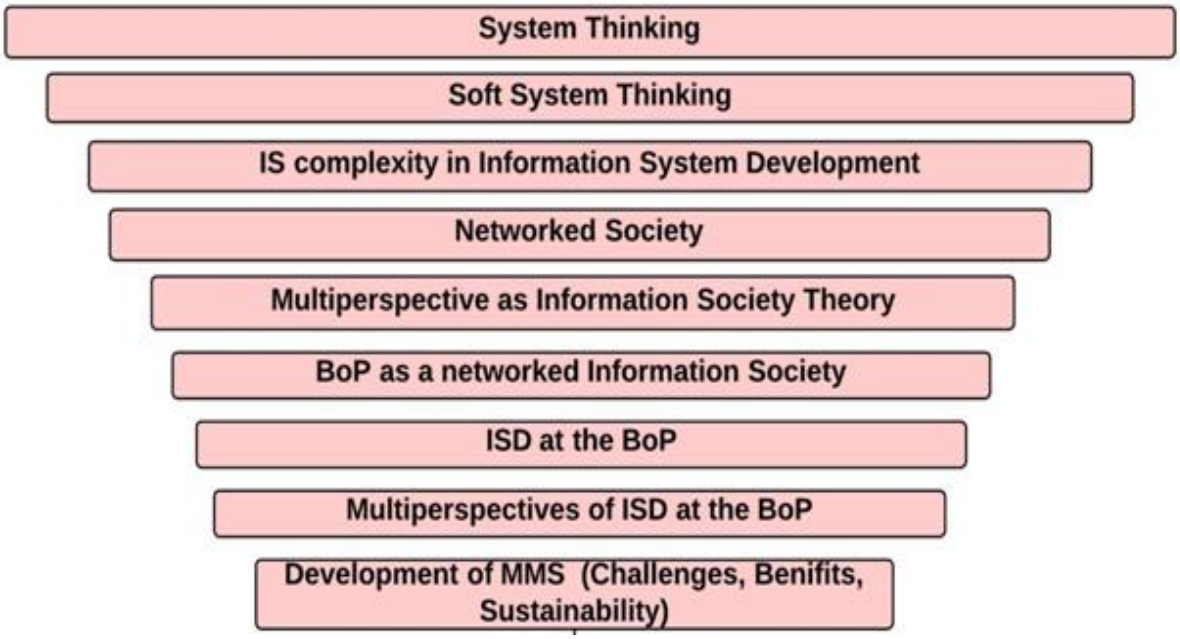
This chapter offers a systematic review of the previous literature that helps understand the mobile money system development process. It builds a cumulative research-supported knowledge based on the previous studies (Iivari, Hirschheim & Klein, 2004: 314). The literature review is a methodological audit of the previous studies to stimulate the academic research (Webster & Watson, 2002). It helps strengthen the explicit rigor and reproduce methods to set, evaluate, and synthesizes the existing body of scholarly work (Fink, 2005). Such a review reveals the justification of the research approach and the methods' selection, highlights the gap of knowledge, and situates the potential contribution (Hart, 2011a&b).

The first section of our review highlights the ISD literature to use the relevant methodologies and techniques in exploring the processes of developing MMS. ISD literature flows from the ***systems thinking schools of thoughts*** (Checkland, 1988 & 1999; Mason & Mitroff, 1973 & 2015). ***Soft systems thinking*** was found useful to solve the wicked problems of the 21st century rather than the other systems thinking approaches (Checkland, 1994; Boardman & Sauser, 2008). After we reviewed the key principles of the General Systems Theory (GST), we revisited other systems approaches to find the rationale behind the choice of soft system thinking as a processual methodology for this doctoral thesis (Checkland & Poulter, 2010; Checkland, 2012).

The second section critically reviews different ***ISD methodologies*** to identify the pros and cons of each and shows how they have influenced the design of the contingent Multiview methodology and its evolution during the last three decades (see **Section 3.2**).

The third section of our literature reviews different theoretical lenses adopted by the information system scholars to address the emerging S-T issues in ICT-based financial systems. A common theme was the use of the so called "***networked society***" to analyse widely used mobile payment, mobile banking, and mobile money systems. This alerted the researcher to offer critical reflection of the work done by revolutionary system thinking philosophers such as Jurgen Habermas (Public Sphere and Information age), Manuel Castells (The network society), Frank Webester (The Information Society), and Al Gore (Hyper-connectedness and Power of the balance). Their work refers to a gap in using ***multiple inquiry systems*** to solve business problems such as those that emerge in the MMS development and among the involved stakeholders (Mitroff, Alpaslan & O'Connor, 2014). We argue that the ***multiperspectives theory*** (Mitroff & Linstone, 1993) is a system thinking theory that helps build relevant boundaries around S-T subsystems of the MMS and their dynamic environment. In doing so, it helps the researcher to know what happens within each subsystem (i.e. *Communication processes)* and how they adapt to the outer changing environment (i.e. *Control processes).* Further, the TOP perspectives help building a *layered structure* of how the stakeholders see problems throughout the MMS development process and offer a sustainable transformation of the system.

Figure 2.1: Chapter Structure and Justification Audit



The fourth section of this chapter offers a ***systematic conceptualization of the BoP*** literature using the multiperspectives theory to understand this context and its key characteristics such as a turbulent environment, inter-organizational systems, decentralization, technological advances, rising stakeholders' expectations, universal access, and big data analytics.

The last section of our literature offers a systematic review of the mobile money and payment literature using ***NVivo 10*** to highlight the settings and context, unified visions, conceptualisation lenses, and methodologies (Walsham, 2012). The major decisions discussed above are shown in the above Figure 2.1 and helps answering the first sub-question of this thesis: ***How can a holistic ISD methodology improve our understanding of mobile money system development at the BoP?***

2. 1. What is Systems thinking?

Ludwig von Bertalanffy initiated the need for analysing the complexity of the organism through studying the interconnectedness of its sub-components and the mechanisms of their interaction (Bertalanffy, 1929). The word "system" encompasses an entity represented in physical or human systems (Churchman, 1917; Mason & Mitroff, 2015). "*System*" is a group of interdependent components that create the whole with shared characteristics than those of the individual elements (Checkland, 1995).

Ropohl (1999) argues that the word "system" reflects a set of sub-entities that get-together to create new relations that did not exist before. Such relations shape the internal structure of a whole emerging entity (a system) that performs a particular function (*functionality principle*). The more diverse are the relationships between these sub-entities, the more functions the system can perform (*equifunctionality principle*). The integration between sub-entities pass through enlarging layers; inner, outer, and layers in between. Accordingly, system researchers need to study layer by layer and the relationship between these layers to provide a rich picture of the

whole entity. In other word, the system's layers cannot be analysed using the ceteris paribus principle or (*principle of excluded reductionism*) (Ropohl, 1999). In our research, we see the key events with the ISD process as systems that together create a whole new artifact.

Ropohl (1999) argues that systems theory is an inquiry language, which we use to describe and analyse a phenomenon. This language offers a unitary *interpretation* rather than *overspecialization* interpretation of phenomena that is based on individual experience. Further, it presents a broad range of expressions including, the formal language of set theory (e.g. qualitative and quantitative modelling), graphic representations (e.g. figures that illustrate complexity), and verbal interpretations of those formal graphic to refer to the precise rationale of the chosen solution. This language accompanied by its tools provides *commonly accepted* rather than diverse explanations of the situation (Halecker & Hartmann, 2013).

General System Theory (GST) was the early version of the system theories that are grounded on two main paradigms of inquiry; *Holism* and *Idealism* (Boulding, 1956). The *Holism* principle considers the world as a single unit in general connections and broad scope, rather than isolated atoms of places, spaces, and time periods. The modern of view of the Holism principle has been revived by Al-Gore's hyper connectedness theory of the world that depends on the boom of ICTs such as social media and mobile phones (Al-Gore, 2013). His modern view does not put an end to atomism, but supports the proper compensation for disintegrating the whole of knowledge.

In his book reviewed in section 2.3.4, Al-Gore presents a unitary interpretation of the six drivers of the world as a holistic system.

GST replaces *Materialism* (systems are real objects that exist only within the material world) with *Idealism* (systems are state of minds that reflect individual's ideas) (Bertalanffy, 1972). Idealism considers systems as socially constructed realities that might not correspond to the traditional objective reality. It considers systems as human-made models with depicting and user-related specifications (Ropohl, 1999). Mapping these specifications depends on the investigator's experience on how to select a purposive sample of people to study the perceived system and on his time and cost limitations. Philosophers (e.g. Max Weber, Emanuel Castells, Habermas & Al-Gore) views discussed later in this chapter are constructed based on gray

literature of their life experience around the world and present their perceived human-made models of the world.

Skinner (2005) argues that the more disciplines we have in social science, the more important, we need to find a unifying interpretation language such as the GST. In this book he defends the approach and explains the basic definitions and principles required to apply the GST in the modern applications of social science such as innovation, ICT, and Management Cybernetics (see Table 2.1).

Table 2.1 Basic Ideas of General Systems Theory

No	Author	Definition and principles
1	Aristotle (384-322 BC)	· He developed a metaphysical vision of hierarchic order of nature applied in the biology field. · His view presents a teleological and natural philosophy.
2	Fredrich Hegel (1770-1831)	· He developed four principles of system theory as follow 1) *The whole is more than the sum of the parts.* 2) *The whole defines the nature of the parts.* 3) *The parts cannot be understood by studying the whole.* 4) *The parts are dynamically interrelated or interdependent.*
3	Wolfgang Goete (1749-1832)	· The world a monistic* System as suggested by Baruch Spinoza. · It brings a multiplicity of nature back to a simple principle integrating body and mind.
4	Ferdinanad de Saussure (1857-1913)	· Systems are characterised by Holism and structuralism and cannot be reduced to parts. · Society is a series of self-organizing structure overlapping each other with certain conformity to law.
5	Jan Smuts (1850-1950)	· He provided a comprehensive exposition of holism.
6	Max Wertheimer (1880-1943)	· He founded the Gestalt** psychology in 1912. · He stated that many physical systems (or Gestalt in German) evolved into a state of equilibrium. · He developed Gestalt-laws which explain how relations of different kind between elements determine the formation of Gestalts.
7	Kenneth Boulding (1964)	· He set five basic postulates to develop modern GST.

* The Monistic principle see that the whole is prior to its parts and that mind and matter are created from the same ultimate substance and by the same creator (Schaffer, 2010).

**Gestaltism is a school of thinking that refuses simple summation of perceptual elements such as sensation and response as the only source of experience (Lapworth, Desmond & Sills, 2012).

The above mentioned systemic principles (i.e. *Causality, Equifunctionality principle, Hierarchy, Excluded reductionism, Holism, and Idealism*) are debatable and merged into different levels and created three main approaches of system thinking, namely; hard system thinking versus soft system thinking (see section 2.1.3), and radical system thinking (Jackson, 2000& 2007; Mohamad, Wood-Harper & Ramlogan, 2014b). While the hard – functionalist – approach considers empirical observations, rationality, and objectivity to understand the complexity of a system; the soft approach analysis views a system through the analyst's subjective view of reality. The advocates of this latter approach define the system as an abstract conceptualisation of the analyst's viewpoint as a relevant representation of the elements, interrelationships, and the overall system behaviour (Wendy & Galliers, 1999; Gharajedaghi, 2011).

2.1.1. Inquiry Systems in Management

Mitroff, Alpaslan & O'Connor (2014) & Mitroff & Mason (2015) raised the question of whether humans can systemise their thinking and turn their mind into an intelligent machine. They can build an "*inquiry system*", which is a truth-searching process to collect information and accumulate knowledge (Linden et al., 2007). It is a series of activities which produces actionable knowledge (Churchman, 1971:8). A skill of "*knowing how to do something*" rather than "*knowing of something*" (Ackoff, Ackoff & Emery, 2005; Ackoff, 2010). Hence, it is a force for changing the world (Churchman, 1971:10).

Churchman pinpoints five types of inquiring systems (Mason & Mitroff, 1973 & 2015; Checkland, 1981, Mitroff, 1983; Linden et al., 2007). Each kind of "inquiring system" offers a distinct mode of thinking, including a set of elements (e.g. inputs, outputs, and operator, and guarantor) which helped to influence philosophers to solve problematic situations at the time (Mitroff, 2012).

The "*Leibnizian inquiring system*" is a deductive approach where preset rules and evidence get examined and falsified. It is based on closed systems which begin with a set of axioms and use

formal logic or a mathematical algorithm to create knowledge that simply solves problems. Such an approach best explains the minimum technical requirements for information system (e.g. software and hardware) (Avison & Wood-Harper, 1990). Its internal validity has not been exposed to debate and yet believed as the most scientific approach of building knowledge. It assumes that the world is simple and can be understood in terms of cause-effect relationships.

The "*Lockean inquiring system*" is a consensual based proposition that offers a moderate view of experts engaging with the problem interpretation and solving activities. It actively seeks input from the environment, and is communicative and social. Lockean inquirers use their five senses to observe the environment and engage in a discourse with others to develop interpretations and understanding of perceived phenomena. However, advocates of this inquiry system define social problems as bounded and well structured dilemmas that can be answered through numbers (Mitroff, 2012). This approach is much more in line with the current writing about the mechanisms of the socio-technical change and organizational learning (Argyris & Schon, 1978; Parrish & Courtney, 2012).

The "*Kantian inquiring system*" is based on the interaction between the human's perception and the realised thing itself (noumenon in Greek) (Monod & Boland, 2007). Each human has different life experiences that make him/her appreciate things differently. Emanuel Kant believed that the single-sided control of reality is not enough to understand a social problem, rather, a range of views needs to be considered to strengthen this understanding. Advocates of this approach believe that the world is complex, knowable and there is more than one way to describe it according to the observer, observed, time and place of observation. In doing so, they combine data from the ground with theories (models of ideas) to gain an unbiased view of the phenomenon (Avison & Malaurent, 2014). They routinely turn these models on or off as they see it is relevant (Churchman, 1971; Friedman et al., 2013). Each model has a measure of how well it is doing. It can be a quantitative measure such as a "r-square" in regression analysis or qualitative replication features that are drawn from the context. This approach can help explain information system development in a wicked environment (Harrop, Gillies & Wood-Harper, 2013).

The "*Hegelian inquiring system*" is a dialectical approach that addresses the extreme views that create a discursive situation. Advocates of this approach argue that social problems can usually be accompanied by such events of disagreement. Once zero point (i.e. Reconciliation) is reached, the conflict can be solved. In doing so, the researcher might highlight all counter theses and try to reach to a rational midpoint. Theories reflect the experts' views and antithesis reflect experts' views that are far from the mean (Mitroff, 2012). Hegelians give a higher emphasis to theory over the posteriori facts. This approach can help reconciling conflicting socioeconomic objectives of cross-industry information systems (Jaspers & van den Ende, 2013).

The "*Singerian inquiring system*" is a pragmatic approach where the researcher gives equal opportunities to all the above mentioned systems so s/he gets a complete insight that cannot be captured by a single inquiry system. Hegel's view is not based on "paradigm shift"; rather it is "swept into" approach boundaries between paradigms which get twisted to accommodate the progressive research process and its new elements. So while the Kantian approach employs diverse views, the Singerian approach employs diverse inquiry systems. The goal of the Singerian inquirer is the creation of common knowledge, suitable for resolution of social and public problems, in contrast to the Liebnizian system, for example, which is very much directed at esoteric, scientific knowledge. But social problems, hunger, poverty, homelessness, crime, and financial exclusion reside in an environment that is exceedingly complex and highly interconnected. The same can be said for management problems, since business enterprises and any other organization, for that matter, exist within that same environment. This approach was found significant in the anthropological studies of ICTs for development purposes (Hayes & Westrup, 2012; Elyachar, 2012 a&b).

2.1.1. Why System Thinking?

In this section we justify the use of the systems thinking approach to understand the process of mobile money system development at the BoP context.

We adopt systems thinking as an approach of perceiving (seeing, talking, and acting) reality in a way that helps us better understand and work with individuals, communities, and organizations to influx the quality of our lives in the society (Kim, 199; Gharajedaghi, 2011).

In the 31th October 2014, Ban Ki-moon, the UN's General Secretary, reported that the MMS is one of the strongest tools for financial inclusion that currently manage 70% of the e-payment transactions around the world. The development of MMS includes emergent properties that arise from the interaction between the social sub-systems (Including service providers, regulators, intermediaries, and users), and the mobile technology as a communication network. Tensions, however, evolve between macro level actors, such as the Central Bank, who do not want to lose control, and MNOs, who want to fully control the end-user relationship. Numerous actors who have sought to bypass the current incumbent have faced dismal results. They follow non-traditional laws to govern this bankless banking system than the traditional laws used to manage the industrial phenomena and the dominant banking systems (Brynjolfsson & McAfee, 2012 & 2014). Such networks are constantly changing and growing and it is vital for the successful enhancement and evolution of the mobile money system that they adapt to these changes. Appropriate development of a correct system in accordance to different institutions' needs helps to reconcile different (sometimes conflicting) economic and social goals and maintain high level of sustainability.

The problem of dynamic changes and conflict of stakeholders' interests are not independent of each other and interact with the unrest of the Egyptian economy following the latest political revolutions. It is argued that while the financial sector in Egypt has been resilient to the global financial crises and the political unrest following the 25th of Jan revolution, it has failed to provide stable and equitable access to finance (Farazi, Arvai & Rocha, 2011). During this period of time, the position of each actor in the payment and the transfer value chain remains highly awkward in the proposed mobile solutions. This environment is characterized by turbulence, decentralisation, rising stakeholders' expectations, and accelerated technology advances (see **Section 2.5**). These interactive problems create situations messes (or a system of problems) (Ackoff, 1971). None of the problems can be claimed as the cause of the mess, and accordingly

cannot be defined in isolation of the other problems that constitute the mess. Such interaction is infinite and cannot be acknowledged through the scientific methods and educated hypothesis (i.e. Reductionism), nor expert consensus (Mitroff, Alpaslan & O'Connor, 2014). Rather, a problem can be abstracted from messes through a systematic analytical lens (Chackland, 1999). In doing so, we can offer "a partial solution to a whole system of problems than whole solutions of each of its parts taken separately" (Mitroff, 2011: 29). In section 2.7.2, we draw the boundaries around three transactions subsystems (retail network, payment network, and account and services platform) that together create the mobile money system (Mas, 2009). The retail network includes all activities concerned with the customer-agent transactions, including money upload, download, transfer, and credit application that are conducted through the mobile phones and Points of Sale (PoS). The payment network includes all activities to process the customer-agent transactions through over the air provision and real-time processing. The account platform is concerned with trusted service management that organize and synchronize all data and feed it on the application programming interface, cloud systems, and the web interface. The systems thinking approach will help understanding the complexity of such a mess in the information era and draw a hierarchy between networks and control them (Checkland, 1999; Checkland, 2012) through the multiperspective theory (Mitroff & Linstone, 1993; Linstone, 2010; Linstone & Devezas, 2012) (see section 2.5.10.5).

The idea of an unsettled and complex environment and how it affects the IS performance has been first discussed in Emery & Trist (1973), where information-based tasks replaced the mechanical ones. Systems thinking helps linking data to the context to drive information and actionable knowledge for multistakeholders (Linden et al., 2007). It helps the analyst to capture the processes of transmitting symbols into desired meanings and how such meanings can be linked to the contextual dynamic nature and complexity (Searle, 1969). In doing so, we can build concepts of reality to make of the problem situation in a continuous learning cycle (Checkland, 1988).

In the 21st century, the BoP context offers a more turbulent environment. It is characterized by a high level of complexity and project blurring, uncertainty, multiplicity of actors, and

heterogeneity between the indigenous context and the international business practices adopted by the MNCs (Arora & Romijn, 2009 & 2012; Heeks, 2012). This confirms the necessity of systems thinking as a tool to understand the world views and problem situation that will be explained in more details in **Chapter 6**.

To understand how the development of mobile money system proceeds, we decided to step-out of the system to be able to explore parts of the problem situation that can be characterized as a system (i.e. Inputs and outputs, boundaries and control mechanisms, feedback loop, and interactions with other sub-systems). Within each system we draw boundaries around a group of stocks and flows to be able to explore how cycles and delays affect the overall behaviour of the system. This will help us highlight how the stakeholders motives, utility and benefits, and challenges during the development process. In turn, we can draw lessons for developers and regulators on how to make such as system more sustainable.

2.1.2. System Thinking Approaches

The information system literature refers to three epistemological stands positivist, interpretive and critical approaches. Each suggests a linear and uni-directional engagement between the understander and the understood. The fourth approach, the systematic inquiry system, alters completely the terms and direction of this engagement (Mitroff, Hill & Alpaslan, 2013). It defines and conceptualises both the understander and the understood reciprocally or "recursively" by the other.

There are many attempts at classifying the systems thinking approaches such as Checkland (1999), Jackson (2007), and Ramage & Shipp (2009). A part of the GST, six other categories have been pinpointed, *Early Cyberneticsm*, *Complexity Theory*, *Learning Systems*, *Later Cybernetics*, *System Dynamics*, and *Soft & Critical Systems*.

The ***Early cyberneticsm*** helps analyse the human-machine interaction and explains how the information-feedback cycle emerges between those two sides. *Gregory Bateson* is one of the

influential scholars in this group who observed that humans and machines interact in a "vicious circle", which includes two types of ties; symmetrical and complementary. The symmetrical type reflects the equal role of man versus machines as two rivals in one relationship, while the complementary relationship represents the unequal role of where one dominates the other one (Bale, 1995).

Norbert Wiener saw "cybernetics" as a tool to enhance control and communication routines embedded in the lives of humans while interacting with nonhumans (Wiener, 1948). Humans communicate with each other within a context and develop a contingent feedback loop on how to control / engineer the tangible elements in such a context (Ramage & Shipp, 2009).

Ross Ashby was another cybernetics entrepreneur who shifted his interest from "how a human patient (including any sick organism) restores its normal function" to "how social systems create an electronic brain and get self-organized" (Pickering, 2005). Ashby referred to the functional circuit where a list of correlated factors produces either positive (i.e. Stable equilibrium) or negative (i.e. Unstable equilibrium) forms of feedback in a punctuated manner (Ashby, 1940). Two books have stamped Ashby's contribution to the early cybernetics; "Design for a Brain" and "Introduction to Cybernetics". The first elaborated a theory of how mechanistic systems can follow an adaptive behaviour (Ashby, 1960:1). The second book offered Cybernetics as a theory of managing human brains as machines (Ashby, 1956; Pickering, 2011).

After World War II, a group of scholars revived the so called "second-order cybernetics" or sometimes "soft cybernetics" that is rooted to the early cybernetics. Heinz von Foerster, Stafford Beer, Humberto Maturana, Niklas Luhmann, and Paul Watzlawick each offered different attempts to develop the "***late cybernetics***" approach (Ramage & Shipp, 2009). Von Foerster led this group with emphasis on the observer-observed interaction as a process that shapes the presumed view of any phenomena (Von Foerster, 2003). This realignment and its institutional

nature led his advocates to consider alternative ways of thinking and question their own assumptions.

Stafford Beer is another pioneer in this group who helped the Chilean government (led by Allende at this time) to empower socialism and to nationalize (or control) the country's key industries. His assumption is that networked technology (cybernetics) will improve the worker's participation in planning the country's future. Beer's theory offered the so called "Hypermodern Information System" as a tool to mirror socialism into the computer age (Morozov, 2014). Such a system relies on the reverse adjustment of the inputs to change the realised (actual) output and decrease the gap to the targeted output. Accordingly, patterns of self-regulation (homeostasis) originated on the mechanical systems can be replicated on social systems. This way of thinking builds up not just homeostatic corporations, but also homeostatic government. Concluding Beer's contribution, he referred to communication, control, and self-regulations as key tools that scholars use to observe behaviours of human and non-humans. His approach is usually called "Viable Systems Model" or sometimes "organisational cybernetics". Such an approach is based on the machine metaphor to explain the complex unitary of humans in a complex problem situation (Reynolds & Holwell, 2010).

Paul Watzlawick contributed mainly to communication theory through a therapeutic understanding of the humans' communication about communication. Earlier on, Bateson set five communication rules of homeostatic social groups; one cannot not communicate, every communication, the nature of a relationship, human communication involve both digital and analog modalities, and inter-human communication procedures are either symmetric or complementary (Bateson, 1972 & 2014). Based on his therapeutic orientation, Watzlawick developed an interactional view of how Bateson's rules work in order to initiate communication and competence among individuals in a social group (Watzlawick, Bavelas & Jackson, 2011). Concluding this group, the researcher realised that late cybernetics (led by Von Foerster) and soft systems thinking (led by Peter Checkland[2]) shifted from the positivistic Leibnizian approach to phenomenological approaches such as the Kantian, Hegelian, and Singerian

[2] See 2.1.3.

discussed above. In doing so, both groups take an epistemological position to define interactions among humans and nonhumans.

System Dynamics is the third group in our typology that offers visualised scenarios of the organizational problem and how its elements interact over time (Morecroft, 2010). This group was founded by *Jay W. Forrester* in the fifties to look deeply on the system behaviour and how the feedback loops and time delays change the system dynamics and iterations. Forrester's approach guides practitioners to better manage a problematic situation and its context to reach to the targeted goals. They need to learn from the continuous problem-solution interplay to improve system efficiency (Brown & Eisenhardt, 1997).

Two of Forrester's fellows developed different versions of system dynamics; Donella Meadows and Peter Senge. Meadows's contribution came from her exposure in the environmental science and sustainability everywhere. Her book "*Beyond the limits"* offers a systematic view of improving earth's capacity, including population, economics and the environment (Meadows, Meadows & Randers, 1992). She urges us to *think in systems* to understand the behaviour of the earth (as a system) by capturing the temporal interaction between its stocks and flows. A system stock can be a quantity of resources (e.g. Information, population, materials, or money) that change over time because of the action of flows (e.g. Entry vs. leak, birth vs. death, production vs. consumption) (Meadows, 2008).

Peter Senge brought systems thinking into management science and business consultancy. In 1999, the Journal of Business Strategy announced Senge as a priest of business strategy and one of the top 24 influencers in the field during the last century. In his life, he joined a number of strategy scholars who were strongly influenced by systems thinking. This includes Arie de Geus (the developer of scenario planning), Chris Argyris (the developer of the organisational learning concept), David Bohm (the developer of the quantum physics-based dialogue), and finally Edwards Deming (the developer of total quality management) (Ramage & Shipp, 2009).

Senge's key contribution is building the so called "learning organization". This social structure represents a group of people who learn collectively and individually to expand their capacity to reach potential targets (Senge, 2014). His book "*The Fifth Discipline,* is one of strategic management's top selling books. It offers five enablers for "the learning organization"; systems thinking, personal mastery, mental models, shared vision and team learning.

Such ideas emerged from another book "*Planning as Learning*" that is co-authored by Senge and Arie de Geus. It emphasises learning as an organizational culture that itself needs to grow faster than the rivals' learning to build a sustainable competitive advantage (De Geus, 1988). The systems thinking discipline offers a visualized description, including diagrams and pictures, to explain feedback cycles. The personal mastery and shared vision disciplines extend Senge's work at "the Innovation Association" and his leadership and mastery seminars. The mental models discipline comes from action science and reflective practice rooted in Argyris & Schön (1987). The final discipline is team learning that is based on Argyris's organisational defensive routines accompanied with David Bohm's techniques of fostering group learning dialogue (Ramage & Shipp, 2009; 119-120).

Complexity Theory models highly complicated systems based on physics principles such as self-regulation and nonlinearity. In doing so, it mixed the advantages of the GST and cybernetics. However, a demarcation is necessary between this theory and complexity science that is more specialised in computer modelling of complex systems and it can be self organised (Nicolis & Prigogine, 1977). Top influencers on this group are Ilya Prigogine, James Lovelock, and Stuart Kauffman. *Prigogine*'s view of systems reflects non-linearity and self-transformation (McMillan, 2004). In cases of disequilibrium (or instability), self-organisation activities might take place and lead to new dynamic nature (Prigogine, 1989). To address this phenomenon, Prigogine rediscovered the man-nature relationship to incorporate them in our understanding of social problems. In doing so, he introduced the idea of non-forecastability to the studies of human activity systems to alleviate the cultural fragmentation among social groups in the 21th century (Ramage & Shipp, 2009).

James Lovelock is an experimental scientist who argues that the data is everything required to draw radical conclusions. He argued that the theory is not king in system development; rather, it is a supplement to the final results. Using his Gaia poetic style, Lovelock reported his extensive journey in designing unusual research instruments. The development of Gaia theory has been reported in his book "*What is Gaia?*" that clarifies how the earth can be a self organised system in comparison to other planets and their varying atmospheres (Lovelock, 2002). His work led to computer modelling for weather forecasts and other planetary phenomena. Applying his idea to humans reveals the adaptive behaviour of the earth in response to human unsustainable behaviour (Lovelock, 2006).

Stuart Kauffman argues that order and self organisation exist in complex systems and there is no need for laboratory selection to get it (Lewin, 1999; Kauffman, 2010). His engagement with the Santa Fe Institute resulted in two influencing contributions to complex systems thinking; "the concepts of complex adaptive systems" and "the edge of chaos" (Ramage & Shipp, 2009: 241). The former refers to the types of systems that emerge from the interconnection between different parts that are systematically self organised in response to the surrounding environment. Such an approach has been also adopted in organisational culture and strategic management (see Pettigrew & Whipp, 1991; Pettigrew, 2012 & 2013) that led to the development of social business models discussed in **Chapter 3**. In his book "*At home in the universe", he discusses his second contribution* (i.e. The edge of chaos). This line represents the boundaries between chaos (complete mess) and materialistic (complete order). Within this boundary life and innovativeness exists (Kauffman, 1995).

Learning Systems, our last group, reflect an engaging style of life where learning by doing is a default. The systematic way of learning is an idea raised by Kurt Lewin and progressed with other scholars who belong to Tavistock Institute[3], namely, Eric Trist, Chris Argyris, Donald A. Schön, and Catherine Bateson (Kolb, 2014). Despite his short life, *Kurt Lewin* influenced the most on how scholars in this group learn from human behaviors to build theories. They learned

[3] This group of academics developed the so called socio-technical approach discussed briefly in this chapter and in more detail in Chapter 3.

that *"there is nothing so practical as a good theory"* (Lewin, 1951:169). His paper "*Action Research and Minority Problems*", stresses on action research as an approach to council conflicting views (i.e. cultural, religious, economic, or industrial/technological). To reach this objective, individuals need to learn how to understand each other and change the way they perceive the world (Ramage & Shipp, 2009).

Chris Argyris is also motivated by actionable knowledge and how it can be developed through consultancy projects (Argyris, 2003). His paper "*Teaching Smart People How to Learn*", clarifies the strategies that individual consultants (e.g. system analysts) usually follow to set their action plans and how they behave with others in their professional network. He highlighted two approaches that professionals usually follow, namely, preset (espoused theory) versus actionable (theory-in-use). While the former represents models of best practices, the latter reflects a continuous learning loop. In his paper "*On organizational learning"*, Argyris developed a framework of how professionals transform their behavior from a primitive single- loop learning to a double-loop learning through adaptive learning (Argyris, 1992). *Donald A. Schön* stays at a middle distance between theory's advocates and those who rely on practice. His book "*Educating the Reflective Practitioner",* guides the consultants on how to learn from theory to improve their practices.

Eric Trist is another influential member of this group who led the S-T school of thought after the Second World War (Trist et al., 2013). His chapter "*The Evolution of Socio-Technical Systems*" set the key principles of the S-T approach and that later developed by other fellows such as Enind Mumford (see **Chapter 3**).

Apart of the above mentioned typology of systems thinking group, there are other three perspectives: (1) Based on systems traditions (e.g. C.West Churchman, Peter Checkland, Werner Ulrich, Mike Jackson and Others); (2) based on situations (e.g. Mike Jackson and Bob Flood), and (3) based on influencers and disciplines (e.g. Ray Ison and Paul Maiteny). However, the aim of this chapter is not to develop a systems thinking typology, rather it tends to present the relevant tools that help define the problem situation in developing MMS and justify the use of the multiperspective theory rooted in soft systems thinking. Accordingly, we employed the

FMA in explaining the systems thinking groups (Checkland, 2000). “A” refers to the area of concern in different disciplines that includes different problematic situations, “F” refers to the framework of ideas that scholars used to define such situations, “M” refers to the methodology or the inquiry system that those users (scholars) adopt to produce their argument. Using this technique helped the reader not to break the link between systems thinking groups, which was the very problem with GST in the first instance.

In the next section we discuss soft systems thinking developed by C.West Churchman, Russell Ackoff, Peter Checkland, Werner Ulrich, and lately Michael Jackson. In doing so, we position this group as apposite to the so called hard approaches that rely more on scientific principles of chemistry and physics.

2.1.3.Hard and Soft Approaches Compared

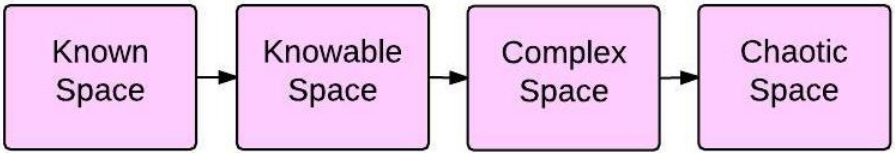
Systems studies such as those of Churchman (1971), Morgan (1986), Mitroff & Linstone (1993), and Checkland (1999), Linstone, 2010; Mitroff & Mason (2015) distinguish between analytic/deductive (hard) and inductive/consensual (‘soft’) inquiring systems. In the soft tradition, thinkers recognize the limits of the single- and simple-minded processes of agreement and analysis. “The multiple realities IS argued that one can never collect any data about any problem without having first presupposed some "model" of it, however implicit, vague, or intuitive” (Churchman, 1971: 86). In doing so, IS researchers might use multiple combinations of models and observations rather than a single model or set of observations to reach the truth.

The hard system methodology provides a complete conception of the actions “*that we need to ask no more questions about it*” (Coleman, 1986). It also provides an independent explanation that we might believe to be true once we have explained that subject x has done y rather than y^ because y was more advantageous, we need to know nothing more. Further, it provides optimal explanations without “*black box*” frustrations (Coleman, 1986; Li, Zhu & Gerard, 2012).

Hard thinking methodology assumes the world as a bounded system. The leaders of this tradition are Snowden (2002), Nonaka (1991) & French (2012). The latter used his statistics profession to develop the "Statistical Decision Theory" presented in his seminal book, co-authored with David Rios Insua. His model is based on Snowden's Cynefin inquiry system that has been adopted into the knowledge management domain. Cynefin has been long applied in studies of strategic risk planning and management and recently in emergency handling in the National Health Services (NHS).

"Cynefin" is a Welsh word means relationships between your behaviour, the place of your birth and of your upbringing, the environment in which you live and to which you are naturally acclimatised." (Kyffin Williams cited in Snowden, 2002: 100). Nonaka (1991) defines Cynefin as "a place for interactions around knowledge creation, management and use" (Nonaka, 1991: 5). French (2008 & 2012), aimed to relate Cynefin systems to decision making and support in knowledge management research. Further, it suggested different forms of Cynefin and its repeatability in different contexts and in relation to different individual values. As shown in Figure 2.2, Cynefin addresses the world as a mix of four spaces. The first, ***known space*** represents the realm of scientific knowledge in which the relationships between cause and effect are well understood and all systems and behaviours can be fully modelled. The second, ***knowable space*** shows the dominion of scientific inquiry in which cause and effect relationships are generally understood, but decision making needs to gather and analyse further data.

Figure (2.2) Cynefin model of problem structuring



Summarized from French (2012)

The third, *complex space* which stands for the dominion of social systems, including potential interactions to separate particular causes and effects in complex environmental, biological and

other contexts. In this space decision makers usually need to explore, judge, and develop broad, flexible strategies to accommodate changes as the situation evolves (French, 2008: 3).

The final, *chaotic space* draws situations -events and behaviours- beyond our current experience and there are no obvious candidates for cause and effect. Researchers following this approach need to take probing actions and see what happens, until they can make some sort of sense of the situation, gradually drawing the context back into one of the other spaces. *"No boundaries should be considered between the four spaces, nor between strategic, tactical and operational levels in the strategy pyramid"* (French, 2008: 2).

In the living world a solution imposes new problems. In doing so, we shift problems rather than solve them. "*We are not concerned with problems, but with perceptions of problems*" (Checkland, 1981: 238). The hard tradition follows rationality and seeks the optimal solution. However, it tends to follow the egoism (self-interest) that contradicts with the utilization assumption (Willison & Warkentin, 2013). The hard tradition does not help identifying the real meaning and sources of individual preferences; rather it relies on data and models, and combinations thereof, as the only legitimate modes of inquiry. However, the world is very complex, and cannot be systemized, but the way we tackle the complexity of the real world can itself be created as a learning system (Checkland & Poulter, 2010; Checkland, 2012). This learning system can be drawn by Soft System Methodology (SSM). Table 2.2 shows the differences between hard and soft systems of thinking.

Advocates of SSM believe that in the complex real world virtually everything interacts with everything, and this includes the observer. Without the observer there are no descriptions; the observer's faculty of describing enters, by necessity, into his description. Complexity has been defined as the ability to hold conflicting world views at the same time and to benefit therefrom, to see the world globally and in terms of unique individuals (Churchman, 1977). Abstraction and generalization are not substitutes for specific case studies.

Table 2.2: Comparison between the Hard and Soft traditions of System thinking

Comparison Elements	Hard System Thinking	Soft System Thinking
Concept of Organization	• Social entities which set up and seek to achieve goals.	• Social entities which seek to manage relationships.
Nature of Problem	• The problem is given and seen from a commonly agreed perspective.	• The problem exists in a complex social and historical environment and is recognized differently by a varied range of participants and different perspectives. • The problem is subsumed within a total problem situation.
Uses	• Usually used to meet the needs of modern engineering and industrial systems.	• When the hard approach fails to explain complex social situations.
Goals and Decision Making	• Clear goals and measurable targets. • Deploy quantifiable data and clear control mechanisms. • Unitary consensus and rational decision within any organization.	• Negotiated goals. • Relational decision making. • Aims toward problem solving by improving the problem situation through defensible rather than logistic processes.
Power	• Clear, unidirectional, positional and often charismatic.	• Diffuse and bidirectional.
Change Agent (Leadership)	• Detached from the problem and presented as heroic symbol.	• Involved in the problem solving and presented as post-heroic. • Agents use their idiosyncratic

Adopted from Mohamad, Wood-Harper & Ramlogan (2015)

In the real world, humans try to undertake purposeful actions that are meaningful for them. These actions are usually goal seeking activities that can be interlinked (modelled) together to show the property trend of this purposefulness (Checkland, 2012). However, each real life situation embeds a different level of complexity and requires a different set of human activities to solve problems. Accordingly, building up systematic interpretations of these activities might lead to an unlimited number of models. Thus, a choice has to be made to decide which model is most appropriate to explore the situation. Making such a decision relies mainly on the interpreter's point of view (or Weltanchauung) (Checkland, 1999).

SSM has transformed from developing "*a rational solution to an apparent problem*", to offering "*models of concepts of purposeful activities that might resolve the complexity of wicked situations*". In fact, we use these models to question our perception of the real situations and to

accumulate more knowledge about the situation. In turn, we can develop more advanced models and learn on an ongoing basis. Testing these new models in actual situations creates "*an organized learning system*" (Checkland, 1999: A8).

SSM is defined as a process of improving real world situations by learning from changes in norms, relationships and perspectives among stakeholders of the human activity system (Bergvall-Kåreborn, Holst & Ståhlbröst, 2008). According to Basden & Wood-Harper (2006), SSM is a participatory approach in which different stakeholders sense the current situation, model, compare, probe an change.

Applying this to the commissioning of the NHS project by Harrop, Gallies & Wood-Harper (2013), we pinpointed four main objectives: "*Liberation of health and other public services*; *Accountability of public service providers*; *Meeting information demands by the Clinics*; *Managing work, time, and costs of organizing the informational contents of those clinics"*. However, these objectives have been found conflicting (i.e. improving any one of them will be at the expense of the other two). In reality, achieving these objectives was not a set of rigid activities rather a politically agreed process to reach to a balanced mix of the four objectives. This mix was the best model of reaching these three goals from the political standpoint.

SSM includes seven stages[4] (Checkland & Poulter, 2010: 194). The first two stages tend to draw a "*Rich Picture*" (RP), which represents the problem situation. In doing so, the analyst interacts with the stakeholders of the problem situation to construct a CATWOE analysis to identify the system's Customers, Actors, Transformation, Worldview, Owners, and Environment (Hassan, Wen & Rajadorai, 2013). During these stages, analysts can find out the characteristics (e.g. the dominant culture and the disposition of power) of the optimum intervention to improve the problem situation. The next two stages help building an abstract solution of the problem situation. The third stage tends to draw root definitions and set a system language. Such root

[4] Further explanation of SSM and it steps is presented in Chapter 3 where we explain the Multiview framework.

definitions offer optimum statements of relevant system components. The fourth stage includes framing a purposeful conceptual model that identifies the minimum required procedures and rational activities each system has to achieve to carry out its main mission. In stage five analysts compare and contrast between their conceptual model and the actors' experiences in the real problem situation. Once the gaps have been identified, stage six forces actors to debate on (or negotiate) the necessary changes required to improve the problem situation. Then the last stage shows the required procedures for implementing the best-fit.

Concluding this section, we argue that SSM offers a way of continuously managing any ongoing wicked human situation. This is done by deep understanding of complex situations, capturing multiple perspectives (Linstone, 1989; Linstone & Devezas, 2012), and bringing rigor to processes of analysis, debate and taking 'action to improve'.

Based on the above discussion SSM is ideal when the IS analyst aims for either or both of the following objectives; To improve an existing problematical situation based on a "trial and error" or "action to improve" fashion that leads to a plausible record of a learning journey. Second is to organize and structure your learning records into plausible models of purposeful activity by keeping realistic questions about the problem situation (Avison, Shah & Golder, 1993). **Chapters 5 & 6** of this thesis meet the first objective and offer a thorough view of the MMS development, while the lessons derived at the end of each chapter fulfil the second purpose.

2.2. Information System Development

The Mobile Money System (MMS) is a multidimensional system that cannot be developed and offered off-the-shelf. As we discuss in the mobile money literature, successful projects such M-Pesa in Kenya, eko in India, and Smart Money in the Philippines had to be developed from scratch by boundary spanning private telecoms that enhance cross-sector collaborations with government, MFIs, retail agents, FMCGs, and low income communities to have the system in

place. So, there is no ready made system called mobile money system that can be adopted by potential providers. Not even a best-of-breed customised package system can be adopted by a network of stakeholders to offer mobile money services.

Table 2.3: Different Approaches of IS analysis

Comparison Elements	Approaches of IS analysis	Reference
Infological/Managerial/effectiveness	Human activity analysis	(Churchman, 1985)
	The Socio-technical System	(Mumford and Weir, 1979 & 2006)
	Structured System Analysis	(De Marco, 1979; Jackson et.al, 2011)
Datalogical/Technical/efficiency	Data Modelling and Analysis	(Verrijn-Stuart, 1985)
	The Technical Specification Analysis	(Avison and Fitzgerald, 1991 & 2011)

Adapted & Summarized from Wood-Harper (1989: 47-78)

Our analysis of the ISD literature shows two key perspectives: datalogical and infological (Hirschheim & Klein, 2012). The datalogical perspective aims to improve the efficiency of data files by highlighting the information needed for the organization and identifying the efficient ways to process the existing data into sensible meanings (Hirschheim & Klein, 2010). The infological perspective treats the organizational context as an information system full of knowledge communicated among individuals and groups to perform their tasks effectively (Wood-Harper, 1989; Terlouw & Albani, 2013). The ISD process starts with inputs (i.e. data / building blocks of information) required for system design and ends with output in forms of information related activities to implement and deploy the system (Wood-Harper, 1989). Following the general system theory discussed in **Chapter 2**, we can argue that there are schools

of thoughts that reflect the infological perspective and others that reflect the datalogical perspective (see Table 2.3 below). The datalogical schools follow the scientific paradigm rather than the system paradigm adopted by the infological schools (Kuhn, 1970).

2.2.1. Human Activity Analysis (HAA)

Peter Checkland used the notion of a system to conceptualize his engineering-based work. He sees systems as tools used by our human minds to reflect our understanding of a situation in which we are engaged. Each system requires a minimum number of relationships to construct a rich picture of the scene we see in our minds. These constructs are not arbitrary; rather they represent our point of views (Vickers, 1983; Jackson, 2000). This approach has been developed further in SSM discussed above (see Checkland, 1995; Checkland 1999; Checkland & Poulter, 2010; Checkland et al., 2012). We adopted the SSM as a methodological foundation in this research to perceive the problems and processes of MMS development. In doing so, we explored a series of systematic models of activities, compare the expected outcomes in our models with the perceived outcomes, and finally uncovered the necessary and feasible changes.

Wilson (2008) sees SSM as a methodology to generate understanding of the business environment by constructing a commonly accepted primary task activity model that encompasses multiple points of views of varying stakeholders. His approach to SSM leads to structural, procedural, attitudinal or organisational environmental transformations before the IS changes. These changes require an organization map that defines the information required to support the primary activities and determines how actors use it to enact the roles needed.

This school of thought uses SSM as a way of surfacing assumptions and discussing what might create a purposeful activity for an organization such as a bank or a business web like bitcoin.com or M-Pesa mobile money service (Vidgen et al., 2002). It embeds systems thinking into the creation of a business model and business strategy. Vidgen et al. (2002) adopted Porter's viewpoints to explain that linkage. They argue that the age of the "*new economy*" is over and the

"*e*" factor added to the word "*business*" (i.e. "e-business") has been misleading. They emphasised that ICTs and their consequent operations cannot be separated from the rest of the business. Otherwise, it will create virtual manners of competing and the integration between the "e" and "business" will fail. Carr (2003) offered a counter argument and emphasized that IT doesn't matter anymore as a strategic device for companies to create competitive business models. Using SSM as a lens, we found that Carr implicitly criticizes the system developers who follow standardized and ubiquitous processes in developing and spreading technology (Carr, 2003). In doing so, the human activity analysis (including business strategy) of different rivals will be similar because they have access to the same technology and they will spend fortunes to follow technological advances to lead their industry. He then suggests that new forms of "*business webs*" and "*networked organizations*" create proprietary technology, which is typically non-replicated and has patent protection. Open Handset Alliance corporation, for instance, developed the Android (Linux-based operating system) that can be directly manipulated and compatible with an unlimited number of application software. This sort of proprietary technology creates a sustainable competitive advantage over Apple and Samsung's exclusive (non-compatible) software. These two companies usually compete over similar replicated operating systems. The IDC, worldwide report shows that Android company holds 81% market share of the industry, while Apple and Samsung share the reminder of the market. Moreover, Android could absorb the rising mobile money services by unleashing Google wallet that can be easily installed in Smartphones.

Tapscott & Williams (2008) confirmed that each of these networks involves connection of billions of individuals, groups, and organizations that allow all to participate in the innovation machine. Consequently, their chances of creating more wealth and alleviate their social and financial deprivation is bigger. These ties reform the dominant arts, cultures, sciences, education systems, economies and even governments. Tapscott reconfirmed that these business networks reproduce and disseminate knowledge products (i.e. electronic content), which shifts the economy from scarcity to abundance (Tapscott, 2010). Knowledge-intensive tangible outputs will also become cheaper and transform the economy toward the "*Informational capitalism*" that combines vast flexibility with global reach (Castells, 2011a&b). Such complexity in the

networked society makes every human problem inextricably connected with every other human challenge and creates a mess (Ackoff, 2010).

Concluding this section, the HAA approach offers conceptual maps for relational purposeful human activities that represent unbounded viewpoints than bounded problem definition and clear cut solutions. This means that simplified conceptual frameworks might be used to represent different contingent viewpoints, as explained in **Chapter 5 & 6**.

2.2.2. The Socio-Technical Systems (STS)

This approach of IS analysis is based on the participatory ethical view that maintains the computing-humans balance at the work place (Trist et al., 2013). To avoid reinventing the wheel, this section reveals the fundamental assumptions of Mumford's approach. "*Efficiency*" on the one hand and "*job satisfaction*" and quality of work life on the other hand, represent the key pillars of IS implementation (Mumford, 2006). Efficiency is a technical goal concerned with the system requirements (e.g. Hardware, Software, Platforms, Applications, Work procedures, Documentation Cycle, and Information Flow) (Wood-Harper et al., 1989). Job satisfaction is a social objective that calls for a good fit between the employees' expectations of the job and the job description (or requirements). Mumford (1991) defined five dimensions of this fitness; the Knowledge fit, the Psychological fit, the Task-Structure fit, the Efficiency fit, and the Ethical fit. The knowledge fit represents the degree to which the employee can develop his/her work skills and professional expertise. The "*Psychological fit"* refers to the employee's ability to achieve his/her personal interest for achievement, promotion, and status. The "*Task-structure*" fit refers to the employee's autonomy, empowerment, and updated feedback in relation to the assigned responsibilities. The "*Efficiency fit*" refers to the financial and technical return to the employees. The "*Ethical fit*" refers to the shared culture and beliefs of the employer and the employees.

The core of the S-T approach is to set the business objectives before identifying the best fit between work efficiency and social designs (Mumford, 2006). Following this approach, analysts diagnose the problem situation and then implement and evaluate the system design. The

diagnosing stage begins with addressing the short and long-run efficiency and job satisfaction and ends with setting objectives for both frontiers. This facilitates developing alternative (standard) strategies that help matching these efficiency and satisfaction objectives.

This school of thought has been shifted in light of the global orientation toward inter-organizational and universal information systems (Grant & Tan, 2013). The rise of multisided ICT-based information systems extended the concept of the ETHICS method from merely social considerations of technology implementation in business or "Social Technology" (Helmer, 1966) to social applications of technology (e.g. Social Commerce) including information, technology, people, and organization/society (Zhang & Benjamin, 2007; Huang & Benyoucef, 2012).

2.2.3. Structured System Analysis (SSA)

This school of thought describes the toolkit that programmers, designers, and analysts can use to develop a computing solution (Duserick et al., 2014). Such a kit includes a set of minimum standards for an effective ISD approach. Ross & Schoman (1977) offered a top-down, sectional, graphical model of the optimal system structure. DeMarco (2002), however, emphasised on the important role of a data dictionary and the role of scaled-down specifications, or niche specs, to be represented in a coherent subset of the English language known as "Structured English".

DeMarco offered a seven-step life cycle for the SSA. The first two steps suggest building a current "*physical model*" and then exposing a current "*logical model*" based on the physical one. The third step is designing data flow diagrams, an entity relationship model, a data dictionary and process specifications.

These "*graphical formations*" consist of lines, arrows, icons and conventions that are used to create figures representing data flows within and beyond the organizational boundaries (Vitalari, 1984). A data dictionary shows the way data storage is managed (either manually or electronically) in terms of names, ranges, values, derivations, and ratios (Wood-Harper et al., 1985). The specification language is defined by DeMarco as structured English or pseudo code

the formal language used in programming. The fourth step is recreating "*a group of new physical models*", while the fifth step is to conduct "*a feasibility study for each model*". Such a study may include cost, schedule, and resources required. The sixth step is selecting the best model that can be packaged with clear specifications in the last step.

DeMarco (2002) argues that the SSA is less useful in commercial IT than in control systems where he spent more than two decades of his life. Many contemporary businesses consider themselves as "DeMarcofied" and do not recognize that this method was successful in a limited scale and the new forms of business need more flexible approaches. They need structured business analysis in parallel to structured system analysis (DeMarco, 2002; De Marco et al., 2012). Table 2.4 summarises how DeMarco's beliefs changed after three two decades of the SSA.

Many of these elements failed the test of the new networked system and vanished; the only elements in bold are found sustainable and useful in the new era of time (Järvinen, 2011). These elements improved the firm's productivity and employees' satisfaction. Recently, the employment market witnessed a cultural revolution and changing work relationships. Elements such as *partitioning*, *loose connection criteria* and *mini specs* will help develop a flexible and efficient system that enhances the diversity of jobs; professionalization and entrepreneurship (De Marco & Imperatori, 2008).

The *complexity* of the new work environment can be resolved by *partitioning* the system into modules. The wider the diversity, the thinner the system interface, and more appropriate partitioning will be. When a thick interface is found, we need to go back and partition it, looking for the natural seams of the domain.

Table 2.4.: DeMarco's shift in the feasibility of SSA

Principle	Commentary 1975	Commentary 2002 in light of the Networked Society
Narrative specs are dumb	These "Victorian Novel" specifications neither specify nor inform.	Narrative specs are not the problem; a suitably partitioned spec with narrative text used at the bottom level makes a fine statement of work.
Four-stage modeling	A dataflow representation of a system is a model and the analysis life-cycle consists of building a sequence of these models showing four different stages.	The four stages I proposed in 1975 were far too time consuming.
Dataflow is the essential view	The point of view of the data as it passes through the system is the most useful.	Dataflow is one of the essential views, not the only one.
Top-down **partitioning**	Top-down is good; bottom-up is evil	Partitioning is essential in dealing with anything complex, but top-down partitioning is often far too difficult to achieve and not at all the great advantage it was touted to be
Loose connection criterion	The validity of any partitioning is a function of how thin the interfaces are.	This is an important truth: when you're attacking complexity by partitioning, the thinner the interface, the better the partitioning – if the interfaces are still thick, go back and partition again, searching for the natural seams of the domain.
Defined process of analysis	System analysis always has the same well-defined steps	Defined process is a holy grail that has never yet been found and probably never will be
Pseudo-coded minispecs	The lowest level is defined in a formal way	It's useful to partition the whole and then specify the pieces, but pseudo-code was an awful mistake (puts analysts into coding mode when they should be busy analysing).
Work at the user's desk	Analysts shouldn't hide in their own offices; the real work of analysis is at the user's desk.	Analysts have a tendency to hide at their own desks, but much of the action is in the business area and they need to venture out to find it.
Philosophy of iteration	You can never get it right on the first try; success comes from numerous iterations, each one better than the last	We never get it right the first time; the best we can do is improve from one iteration to the next; if we can continue to do this at each iteration, we can get arbitrarily close to a perfect product.
The customer is king	The customer knows what the system has to be; the analyst's job is to listen and learn	Customer needs grow with the over orientation toward competitiveness; the analyst job is to expect the future business models and advise developers on which system might achieve such a purpose.

Summarized from De Marco (2002) & De Marco et al. (2012)

The philosophy of ***iteration*** is still useful to assure continuous social interaction between individuals in the company and between the company and the employees. Developing an IS is never right from the beginning, rather through continuous iterations we get arbitrarily close to a better product. This requires analysts to explore the emerging issues in the business and technology areas and venture out to find them.

De Marco's approach was the seed for the information engineering school of thinking (Martin, 1990; Wohlin et al., 2012). This school of thoughts offers a set of interlinked techniques such as enterprise modelling, data modelling, and process modelling that facilitates establishing a knowledge base that shape and maintain a data processing system (Martin, 1990). These techniques help develop a highly automated system that is user-centric by involving users in solving their own local problems. In this sense, users integrate horizontally across divisions and vertically across different organizational levels. This supports the alignment between the data processing and the organizational strategy (Zarvić et al., 2012).

2.2.4. Data Modelling and Analysis

Avison & Wood-Harper (1990) referred to a conventional philosophy that data is everything in any system. Mapping the key entities, properties, attributes, structures of the problem situation will help identify the nature of the system. As shown in Table 2.3, the datalogical view follows a static (technical) nature of a system. So, Data Modelling (DM) draw the underlying blocks of a system regardless of the different uses of data (functions) and the process of using them. According to Nelson (2005) & Simsion (2007), the DM can offer an agreed definition of the system and the organisation(s) in which the system boundaries are drawn. Then the system can be implemented and validated with less resistance. Advocates of this approach believe that building a database can serve any change in the organisation(s) and their processes. It also saves effort and money required for maintenance and securing extra technical requirements.

Burton-Jones & Grange (2012) rooted this philosophy to William Kent, who arued that an effective IS must mirror reality. In doing so, the analyst needs to identify an object (real) system and information (actionable) system (Kent, 1978). The object system and surrounding environment are usually described in a clear language that information users can understand to control such a system (e.g. business enterprise or a business web).

Avison & Fitzgerald (2006) discusses three main data techniques to improve the match between the object system and IS; document-driven, entity-relationship modelling and normalization. Document-driven modelling relies on the organisational archive, online and manual reports, forms, enquiry formats. These resources can help draw relationship and structure a flexible database. Such a structure normalizes the relationship between data entities.

Entity-relationship modelling commences when the analysts interview the key stakeholders of an organisational phenomenon to identify the data elements and the structure of the entities (Howe, 2001). It also includes routine observations to document the data entities. These entities represent particular interests for data users within or beyond the organisational boundaries. The dilemma is that the 21st century encompasses complicated problems where mobile ICTs (e.g. mobile technology) extends the stakeholder's circles, rotates them, and shrinks them into different nodes (Castells, Hutton & Giddens 2000; Castells et al., 2009; Castells, 2011; Castells & Himanen, 2014). This weakens the validity of the data collected from inadequate sources and irrelevant stakeholders from the past (Wood-Harper, 1989).

While the above mentioned approaches could be employed to define and solve problems, the DM approach is to define the organisational problems and gives little guidance on the system design and problem solving (Wood-Harper & Fitzgerald, 1982).

This trend has been taken further by "Big data" analysts who argue that the global future trends can be controlled using massive databases (Zikopoulos & Eaton, 2011; LaValle et al., 2013). Risk analysts who belong to the hard systems thinking school (e.g. Simon French) tended to develop a social view of the database analytics to avoid being data led humans. This approach has been developed further into "Bayesian Statistics" and "Social Informatics".

2.2.5. Technical Specification (TS)

In 1985, James Martin authored the seminal work of Fourth Generation Language (4GLs) (Bui-Thanh et al., 2013). Martin states specifications such as Problem Statement Language (PSL), Problem Statement Analysis (PSA), Requirement Statement Language (RSL), and Interpretive Structural Modelling Software (ISMS) (Martin, 1985: 320-321). Table 2.5 provides detailed explanations for these languages.

Martin discussed specification languages such as Domain-Specific Visual Languages (DSVLs) normally used in hardware design and protocol specifications (Mernik, Heering & Sloane, 2005). Avison & Fitzgerald (2006) refer to holistic techniques, data techniques, process techniques, project management techniques, organizational techniques as the key modelling languages.

Out of the aforementioned languages, Object Oriented (OO) modelling is the most agile language that dominated the era of the information society and e-commerce. OO is a programming language that defines the data type, the data structure, the types of functions executed by this structure, and object defined interface (Martin & Odell, 1994). OO considers the data structure as an object that involves data and their operations. Each new object share inherited (common) characteristics from other existing objects and accordingly programmers can create modules that are compatible with an unlimited number of new objects. In this case, OO helps to localize the change across the system. Essentially, OO is a mean of understanding the ISD process that supports the business. This language was found applicable to describe and understand the development of real-time systems in telecommunication services (Avison & Fitzgerald, 2011; Krogstie & Lyytinen et al., 2003).

Table 2.5: Computing Specification languages

Computer Specification Language	Explanation and Use
Problem Statement Language (PSL)	This language is a powerful automation language used to document and analyse the computer specifications. Usually used to reset technical specifications from the end-user point of view.
Problem Statement Analysis (PSA)	This language follows the PSL to develop software that presents these requirements to the analyst in a systematic and organized manner.
Requirement Statement Language (RSL)	Requirement Statement Language (RSL) is used to present complex system design for large cybernetic large real time systems. It offers a sensible formal symbolization and enhances the construction of a conceptual model. RSL maintain high degree of The consistency and completeness on the requirements description.
Interpretive Structural Modelling Software (ISMS)	This language converts wicked/unstructured model descriptions into systemic/structured models. Each model includes "decisions" and "information" as key system pillars. It offers an interactive tool to build an "information matrix" required to make critical decisions. This matrix helps develop a "reachability matrix" represented in mathematical forms (graphs) used to model pairwise relations between information and decisions. These graphs include "vertices" or "nodes" and arrows called edges to connect them. Later these graphs are then transformed into flow charts. In summary, (ISMS) help structuring wicked situations where a large number of multi-stakeholders and decisions are included.

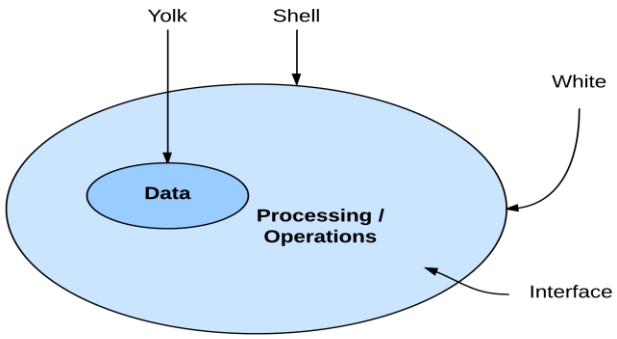
Summarized from Wood-Harper (1989: 59)

The OO simplifies adding new subscribers and activates more information services for them such as voice, data, and e-wallet. It also facilitates designing business like billing, subscriber usage, and daily money transfer. OO enhance this co-existence of business and real-time through common expressions and means of specifying the integration points for the transfer and receipt of information.

The software system can be thought of as full of objects that request information and inform each other in support of a business activity. In OO, each object has a unique identity, details, public

and even private behaviour. Your mobile money account, for instance, can be considered as an object because it includes an account ID as a unique identity, details such as balance, overdraft limit, and history of transactions. The mobile money account is also associated with public behaviours such as money withdrawal, money uploads or transfers (Pham et al, 2013). Examples of private behavior include acquiring or allocating due interest for saving and microcredit services.

Figure 2.3: Objects represented by an egg



Adopted from Avison & Fitzgerald (2006: 277)

Encapsulation (or object as an egg) is another key element in OO modelling (Booch et al., 2008) (see Figure 2.3). The "*Yolk*" is the data and behaviour surrounded by the "*White*" which is the data processing. The "*Shell*" of the egg edges all contents, keeps them together, and protects them from the outside world. The frame is also the interface of the whole object. It identifies the means by which each object interacts with others in a well-defined, but flexible way to request information or perform logic.

Early developers of OO had different notations for their own version of this language, which resulted in a wide diversity of approaches and led to confusion. This motivated the *Rational Software Corporation* to mandate James Rumbaugh from General Electric to develop two

standardized versions of OO in 1994 (Zendler, Spannagel & Klaudt, 2008). Together Rumbaugh[5], Grady Booch, and Ivar Jacobson developed the Unified Modelling Language (UML). It is a visual modelling language that helps map the real-world processes of internet-based systems (Booch et al., 2008; Fowler, 2004). UML is a standard language for visualizing, specifying, building and recording the artifacts of a software system (Kruchten, 2004). It has the following characteristics as shown by Avison & Fitzgerald (2006: 241-256):

- Provide a ready-to-use, expressive, visual modelling language so users can develop and exchange meaningful models.
- Ability to extend and specialise core concepts.
- Independence from programming languages and development processes.
- A formal basis for understanding, modelling language.
- Encourage growth of the OO tools market.
- Support higher-level development concepts.
- Integrate best practices and methodologies.

UML takes many forms of web-based IS, real-time, and mobile-based applications (Krogstie et al., 2004; Singh et al., 2012). Each form of modelling shows how to achieve the desired objectives of the relevant type of IS. For system developers, the intertwining of the OO and the UML gives more flexibility to both analysis and design. The diagrams can be shown in greater detail to enable programmers to execute them manually in program code (Vidgen, Avison & Wood-Harper, 2002).

Mobile-based IS matches the Web-based one, both require functional and non-functional requirements (Pernici, 2006). The former shows the potential outcomes of the Web service, while the latter presents the process producing the service and diffuses them to the end-user.

[5]Earlier Rumbaugh invented the so-called Object-Modeling Technique (OMT) and Booch contributed toward the Object-Oriented Design (OOD). Later Jacobson created the so-called Object-Oriented software Engineering (OOSE) that complemented OMT and OOD to develop the commonly known three Amigos of internet and UML modelling (See Jacobson et.al, 2013).

In conclusion, the technical design stage is more concerned with "*how to achieve the desired objectives*" in terms of minimum software required rather than with "*what are these objectives*" (Vidgen, Avison & Wood-Harper, 2002).

The above mentioned schools of thoughts embed varying paradigms, ontological and information assumptions, conceptual models, and objectives (Wood-Harper & Fitzgerald, 1982).

2.2.6. A comparative analysis of ISD approaches

Comparing the aforementioned schools of thought provides us with the essential knowledge and understanding of the advantages and disadvantages of each approach (see Table 2.6). Recently, Siau & Rossi (2011) set four wide dimensions to classify different ISD schools, namely; feature comparison, theoretical and conceptual evaluation, and empirical evaluation. Those schools reflect varying data modelling paradigms and pragmatic implications (Hirschheim, Klein & Lyytinen, 1995). They also embed varying ontological and epistemological positions; information assumptions, conceptual models, and objectives (Wood-Harper & Fitzgerald, 1982; Wood-Harper et al., 1985; Avison & Wood-Harper, 1990).

Table 2.6: Different Approaches of IS analysis

Approaches of IS analysis	Reference
General Systems Theory	Boulding (1956) (Bertalanffy, 1972) (Phillips, 1977)
Human activity analysis	(Churchman, 1985)
The Socio-technical System	(Mumford and Weir, 1979 & 2006)
Structured System Analysis	(De Marco, 1979; Jackson et.al, 2011)
Data Modelling and Analysis	(Verrijn-Stuart, 1985)
Technical Specification Analysis	(Avison and Fitzgerald, 1991 & 2011)

2.2.6.1. Ontological Assumptions

The ontological dimensions have been discussed by Burrell & Morgan (1979)[6] as shown in Figure 4.2. They argue that ISD might be "*functional based"* when it reveals the status quo, social order, stakeholder consensus, meeting needs, and rational decision making processes (Hirschheim, Klein & Lyytinen, 1995; Hirschheim, Klein, 2011 & 2012). The technical specification and data analysis for instance, neutralize an agreed understanding about the nature of an organization using data as a unit of meaning. It maps the system as it exists and tends to solve the organizational problem with functional applications on the database (Shave, 1981). The key assumption is that we can identify the true nature of a system by categorizing and assessing the set of data elements (including entities and attributes) that constitute a particular event.

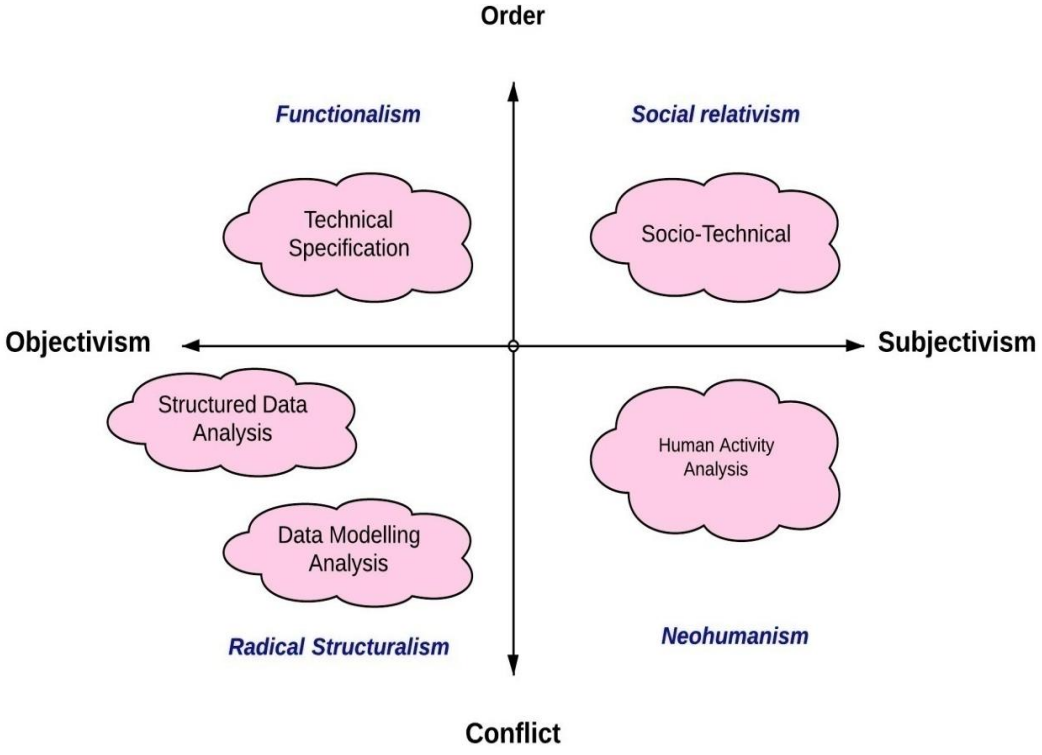
The second ontological ground is the "*social relativism*" that aims to explain the realm of personal consciousness and subjectivity, and within the framework of reference of the social actor as opposed to the observer of the action. The STS for instance, seeks to explain how the individual elements of the social system (or the organization) interact to form a working system using technology. This view of reality assumes that social roles, institutions, and artifacts exist as abstracts of the meanings which may attach to their own world (Silverman, 2011 & 2013).

The third view is "*radical structuralism*", which represents society and organizations as entities free of limitations and focuses on the structure and analysis of economic power relationships. This can be seen in the structured systems analysis and information engineering discussed above.

The last ontological position is "*neohumanism*" that sees the world as a radical changing nature that can be understood through different social and organizational forces. It highlights all forms of ideology's liberation, power and psychological motives and social boundaries.

[6] This model will be explained in detail in **Chapter 4** to reveal the research methodology adopted in this research.

Figure 2.4: A Taxonomy of ISD Schools of Thoughts Based On Ontological Assumptions



The HAA for example, results in a contingent framework of the analyst's view of the problem and its solution, which is acknowledged one of perhaps many candidate solutions (Wood-Harper & Fitzgerald, 1982; Lin & Wang, 2012; Sarker, Chatterjee & Xiao, 2013). See Figure 2.4 that identifies the taxonomy of the ISD schools according to their ontological grounds.

2.2.6.2. Epistemological Assumptions

The philosophical assumption is a way of thinking and recording what we know about problems and comprises a set of accomplishments which are recognised as the basis of further practice (Kuhn, 2012). Being called a paradigm, it should be subject free to help tackle more than one problem regardless of their characteristics (Wood-Harper & Fitzgerald, 1982). In his seminal work, "Discourse on Method (1637)", Rene Descartes recommended that we partition complex problems into parts and solve the parts one by one. Peter Checkland argues that this learning

Table 2.7: Epistemological Paradigms of ISD

Methodology	Scientific Paradigm (Reductionism)	Systemic Paradigm
General Systems Theory		1. Its interdependency nature of the ISD. 2. Its concerns with value systems and objectives. 3. Its analysis of the interaction of subsystems. 4. Its resulting advocation of structural
Human activity analysis		1. Treat the IS as an open system. 2. Uncover fuzzy problems and socially constructed purposeful actions of meaning. 3. Utilises systemic models, which are relevant to the argument of actors about meaning in the situation. 4. Considers multiple realities (including the analyst and the user). 5. Adopts activity models to orchestrate a debate about change prior to an "agreed notional activity systems model.
The Socio-technical System		1. It addresses the sociology of functionalism rather than interpretivism in the above movement. 2. Looks at the action of the work-tasks and the psychological consequences.
Structured System Analysis	1. It breaks systems down, using functional decomposition into lower level until each component can be easily understood. 2. The aggregate of the whole equals the sum of the parts. 3. Develops a model which is as close to reality as possible. 4. Sets graphical formations (e.g. dataflow charts, datagrams and actigrams). 5. Suggests different models of data flows according to different scenarios.	
Data Modelling and Analysis	6. Observes the complex real world as a set of data that building up organizational ties and processes. Does not solve problems, rather than describing the actual problem.	
The Technical Specification Analysis	1. Identifies the technical specifications. 2. Sets specification Languages to describe the "pure" forms which exist in information processes and data. 3. Uses mathematical Language to set primitives.	

system is characterized by reductionism and falsification and reflects a scientific view of engineers rather than social researchers (Checkland, 1972). He also found it inadequate to address living systems and in particular human activity systems. Later he set two types of paradigms "*Scientific Paradigm*" vs "*Systems Paradigm*" (Checkland, 1976).

The former can help reduce the complexity of the real problems using experiments that results in the validation of hypotheses through replication and refutation. The latter can help thinking more holistically, while accepting that whatever you take to be the whole of the problem situation might itself be seen as part of a yet larger whole problem" (Checkland, 2012). Following the systems paradigm it is seen that any whole has nascent properties that exist only in relation to the complete whole.

Suppose you have a sack containing all the parts of a handset and tip them out in a heap on a table; what you have here is a collection of the parts of a handset. If, however, you know the concept "mobile handset", and assemble the parts to shape one, then the resulting whole has the emergent characteristic of "*communicational potential*" for anyone who uses this device.

In doing so, the user can conduct a phone call, use the internet, or transfer money to another user. Adopting the scientific paradigm you only recognize the value of all pieces in the sack, while the systems paradigm enables you to see the value of the whole mobile handset and its different uses. Table 2.7 shows how the above mentioned schools of thoughts fit in either the scientific or the systems paradigm.

2.2.6.3. Assumptions about Information Situation

These assumptions represent the putative truth that are expected about the role of information without evidence and is commonly accepted among the members of each school of thought. The

Table 2.8: Characteristics of Approaches to Information Systems Definition

School of thoughts	Archetype Paradigm	Assumptions About Reality	Assumptions about Information Situation	Objectives in Using The Methodology	Conceptual Models/Constructs Utilized By the Methodology
HAA	Systemic	The reality is Problematic	Situation is Problematic: Examine Structure and Processes and the Relationship between the two climates.	Exploring with Different Root Definitions and Conceptual Models	Root Definitions of the HAS: 1. Customer; 2. Actors; 3. Transformation; 4. World View; 5. Owner; 6. Environment.
STS		Reality is viewed as a System	Needs for Satisfying work and Flexible Information Technology	Analysing and Designing through Participation with users utilising he Ideas of the Socio-technical System Model.	Open Socio-technical System Model: Technology; Tasks; Organizational Environment; People.
SSA	Reductionist	Reality is information (Data) Flow.	Flows, Processes, Files, Sinks & Sources	Analysing the information Flow.	Abstraction; Divide-and-Conquer; Formality; Hierarchal Ordering.
TS		Reality is a stable Set of Data and Processes.		Specifying the Technical Solution.	Human-Computer Interface And Application; Information Retrieval; Database; and Maintenance; Control; Recovery; Monitoring.
DA		Reality is a relatively Stable Data Structure rather than a Data Process	Semantic Concepts that Appear to be useful Informally: Entity, Association & Property	Manipulating and Analysing using these Symbolic Objects	A set of Symbolic Objects to represent theses Semantic Concepts

Adapted from Wood-Harper & Fitzgerald (1982) & Wood-Harper (1989)

HAA for instance, detach thinking about the contents from the situation contents themselves. This problematic view of the real world makes it challenging to organise information contents or the way to think about them. Further, the information situation includes organizational and holistic issues that follow slow structural changes and accelerate changes in processes.

The STS addresses the fit between IT efficiency (technical) and the employees work satisfaction (social) (Mumford, 2006; Stahl, 2007). The SSA uses data as a tool to understand reality. In doing so, you consider the information situation as data flows that reflect different organisational processes.

The TS assumes that reality is a fixed set of data and processes that require a specific list of technical solutions. Using a mobile handset for instance, require a friendly user interface, an information retrieval database, maintenance, control, recovery and monitoring specifications (Avison & Wood-Harper, 1998).

The DM abstracts reality in a stable data structure rather than as a process. These semantic concepts include entities and its associated properties. They can be easily manipulated with any change in data functions and processes. Visual symbolic presentation is the standard way through which these concepts are presented.

2.2.7. Contingency approaches

In the late eighties, an academic debate occurred about using pragmatics and hybrid ISD methodologies such as Cookson (1983) and Benyon & Skidmore (1987).

Avison, Fitzgerald & Wood-Harper (1987) highlights the limitations of those competing hybrid approaches. The authors argue that Cookson's taxonomy adopts the GST only as a philosophical

lens that shapes the way we build a pragmatic methodology. For Cookson, the expert system is yet to mature to be considered as an ISD approach. He also ignored formal ISD methods and recalled Vienna Development Method and other planning approaches such as Business Information Analysis and Integration Technique (BIAIT), IBM's Business Systems Planning (BSP), and ends/means analysis to expand the outreach of the methodology and inform top management on what is essential for the ISD process.

Benyon & Skidmore's approach drops GST and other significant elements such as expert systems, planning approaches and formal methods. Further, it does not consider prototyping as a standalone approach of ISD (Avison, Fitzgerald, & Wood-Harper, 1987).

Hirschheim, Klein & Lyytinen (1995: 28-40) set seven classes of ISD methodologies. The development life-cycle approach, the structured approach, prototyping, S-T participative approach, sense-making approach, trade union led approach, and emancipatory approaches.

Later, Avison and Fitzgerald (2006) reported four commonly used ISD methodologies; Strategic Option Development Analysis (SODA), Capability Maturity Model (CMM), Euromethod, and Multiview. The first approach uncovers the duality between the systems analyst and his personal journey in understanding the context and the ISD process (Ackermann & Eden, 2010). The second addresses the flow of the ISD process and their interlinked structure (Kandjani & Bernus, 2011). Euromethod, however, is an agile method using analysis, design, diffusion, and the evaluation stages of the system development process.

Multiview**1** encompasses many of the techniques adopted in the other approaches and its stages parallel those of other methodologies. While the above mentioned approaches help define the information system under study, Multiview**1** is an intervention process that offers a set of planned and developed activities to a variety of the stakeholders involved (Avison et al., 1998). Performing each of them requires predefined tools and techniques. Multiview methodology also guides others development processes such as system procurement, monitoring, and evaluation (Bell & Wood-Harper, 2014a). It also includes requirements analysis that considers both the technology capabilities as well as organisational requirements. Multiview is proven to be a

holistic IS approach that facilitates problem structuring and S-T analysis as a core of any system development project. This approach has been developed into second and third generations (i.e. Multiview **2&3**). The evidence behind the definition of this approach has been brought from case studies and action research taken place in more than 26 countries (developed and developing contexts).

While Multiview**2** was developing, business strategy studies such as Noble (1991) and Valiris & Glykas (1999) argued that Multiview methodology considers the objectives of developing IS in relation to the changing dynamic organizational context (internal & external). It is not only concerned with the efficiency of the IS (i.e. what we need to produce?), but also tackles systems effectiveness (i.e. are we doing the right thing?). It helps refine processes and procedures to reach the organizational objectives as well as system business modeling, and information re-engineering (Martin, 1990).

Multiview**3** iterates the issues of contingency and the strong link between the analysts and the context of the problem situation. It highlights the ground assumptions of SSM and shows how developing countries can offer richer pictures of problematic situations (Bell & Wood-Harper, 2014b). A historical record of Multiview methodology and its integration with the multiperspectives theory is explained in detail in our framework chapter.

2.3. Information System Complexity

The multi-stakeholderism[7] and the existence of multiple layers of relevant systems within the IS increases the complexity of the development process. The dynamic nature of ISD makes it

[7] This concept refers to a governance structure the periorities achieving the sakeholders interests and engage them in designing and implementing the corporate goals. This also includes involving stakeholders in the ISD process and related decision marking process. This concept has been introducted to the IS research through cases of information society such as e-government and ICT-based value chain (See Denardis (2013) & Chenou (2014).

challenging to manage complexity and leave less chance for predictability and consistent measurement of system sustainability (Xia & Lee, 2003; Bell & Morse, 2013).

Bennetts, Wood-Harper & Mills (2000) refers to SSM as a methodology to address the complexity and the stakeholderism that dominates the networked society and affects the IS success/failures. During the last three decades, executives and practitioners faced difficulty answering the following inquiries;

- Why does the ISD process take so long to get finished?
- Why are ISD process costs so high?
- Why can not we predict all the errors before we deliver the system to our clients?
- Why can no we measure system progress during the development process?

Yet, they follow the "just do it" strategy and do not learn from the so called "Best Practices" (Lyytinen & Hirschheim, 1987; Gibbs, 1994; Heeks, 2002; Gao, Lyytinen & Wang, 2014). Extra training on these best practices does not guarantee success, because there is no agreement on what are the best practices that differ from one context to another and through time (Walsham, Robey & Sahay, 2007).

Lyytinen & Hirschheim (1987) conducted an international survey that has shown four main types of failures in the ISD process: Correspondence failure, Process failure, Interaction failure, and Expectation failure. The first refers to the mismatch between the system in place and the actual organizational needs. The second refers to the ISD process that goes beyond the preset timetable and the agreed budget. The third refers to the ISD that is oriented towards the system provider and disenfranchises the end users in the process and in turn fails to satisfy them. The fourth type of failure takes place when the system does not meet the expectations of varying stakeholders.

Recently, scholars moved from prevailing representational framings of information systems success and failure to a performative perspective (Cecez-Kecmanovic, Kautz & Abrahall, 2014). This new orientation identifies IS success/failure as relational effects that are based on sociomaterial practices of IS actor-networks including developers, managers, vendors, technological artifacts, and methodologies when developing the system. The performative

approach is developed based on ontological politics (i.e. the shaping and development of the IS actor-network) and the emergence of different agencies of assessment that performed both different IS realities and competing IS assessments. The word performative considers IS as an acting human that does not follow a fixed behaviour, but rather reacting to the agencies of assessment as well as the assessment outcomes of success and failure.

In the next section, we discuss the multiperspectives theory that we adopted to conceptualise complexity and stakeholderism in the information society era with case evidence from the e-Masary mobile money system. It offers a thorough justification of choosing such a theory as a lens to understand ISD at the BoP context.

2.4. The Multiperspectives Theory

Following the soft thinking, Churchman (1971) prescribed four ways to diagnose and formulate a wicked problem situation such as MMS development; "Leibnizian", "Lockean", "Kantian", or "Hegelian". These views are alternate and none of them can alone capture the full picture of the world view. The Leibnitzian system offers a single "believed-to-be optimal" formulation of the problem, followed by the collecting of data to support this single view. The Lockean system suggests that data collected about the existence of a problem should be followed by attempts to arrive at a single formulation of the problem based on the data and/or expert consensus. The Kantian system incorporates several views held about the kind of problem, then efforts made to combine these views. The last type of system is the Hegelian system in which there are two diametrically opposing views held by the investigator of the problem, where there is strong debate.

The "*Multiperspectives Theory*" developed by Harold Linstone in the mid eighties provides a concrete Kantian view that forces us to distinguish "*how we are looking*" from "*what we are looking at*" (Linstone, 1989; 321). In our research this theory shifted our attention from "*What are the challenges, uses and sustainability features of MMS development*" toward "*How different*

stakeholders see these features from different technical, organizational, and personal views". These three perspectives naturally present varying attributes and offer insights on a system that is unattainable with the others. Each perspective offers different archetypes through which humans experience the world (and themselves) and order the world of phenomena, so that they are able to have experience (Mitroff, 1983: 84).

The "*Technical view*" (T) diagnoses the variances between the targeted and realized "*design of jobs and technology use*". Specifically, it covers activities of system design, data specification languages and structures. This view regards an information system as a technical artifact, and assumes cause and effect linkages with its organizational environment in terms of inputs and outputs (Iivari & Hirschheim, 1996). In so doing, it secures methodological rigour and practical accuracy of the ISD process. However, developing MMS exhibit openness, low sperability and high interdependence. If reduced to causal relationships, they lose their meaning and the ability to be explained (Wood-Harper & Fitzgerald, 1982; Watson & Wood-Harper, 1995).

Accordingly, the "*Organizational perspective*" (O) is needed to address other social realities such as adaptation to the surrounding organisational and political environment. Such a view focuses on the dynamic relationships between intra and inter-organizational boundaries. This helps constructing and maintaining a broader systematic whole.

Other intuitive and reactive issues such as perception of risk and inability to plan for low probability / high-impact events are tackled by the "*Personal view*" (P). In contrast with the O perspective, this view highlights more the self and sectional interest rather than multiple issues. Linstone (1989: 321) emphasises that the P perspective is based on personal or sectional interests, not shared symmetrically within the broader whole.

The technical perspective covers the system design, data specification languages and structures without reference to how the stakeholders (including the analyst) understand the system to successfully implement this design into a sustainable MMS (Linstone & Devezas, 2012).

Table 2.9: Characteristics of the TOP perspectives

Perspective	Technical (T)	Organizational (O)	Personal (P)
World view	Science-technology	Social entity: small to large, informal to formal	Individuation, the self
Goal	Problem solving, product	Action, stability, process	Power, influence, prestige
Mode of Inquiry	Sense-data, modeling, analysis	Consensual and adversary	Intuition, learning, experience
Ethical basis	Logic, rationality	Abstract concepts of justice fairness	Individual values/morality
Planning Horizon	Far	Intermediate	Short, with exception
Other characteristics	Looks for cause and effect Relationship Problem simplified, idealized Need for validation, replicability Claim of objectivity Optimization (seek best solution) Quantification Trade-offs Use of averages, probabilities Uncertainties noted	Agenda (problem of the moment) Problem delegated and factored Political sensitivity, loyalties Reasonableness Satisficing (first acceptable solution) Incremental change Standard operating procedures Compromise and bargaining Make use of uncertainties	Challenge and response Hierarchy of individual needs Filter out inconsistent images Need for beliefs Cope only with a few alternatives Fear of change Leaders and followers Creativity and vision by the few Need for certainty
Communications	Technical report, briefing	Language differs for insiders and public	Personality important

Adopted from Linstone (1989: 313)

Based on the above discussion, we see that the T perspective is essential for "*the design stage*", while the O & P perspectives view give more attention to "*the implementation challenges*". Together, the Technical, Organizational, and Personal (TOP) perspectives serve as an effective and practical tool to overcome the limitations of the traditional systems analysis in diagnosing wicked situations in the real world (Linstone, 1989).

Commenting on Linstone's work, Castell et al. (2002: 475) sees the TOP views as "circular rather than a hierarchical or bifurcated, archetype of sciences". The intertwining between the TOP views presents a collective property of objectivity. They do not present a better single truth, rather a provisional model of action (Churchman, 1971). Further, TOP perspectives offer a learning path to live with uncertainty not a fixed order of actions. The TOP views do not present a definite solution, but we can only suggest a ceteris paribus basis on each perspective to provide a contingency analysis (Castell et al., 2002). It creates a balance or a harmony between the human (subjective) and technical (objective) aspects of an organization. As shown in Table 2.2 this trilogy as meant by Linstone to help understanding the problematic situations in MMS development and especially in the e-Masary action case described in **Chapters 5 & 6**.

This theory has been examined and elaborated during the last two decades in the fields of ERP in education (Surisetti, Sarkar & Jain, 2012; Singh & Wood-Harper, 2010), health commissioning (Harrop, Gillies & Wood-Harper, 2013), organizational culture in the airline industry (Hongratana-Uthai, 2011), and culture and use of MP3 players (Lee & Ho, 2013).

2.4.1. Why the Multiperspectives theory?

The environment of MMS development represents a wicked problem situation that requires an inclusive Kantian approach to reconcile the disparate views of individuals, groups, and organizations that constitute this type of information society. "*People only see what they are prepared to see*" (Ralph Waldo Emerson cited in Holmes, 2007). Interestingly enough it has

been said a long time ago and we all know it very well, yet ironically people fail to accept, digest or even see other perspectives or different point of views other than their own (Mitroff & Linstone, 1993). Their various viewpoints are contingent by their indigenous experiences and day-to-day situations and no party can be claimed as the holder of all strands of knowledge or absolute truth.

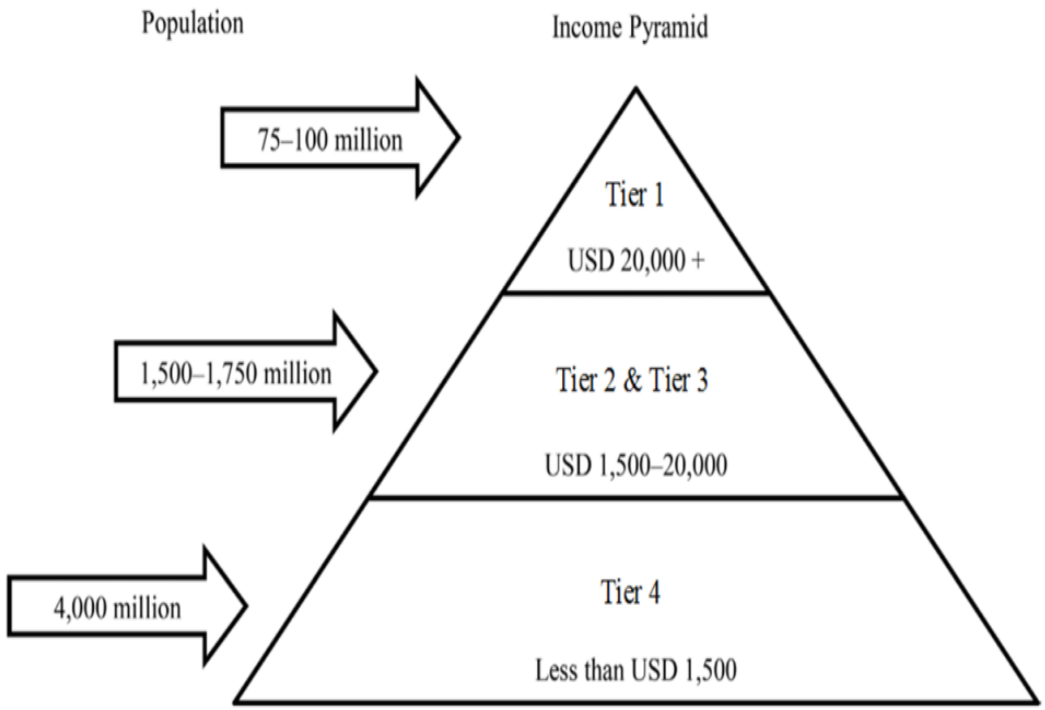
Our literature review discussed at the end of this chapter emphasises that the MMS is a multi-sided platform that requires creating mutual value propositions in the design stage, and a wider socioeconomic impact at the implementation stage to reconcile varying needs of multiple stakeholders and diffuse a sustainable system. Each actor in the MMS remains highly problematic in the proposed platform. First, some key actors (e.g. regulators) do not want to lose control over security, while others would like to fully control the end-user relationship (e.g. mobile network operators). Therefore, conflict is likely in any solution, if we want to go forward. This explains why numerous actors who have attempted to launch systems with full control or who have sought to by-pass the current incumbent (i.e. financial institutions, mobile network operators) have faced dismal results. Such a context is increasingly challenging to manage and includes the multidimensional complexity which requires a Kantian approach for problem formulation and solving (Linstone & Zhu, 2000).

2.5. Multiperspectives analysis of the Base of the Pyramid

Chambers (1994) asserts that poverty is a reaction to the capitalistic practice that disenfranchises the poor. Such practices left the poor in isolation, inferiority and vulnerability. For decades, professionals (especially top executives in banks, and fast moving consumer goods) viewed the poor as a profitless market. They failed to see the poor, either from a humanitarian perspective or as a mass market that achieve millions from small profit margins. Looking at the poor from the bottom-up, we can explore how they are creative and strong partners for sustainable third Generation corporations (Hart et al., 2011).

Coimbatore Prahalad proposed a novel answer to how the private sector might deploy its capabilities to solving the problem of such human misery (Walsh, Kress & Beyerchen, 2005). Prahalad & Hart (1999 & 2002) started their anti-poverty venture by considering the poor as conscious customers who can contribute to their own development and to the firm's financial value. They saw that "*customers are also responsible to co-create the business capabilities and are important joint problem-solvers*" (Prahalad, 2009, p.xvii).

Figure 2.5: The World Population Pyramid



Adapted and revised from Prahalad (2009)

The BoP approach implies a sustainable win-win situation where the poor are involved in the process of business profit generation. According to Hammond & Prahalad (2004), there is untapped purchasing power at the BoP, which presents a significant profit for firms who sell affordable products to the poor. Extending this approach, Prahalad & Hart (2002) state that access to affordable products may increase the prosperity of the poor and transforms the private-

poor relationship from philanthropy to sustainable mutual dependency. In their early work Prahalad & Hart (1999) estimated the annual PPP[8] income of the BoP people by less than $1500.

As shown in Figure 2.5, Tier 1 represents the richest class of the world population who control the majority of the world resources. Tier 2 includes the middle class who occupy governmental jobs in addition to middle and lower level positions in the private sector. Tier 3 represents off-the-poor class who run a small business or those who cultivate their own land.

The bottom layer, Tier 4, shows this socioeconomic class of low income population. It represents those who have seasonal jobs and work on wages.

Recent surveys have provided more accurate measures of the actual size of the BoP market (Guesalaga & Marshall, 2008; Kolk et al., 2013). The joint report of World Resource Institute (WRI) and the International Finance Corporation (IFC) is based on household income and consumption survey data on 8 important sectors (e.g. food, health, energy, ICT etc), drawing on household surveys in 110 countries for income, and by the sheer volume of the BoP (roughly 4 billion people) the spending volume is huge. Together they have substantial purchasing power: the BoP constitutes a $5 trillion (PPP) global consumer market according to the WRI-IFC estimation. By this new estimation, the choice of a $3000 upper limit is based upon the world mean income (Hammond et al., 2007).

According to Prahalad (2009), firms must consider the 4 billion poor people as part of a system of inclusive capitalism, and accordingly they need to treat the poor not as burdens, but as resilient and value-conscious consumers. Prahalad implies that the poor must get respect, fair treatment, and self-esteem, which is the most ongoing contribution that firms can make to the process.

[8] Purchasing power parity is the average per capita income (see poverty measurement in chapter 2)

Hart & Milstein (2003) viewed the BoP from the point of view of firms. They thought that the BoP market might also be critical for the MNCs to survive and compete in the next decade, with upper class markets becoming increasingly saturated. The BoP could serve as an incubator for worldwide competitive enterprises, while local firms in developing countries show the way (Clayton & Craig et al., 2001). Clayton asserts that BoP market provides new prospective for reflecting a national economic development strategy. BoP initiatives have gathered significant momentum in the theoretical and practical fields. The World Trade organization (WTO), the United Nations Development Program (UNDP), and other multilateral development agencies have adopted private-led initiatives for poverty alleviation and economic development (Ansari, Munir & Gregg, 2012). An example of this is the Global Compact founded by the United Nations (UN), which demonstrated the high potential of the role of MNCs in poverty elimination (Schwittay, 2008).

Sen (1976) believes that the freedom to choose needed commodities could improve the standard of living, the happiness that people can enjoy, and their long-life fulfilment. By saying so, Sen implies that the absence of interference from others may affect the way people behave. Sen's view is that freedom is valuable in itself, and is a means to other ends (Sen, 1999).

The early versions of BoP put forward by Hart & Prahalad (1999), Prahalad & Hammond (2002a), Prahalad & Hammond (2002b), Prahalad & Hart (2002), and Hammond & Prahalad, (2004) discuss *the BoP as a type of market* that has geographical and demographic characteristics. Hammond & Prahalad (2004) believe that BoP is not bound to geographical regions, but is a group of people who have some shared general features. Prahalad & Hart (2002) emphasise that the BoP communities, mostly live in rural villages, urban slums, or shanty towns, which are, however, moving towards urbanization. They also state that only 1 billion BoP consumers are found in megacities. Those people work as delivery channels for the products produced by the informal economy[9] in the rural areas. Prahalad & Hammond (2002a) add that poor communities are either illiterate (in particular women), or have low education levels. Prahalad & Hammond (2002b) assert that the lack of access to water, sanitation services and basic health care services

[9] Informal economy: Local microenterprises that are not taxed or registered by the government (See Rosser and Rosser et al., 2000: 156).

are also characteristics of BoP communities. In the same paper, the authors discuss lack of access to finance as a challenge that faces BoP communities. Borrowing money from money lenders was the only option for those who had no collateral. They had to pay back their loans with a high interest rate (Prahalad & Hammond, 2002b). Prahalad (2009) mentions the poverty penalty as a significant characteristic of BoP communities as well. This means that the poor live in very high-cost economies. Poor people pay higher prices for basic products/services than do the middle and upper classes. "*People expend cash and/or efforts to obtain their basic goods and services*" (Prahalad, 2009: 25). The next section pinpoints the key characteristics of the BoP market in Egypt, including statistics and economic indicators.

Kolk et al. (2012) emphasizes that the BoP presents a wide variety of BoP definitions, concepts, contexts, initiatives, impact measures, and even different approaches. BoP literature also lacks a solid conceptualization model to compare and contrast successful versus failure case studies (Karnani, 2009). In response, this section uses the multiperspectives theory to elaborate the evolution of the Base of the Pyramid concept (BoP) and discuss how the ISD proceeds within this context from the TOP views.

2.5.1.Technical perspective

The BoP is a business model that aims to bridge the gap between the business strategy and socio-economic development (Prahalad & Hammond, 2002a; Simanis & Hart 2009a&b). The BoP market represents four billion people who live on less than $3,000 per capita purchasing power and primarily run their microenterprises in the informal economy (Hammond et al., 2007). The BoP literature provides a convincing argument to business-minded leaders for viewing the poor as an untapped market of consumers, producers, and entrepreneurs (Akula, 2008). It also provides a structure for the cause and effect relationship between technology access and the emerging job designs and business values (Jagtap & Larsson, 2013).

From the ***technical perspective,*** the researcher highlights the issues of information system design, and technology access and use at the BoP. Challenges of friendly interface, technology infrastructure, and profitability have been also considered in this perspective. Further, the cause and effect relationship between technology and new value propositions and value constellations is presented consistent with Mitroff and Linstone's view. The researcher has found that other philosophical assumptions, such as Manuel Castells' idea of "the space of flow" is also useful to show the intervention between technology and business models in order to create new job designs and socio-economic impact (Castells, 1996).

2.5.2. Organizational Perspective

The BoP, also offers insight into the mindsets, capabilities, and partnerships that MNCs need to develop viable business models (Seelos & Mair, 2007; Kistruck et al., 2013; Sánchez & Schmid, 2013). Most recently, a second generation of BoP (or ***BoP 2.0***) has emerged. Rather than an emphasis on "*finding a fortune at the Bo*P", this generation suggests that BoP businesses benefit from "*creating a fortune with the people at the BoP*" (Arora & Romijn, 2009 & 2012; London & Hart, 2011). A fortune-creating approach involves identifying and enhancing what is "right" at the BoP markets, co-creating and piloting business models in deep dialogue with the poor, and establishing competitive advantage based on the capability to become socially embedded in the local context and to assess and enhance mutual value creation (London, 2009).

From the ***organizational perspective***, the researcher discusses the systematic interdependence collaboration among the key actors at the BoP. It raises questions about how they ought to interact in the future in comparison to how they currently collaborate. The BoP literature on partnering has primarily focused on strategies for interdependence collaboration between the poor community (the grassroots), donors, private enterprise and other non-traditional partners such as the Non-Governmental Organizations (NGOs) and state organizations (Margolis & Walsh, 2003; Simanis & Hart, 2009; Arora & Romijn, 2012; Hens, 2012). Organizational challenges facing such collaboration have also been considered in this discussion (Kandachar &

Halme, 2008; Rhyne, 2009; Perrot, 2013). To address all of these issues and the role of technology to overcome collaboration challenges and maximize potential benefits of collaboration, the researcher adopts the theory of the public sphere by Habermas to explain the shift of roles from state-led to private-led public initiative of universal access. Further, he uses the idea of "the balance of power" (Al Gore, 2013:125) to explain the accelerating role of the MNCs in enhancing the millennium development goals and in creating new streams of social enterprises at the BoP.

2.5.3.Personal Perspective

The ***personal perspective*** discusses the issues of power, cultural challenges and other individual interests at the BoP. Both Habermas and Castells discussed these issues and how they develop in wicked situations. The BoP literature still misses this dimension of personal interests and power structure with the exception of one paper by Hayes & Westrup (2012) that discusses the state power over what MNCs invest in at the BoP. Another paper slightly refers to the power of community elites and how they control the allocation of products and services offered at the BoP and how they report the poor areas according to their own judgement and enrich their own part of the community (Arora & Romijn, 2009). The personal perspective shapes individual behaviour and needs to be understood so that plans can be harmonized with the fundamentals of the workplace (Harrop, Gillies & Wood-Harper, 2012).

Tarafdar, Anekal & Singh (2012) delivered the first attempt toward a systematic conceptualization of the development of the Bottom of the Pyramid market. The study explored "*How the use of ICT enables development of markets at the BoP*". Tarafdar, Anekal & Singh (2012) used institutional theory to explain the role of ICTs as tools to automate, informate, and transform market mechanisms in the BoP. However, they used secondary and primary research limited to the Indian context rather than a global context. They also limited their discussion to

the first generation, the so called Bottom of the Pyramid[10], a potential market of four billion people live with less than $3,000 per capita purchasing power and primarily run their microenterprises in the informal economy (Hammond et al., 2007). Ironically, they dropped the second generation (the Base of the Pyramid). While the first generation, addresses "*How to find a fortune at the BoP*," the second generation explores the benefits from "*creating a fortune with the BoP*" (Arora & Romijn, 2009 & 2011; London & Hart, 2011). A fortune-creating approach involves identifying and enhancing what is "right" in BoP markets, co-creating and piloting business models in deep dialogue with the poor, and establishing *a base of competitive advantage* based on the capability to become socially embedded in the local context and to assess and enhance mutual value creation (London, 2009). Such foundations of the second generation, BoP **2.0**, offer the same principles of stakeholders' involvement and the ethical approaches of the ISD. These principles have been found core in both of the Multiperspectives theory (Linstone, 1988) and Multiview model (Wood-Harper & Avison, 2003) used in our research.

In conclusion, this section contributes toward a systematic conceptual model of the BoP business model and the ISD in such context. In **Chapter 3**, we discuss alternative business models that help tapping the disenfranchised market (i.e. The Bottom of the Pyramid). In doing so, we justify why the BoP as a business model offers a useful lens for our study.

[10] Our discussion in this section distinguishes between two concepts: the first is the Base of the Pyramid as a business system at which multiplayers collaborate to deliver socioeconomic impact; the second is the Bottom of the pyramid as a place of targeted market segment. Accordingly, we use the proposition "at" when we refer to the first concept and use the proposition "in" when we refer to the second concepts. The second concept reflect a marketing point of view that considered the people in the slum areas as unconscious customers. Both concepts have been abbreviated as BoP.

2.6. Information System Development @ BoP

The aforementioned discussion shows seven key trends: turbulent environment, inter-organizational systems, decentralization, technological advances, rising stakeholders' expectations, universal access, and big data.

2.6.1. Turbulent environment:

The idea of unsettled and complex environment and how it affects the IS performance has been first discussed in Emery & Trist (1973), where information-based task replaced the mechanical ones. In the 21st century, the BoP context offers a more turbulent environment. It is characterized by a high level of complexity and project blurring, uncertainty, multiplicity of actors, and heterogeneity between the indigenous context and the international business practices adopted by the MNCs (Arora & Romijn, 2009 & 2012; Heeks, 2012). The leadership of MNCs at the BoP stimulates the market competition and radical innovation. However, the fast move of the MNCs in diverse directions produces unexpected and conflicting results. Despite that fact that business networks at the BoP facilitates outsourcing of tasks and resources, it includes individual bureaucratic organizations (e.g. Government) that still follow the rigid organizational hierarchy and have a high level of control over tasks. Accordingly, they cannot effectively adapt to the dynamic environment and might drag the network behind the promising potential. Accordingly, there is a need for a new methodology that could facilitate designing a network society with adaptive potential at the BoP (Walsham, 2013).

2.6.2. Inter-organizational systems

The emergence of the BoP business model led to many virtual-based MNCs in which the quality of working life is higher than the traditional forms (Eason, 2011).

These forms require inter-organisational IS that work as an open system and maintain the task interdependencies among different partners. In doing so, ICT mediates communications between stakeholders in the BoP social system. A long four stage of virtual representation; namely *the catalogue stage, the transaction stage, vertical integration, and horizontal integration*, the complexity of IS increases (Layne & Lee, 2001). These stages facilitate one or more of the following inter-organizational systems as shown in Table 2.10.

Table 2.10: Types of inter-organisational Information Systems

Type of Inter-organizational System	Description
The collective operational task	The system in question is one that undertakes the operational delivery of collective tasks (i.e. Achievement of overall task objectives depends upon the co-operative endeavour of a social system in which people occupy work roles within which they have responsibility for some part of the collective task).
Social and technical subsystems	Overall task performance in the system is undertaken by the human resources in the social system making use of technical resources designed to support the tasks in question. In an effective socio-technical system the technical and social systems are co-optimised in order that an integrated approach can be taken to the performance of the collective task.
Open systems	The work organisation is an open system in transaction with its environment and it has to adjust its behaviour as environmental conditions change. Accordingly, the social and technical subsystems have to enable the socio-technical system to be flexible in the short term and to evolve in the long term.
The unfinished system, reflection and redesign	As an open system that needs to be able to cope with new demands, the operational system that does the work is always unfinished in the sense that it has to renew itself to optimise the way it tackles emergent requirements. As a consequence there have to be resources available that can reflect on the appropriateness of the current operational system and undertake any redesign that may be necessary.

Adapted and summarized from Eason (2011: 2)

The participative design and implementation of these large-scale systems takes place across organisational boundaries. In the MMS, for instance, integration of transactional data between mobile telecoms, banks, FMCGs, and NGOs is very challenging. The accelerating debate around these mass projects when they target the BoP context is whether to follow bottom-up or top-down design and implementation approach. Eason's recent studies in the area of healthcare

services suggests a “middle-out” approach based on individual and national level priorities (Eason et al., 2012).

2.6.3.Globalisation and Decentralization

In the ear of open market, the competition is accelerating. In response, MNCs improve competitive advantage through more decentralised organisational structures that loosen the bureaucratic hierarchy and reduce communication cost at the workspace (Singh & Wood-Harper, Wood, 2008). This flexible structure creates the so called “ multidimensional organization” (Ackoff, 1999) that required a mutlidimensional IS. Such a system should serve a wide variety of customers, products, and resources. Successful implementation of these multidimensional systems facilitates lean and nomadic coordination and communication tactics that enable MNCs to achieve a variety of conflicted objectives (Kien, Soh & Markus, 2013).

Castells et al., (2006) argues mobile phone access to those multidimensional (networked systems) absorbed all other ICTs and computing tools and facilitate a mobile collaboration in a mobile space of time.

In summary, the high level technology employed in the multidimensional systems as well as the decentralised organisational structure incorporates different stakeholders who create new forms of collaborations.

2.6.4. Technological advances

Effective multidimensional systems encompass the new wave of business communication tools such as blogs, wikis and group messaging software that in turn creates more unintended, knowledge-based collaboration (Mcafee, 2006). It also created new forms of inclusive innovations and reduces the gap between the designed and actual technology (Heeks, 2002).

Because mobile phones encompass all these technologies, the same impact is expected from mobile apps into the financial service domain. Picking random cases such as M-Pesa (in Kenya), eko (in India), Smart money (in the Philippines), and EasyPiasa (in Pakistan), usage of mobile financial services in developing countries expanded from 15 million in 2009 to 450 million by end of year 2014. So, advanced technologies for financial services will be widespread at BoP (Heeks, 2012).

Mobile phones have been converted from talking devices to computing and data processing devices. In Kenya, 75% of M-Pesa users have small businesses that deliver a significant source of GDP to the national economy. Accordingly, advanced usage of mobile phones helps building massive business databases that can be computed and analysed to draw future trends of the national economy (Brynjolfsson & McAfee, 2014). This approach is called "big data analytics" that will be explained further in the next section.

2.6.5.Big data

The global nodes of connections reveal unity and a global mind, but also create clashing demographics and cultures, strategic imbalances of powers (Al Gore, 2014). Developed countries that control those global nodes have been trapped in a slowdown of technological innovation, slow growth in productivity, income and job creation (Friedman, 2012).

Brynjolfsson & McAfee (2012) argue that smart machines (e.g. mobile phones) drive the global economy through data computing, artificial intelligence, and communication networks. The accelerating production of cheap mobile devices doubles the amount of digital data every day and might lead to a computer revolution (Brynjolfsson & McAfee, 2014). Machines can draw our future, but only as a science fiction. Human interference in how the data are drawn and converted into actionable information is necessary (Wing, 2006).

The usage of technological advances and creative business models at the BoP create a huge amount of personal, business, and technical data that might help us understand our world and draw future scenarios. The wide application of grounded theory has been captured by Tom Davenport, who claims that analytics of massive amounts of unstructured business data might gather intelligence on terrorists, help manage of supply chain webs, and even how to brush our own teeth. It is useful to plan our future by analysing text, voice and video, it needs an appropriate format to make sense of it. Davenport (2014) refers to key principles to format big data; data structuring, data management and decision making.

Structuring data is not enough to draw the right analysis. For instance, a content analysis of mobile text or posts on Facebook messenger may give you different trends of politics and culture, but does not reveal the right meaning of political sarcasm and revolution.

Effective big data management requires new decision making techniques that we do not possess at the moment. Such techniques should be able to absorb real-time (continuous) data streams at the disposal of governments, corporations, and small businesses to be able to monitor their business conduct (Baker, 2014).

2.7. Mobile Money System at the BoP

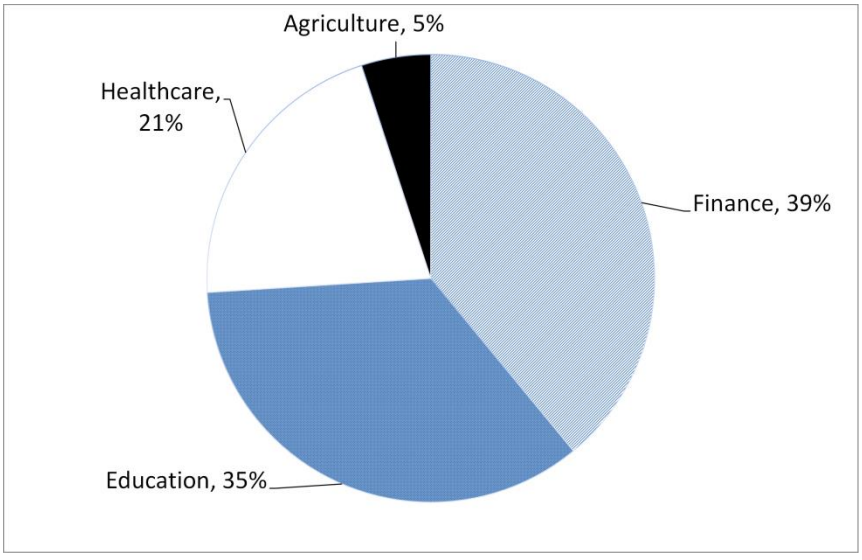
2.7.1. Digital Financial Services

ICT and other digital artefacts have been recognised as enablers of innovation (or as operand resource) in business processes, models, and value chain (Durmusoglu & Barczak, 2011; Lee & Berente, 2012). Mobile phones, specifically, were found useful to enhance the livelihood for the low-income people living in the slum areas, as well as connecting the high-income people living

in the rich areas to a wide variety of live applications. Yoon (2007) emphasizes that mobile phones encompasses all the benefits of computers, web applications, and telecommunication tools that improves humans' capacity to manage their daily activities.

Ramdas & Chandy (2013) conducted an extensive survey to reveal the challenges pending the full potential of mobile phones in Africa. The study revealed four disciplines where mobile phones have the most impact; agriculture, education, finance, and health (see Figure 2.6). Despite the wide promotion of m-health cases such as "*mHealth4CBS"* in South Africa and m-agriculture projects like "*m-spark"* in the UK, the potential impact is yet to yield the social and commercial return envisioned. The yield of m-learning and m-finance, however, is more significant in Africa and the Middle East. In March 2014, Guy Pfeffermann reported in the Financial Times that the number of mobile subscribers in Africa jumped from 25m in year 2001 to 780m in the year 2013. He argued that such a spread empowered the innovation revolution in countries such as Kenya that started mobile financial services and the next run is in m-learning. The "*telecentre*" organization in the Middle East has had a massive impact in Jordan, and North Africa to reduce illiteracy through m-learning.

Figure 2.6: Impact of Mobile Phones in Society



Adopted from Ramadas & Chandy (2013)

However, the recognition of "*M-Pesa"* as a transformative tool of society still occupies all the world newspapers and academic journals. In their survey Ramdas & Chandy (2013) called for a systematic plan to overcome the challenges of mobile applications in the four domains. Challenges include the limited definitions of core services, limited platforms, weak supporting infrastructure and limited research on demand factors, including commercial feasibility and long-term social return. Currently, the area of m-finance is growing and has a strong potential in the developed countries and even more in the developing world.

The m-finance domain includes two development approaches; ***push approach*** versus ***pull approach*** (Mohamad, 2012) (See Figure 2.7 below).

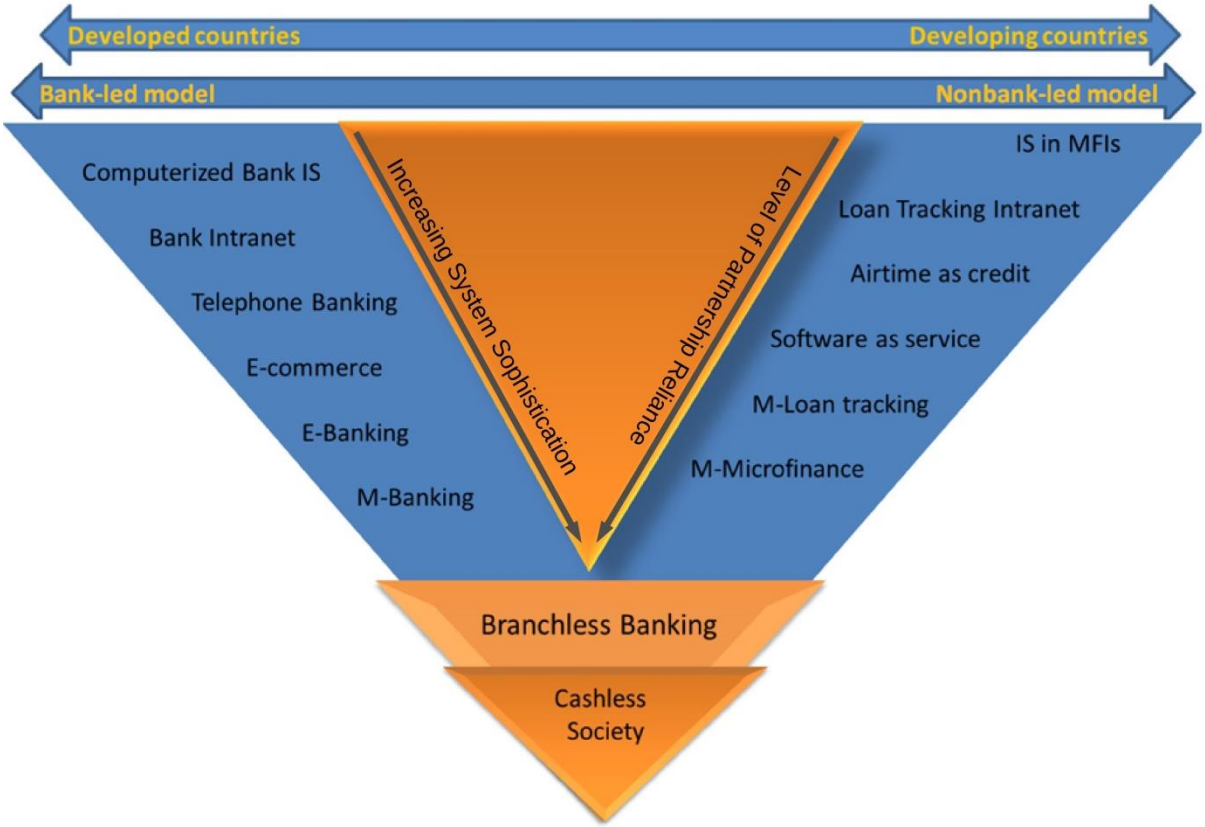
The ***push approach*** started in the 60s when the Financial Service Providers (FSPs) in developed countries such as America and Britain, used computers to improve the efficiency of financial data processing, and then expand (push) the delivery of their existing financial services to the high-income and banked customers. In this approach, FSPs usually outsource the system development activities to an external software vendor and leave limited chances for stakeholder involvement. In some cases, FSP delegates the system development to their IT and R&D departments to make sure the systems produced are consistent with the organizational strategy and services/products provided. The HSBC bank, for instance, outsource their mobile banking applications to IBM and Apple to develop separate Near Field Communication (NFC) to the HSBC customers. In this approach FSP follows a big bang and top-down approach in setting the system development strategy and leaves a limited chance for prototyping and other approaches that include users and the concerned stakeholders.

Mohamed, Wood-Harper, and Ramlogan (2013& 2014a) explored diverse applications of mobile phones in the western financial market that ranges from computerized banking IS, intranet, telephone banking, e-commerce, e-banking, and mobile banking. Pavlou (2003) refers to issues of trust, presence, friendly use, and design interface as critical elements in developing e-commerce applications. E-Pay and Amazon dominated scholarly work showing the impact of web and mobile application on trading systems, payment, and global outsourcing. Alibaba Group, a Chinese e-commerce platform, is another revolutionary step reported by scholars as the gate for

outsourcing and trading activities across the poles of the earth (Zhao, Wang & Huang, 2008; Tan et al., 2009). Mobile-based Alibaba has been recently offered to the public and attracted $21.8 billion in its first week stock sale as businesses and individuals flocked to invest in the company that is dominating China's promising e-commerce services (The New York Time, 19th Sep 2014).

Laudon & Laudon (2014) emphasised that digital financial firms do not recognize that the user experience for mobile interaction is essentially different from personal computers and laptops.

Figure 2.7: Digital Financial Services from Global Perspective



Adopted form Mohamad (2012: 12)

Such applications are usually task limited and should be designed for usability in small size devices that include memory bandwidth, screen space, processing, data entry, and user gesture icons. The push approach is mostly followed by banks who currently target 20% of the world

population (Mallat, Rossi & Tuunainen, 2004). Mobile payment literature reported the wallet applications developed by Apple, Isis, Paym, PayPal, and Izettle (Dahlberg et al., 2008; Au & Kauffman, 2008). In doing so, they execute "*transactions*" and process "*information*" in the same way that is followed in the traditional banking payment systems.

This side of the literature concerned with the developed countries focuses on the user's acceptance of ICT in general (including mobile phones) as tools to improve the consumption of payment and other financial services (Schierz, Schilke & Wirtz, 2010). A few, however, consider mobile technology as a socio-technical element that transforms trade activities into financial information system. Such a view, however, is not captured by analysts and scholars who study the developing world.

The "***pull approach***" started in the late 70s in developing countries (e.g. Bangladesh, Egypt, Tunisia, Mexico) to enhance digital innovation in order to meet the financial needs of the low-income unbanked people (Avgerou, 2008). Instead of pushing the service to unconscious users, this approach urges the FSP to involve (pull) users and consider them as partners in the system development process. This different context requires more mobility and flexibility of the FSP to capture the individual (personal) needs of users. Such users live in different *spatial-temporal contexts* (including locations out of the reach), *environment context* (humidity, high temperature, noise), *task context* (daily wage jobs, implicit goals and expertise, lack of direct supervision) (Krogstie & Lyytinen et al., 2004). They are physiologically and mentally different due to mobility and continuous concern to cover their living expenses and secure jobs. The social context that surrounds the users of digital financial services is different in terms of social capital, team work, and the user's status among the community. The pull approach in general creates a *new information context*, where users become part of global, national, and personal information space in real-time. They produce the information and lead the FSP into something that makes a better life for them.

Recently, Fichman, Dos Santos & Zheng (2014) documented the evolution of ICT applications in FSP in the developing world. A clear focus has been given to the microfinance services (including insurance, saving, credit, and remittances). Empirical examples have been drawn from

IBM standard packages for loan tracking that started in early 80s in Bangladesh after the tsunami and the starvation that followed. At that time, Mohammed Youns launched the most famous and claimed to be a successful model where a credit information system was installed to improve the transparency of credit policies to Grameen ladies. However, in many developing countries, credit information systems are still in their infancy, and information sharing among lenders remains weak. Later, the Grameen phone was the first project to use airtime (call minutes) as a digital commodity to be allocated to borrowers instead of physical cash credit (Yunus, 1998; Yunus, Moingeon & Lehmann-Ortega, 2010). In the late 90s, the era of ICT for development (ICTD) has come to the surface to show how ICTs can make our lives better (Cecchini & Scott, 2003; Welshame, 2012) and close the digital divide between the east and the west (Sein & Furuholt, 2012).

When the 21st century began, two contradicting views dominated the IS literature concerned with the developing context. The first, was that ICT does not play a central role in many of today's activities performed by FSPs and, therefore, will not do so in the future (Ferrari, 2008). The other assumption was proposed by the technological determinists who assumed that the technological path of microfinance will grow equally to that in the established banking industry (Kauffman and Riggins, 2010; Weber & Kauffman, 2011). Advocates of the former view, argued that mobile phones were used in the first place to improve the financial functioning and wider outreach, but only high administrative cost, low revenues and very high risks had positive relationships with the broadened outreach. The alternative view of Parikh & Lazowska (2006) suggested that when developing new mobile-based microfinance architecture, the cash value of individual transactions is very small, so the only way to be profitable is to serve many clients efficiently. This is an important measure of efficiency in the microfinance field. They emphasize the need to develop a technological infrastructure which is easy to use and allows more clients to be served.

Ashta & Patel (2013) reported the use of Software as a Service (SaaS) as business model to provide non-bank microfinance services. Ashta conceptualized microfinance services as those financial services provided by a business developer to serve low-income people who used to pay high interest rates for money sharks on the top of every transaction. The authors have drawn their evidence of how useful is SaaS, using cases from South Asia and Sub-Saharan Africa. They

emphasised that the small size of most MFIs makes software seem expensive (i.e. high installation and maintenance costs). The software vendors are many and they offer similar standard packages, while large diversities of microfinance activities, procedures, and documentation cycles require a high degree of support from MIS vendors and customised best-of-breed packages. Cloud computing (as shared infrastructure) in this context is used to lower operating costs, maximize the use of a decentralized financial information systems, record updated transaction diaries, and reduce uncertainty. This sharing of infrastructure costs creates a win-win situation in which software providers receive high margins and provide low support to a few customers (Ashta, 2011). Simultaneously, small MFIs can buy cheap products and get volunteer support for their products. The SaaS provider becomes an intermediary who enables both of these opposite needs to be addressed. Essentially, the SaaS provider uses a software solution which they host in the cloud. The MFIs use this "*paid on a pricing model*" such as number of transactions, accounts or customers. Ashta and Patel (2011) provide a technical guide on how SaaS will operate in an international microfinance setting with its unique problems. Collecting his evidence, Ashta conducted multi-case studies (Mambu, MicroPlanet Technologies, IBM, FINO and MOSTFIT) to illustrate the mechanisms of this partnership between MIS vendors and MFIs. His main goal was to explore the conditions where SaaS is an appropriate partner for MFIs, the difficulties of implementation and needs of tailor made solutions.

Ashta (2012) emphasised that sustainable cloud-based credit information systems require a wider collaboration with banks and telecoms to unleash the full integration between the push and pull approaches. Following his trial, recent IS studies such as Alampay & Bala, (2010), Elder et al. (2012), Mohan, Potnis & Alter (2013) and management studies such as Battilana & Dorado (2010), Behl (2013), and Behl & Singh (2014) emphasised that "branchless banking" integrates the push and pull approach and grants universal access for stakeholders where users and developers contribute in the development process. However, their control over the system is not equal, and technology (as an accountant) does not play an equal role to humans (as actors) (Maurer, 2012).

Branchless banking can be bank-led or nonbank-led. The bank-led approach is more prominent in Japan, USA, and the Scandinavian countries, while the nonbank-led approach started in Kenya,

Somalia and sub-Saharan Africa more generally. Mobile money is a nonbank-led system (platform) that includes push services (such as m-payment and m-banking) and pull services like m-finance (see Figure 2.8). MMS requires standard Near Field Communication (NFC) applications such as Unstructured Supplementary Service Data (USSD), Short Message System (SMS), or a built-in application on the SIM card (Donovan, 2012a). MMS is controlled by non-bank providers such as IT business development companies and/or mobile network operators. In so doing, they control all channels and remain the system owners (i.e. the essential gatekeepers in deploying mobile money systems) (Donovan, 2012b).

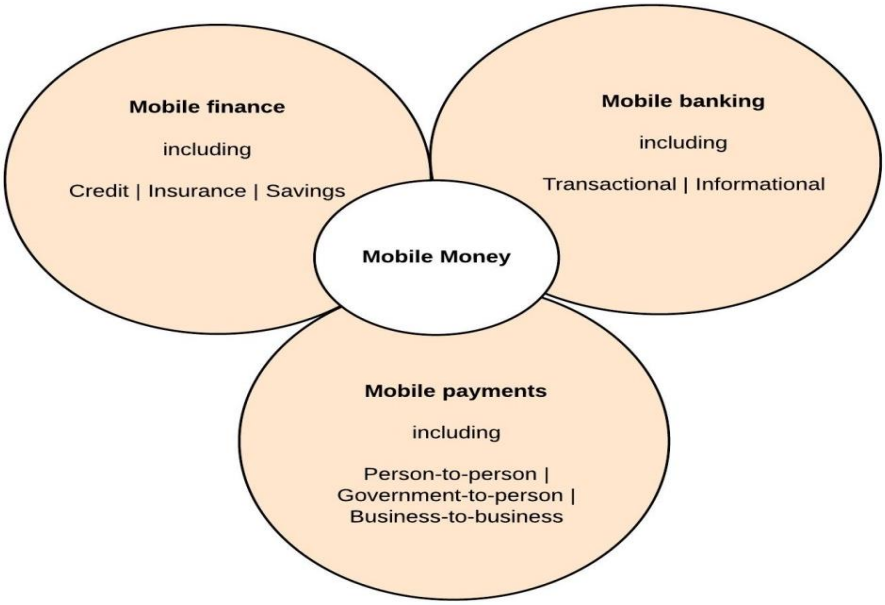
The recent stage in the digital financial services revolution is the so-called cashless society. It is a universal access platform where Virtual Currency (VC) replaces physical cash in terms of payment, trading, currency exchange, and wealth accumulation (Nakamoto, 2008; Mohamad, Wood-Harper & Ramlogan, 2014). This is a peer-to-peer platform started first in the USA through Bitcoin as Cryptocurrency. This type of currency is traded on open source cyberspace (i.e. the mining or *www.bitcoinmining.com*) that aims to create communications and interactions among traders (Guo et al., 2011). Individuals and organizations use this currency as computing power to pay for or exchange products/services and record these transactions in a public ledger.

Access to Bitcoin can be through wallet software, personal computer, web application, but mostly through special Bitcoin mobile applications. In this cashless space, things like words, human relationships, data, and wealth are all computer-mediated. Today, the cashless space is reducing the boundary between physical and virtual worlds, leading huge changes in many types of business including their technological, organizational, and personal perspectives. When adopting and modeling the surroundings of the Bitcoin, for instance, we are no longer modeling open source software, rather we enter the world of business modeling (Carugati & Rossignoli, 2011). Both the Bitcoin (as an Information System) and the organizations (as Business Systems) need to be set up at the same time (Eriksson & Penker, 2000). Bitcoin has been adopted by service companies[11] to improve their flexibility and competitive advantage, and to attract more

[11] In the UK, there are only ten sectors that approved Bitcoin as a money substitute (The Telegraph, 10th Jan 2014). All of them are service industries such as transportation, entertainment, real estates, food, shipment, fashion, and placement (Office of National Statistics, 2013). Recently, Cumbria University adopted Bitcoin as a money substitute

customers. This cashless platform allowed these service companies to track their customers' needs and build big data storage for the future business plans (Yermack, 2013). Despite the promising impact of cashless systems on society, it is, however, not risk free. Mohamed, Wood-Harper & Ramlogan (2014) followed the systematic multiperspectives theory (Linstone, 2010) to explore the Technical, Organizational, and Personal (TOP) changes that organizations conduct to issue Bitcoin accounts and use it as Cryptocurrency. Failing to manage such changes creates TOP risk and decreases the rate of adopting and accepting Bitcoin as alternative to physical cash.

Figure 2.8: Different Types of mobile financial services



Adapted from Donovan (2012a)

The above discussion, emphasizes that both technologies and organizations are subject to huge changes in form, function, and purpose (Orlikowski, 2008), the spread of ICTs (including Internet, Web 2.0, mobile phones, and cloud computing) together with the new technical and cultural predispositions of modern society, allowed a huge revolution in the financial services. These upgrades (as we move to the bottom of Figure 2.7) offer more sophisticated systems that

---

and had to conduct different technical, organizational, and personal changes to succeed (Times Higher Education, 21st 2014).

require higher level of partnership dependency. In the following section, we will explain mobile money system in more details and point to the level of sophistication of this system.

2.7.2. What is Mobile Money System?

Mobile Money System (MMS) is a near field communication system that encompasses a network infrastructure for uploading/downloading and transferring money that facilitates the exchange of virtual cash between various actors (such as individual users, intermediaries, businesses, governments, and financial service providers) (Hughes & Lonie, 2007).

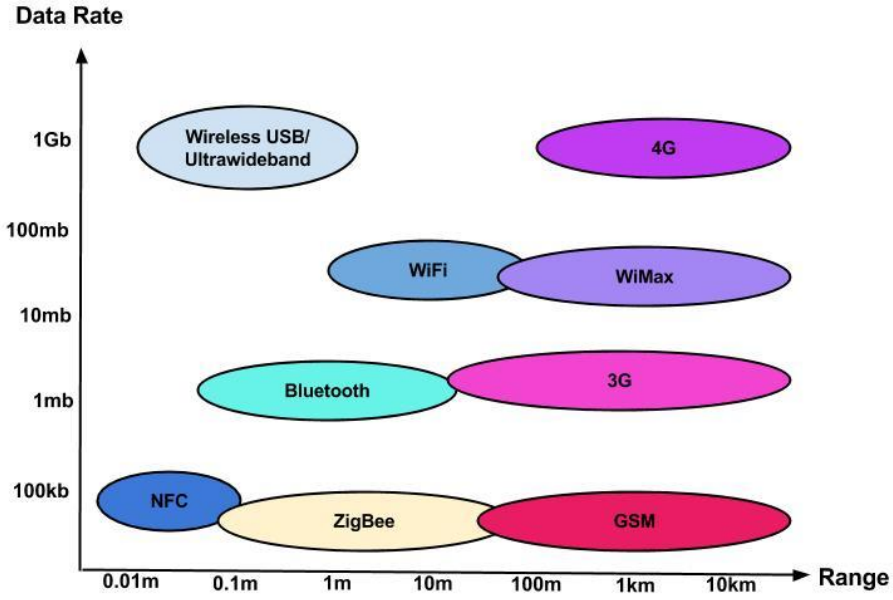
NFC is a radio frequency communication that was first developed by Sony and NXP semiconductors to connect devices within a distance of 10 centimeters (Finkenzeller, 2003). NFC-enabled devices have bidirectional signals that can facilitate disseminating up to 424kbps within less than 4 centimeters. Such specifications enable users to share their smart cards, conduct payment transactions, access smart systems for interactive dialogues, and access bank accounts with a finger touch. It also helps users to organise digital vouchers and loyalty programmes (GSMA, 2014).

As shown in Figure 2.9, the NFC has a capacity spectrum that ranges from a limited range and small amount of data (e.g. Early version of Nokia 6131) to 4G on the top right corner that facilitates communicating more than1GB within a wide distance range.

The NFC chip can be easily attached to a debit/credit card or any type of smart cards. It can also be inserted in traditional or smart mobile handsets via UICC SIM card or a micro-SD card. Some mobile phones such as Acer-Liquid Glow E330, LG- Spectrum 2, and HTC-Desire are available for affordable prices, and include built-in NFC stickers (Rapid NFC, 2014; Euromonitor International, 2014). Such phones enable users to perform multiple functions and work with a

variety of commercial and non-commercial applications provided by the network operators regardless the hardware on hand[12].

Figure 2.9: The Capacity Spectrum of NFC in the Financial Services



Summarized from the NFC Research Lap (2014) & GSMA (2014)

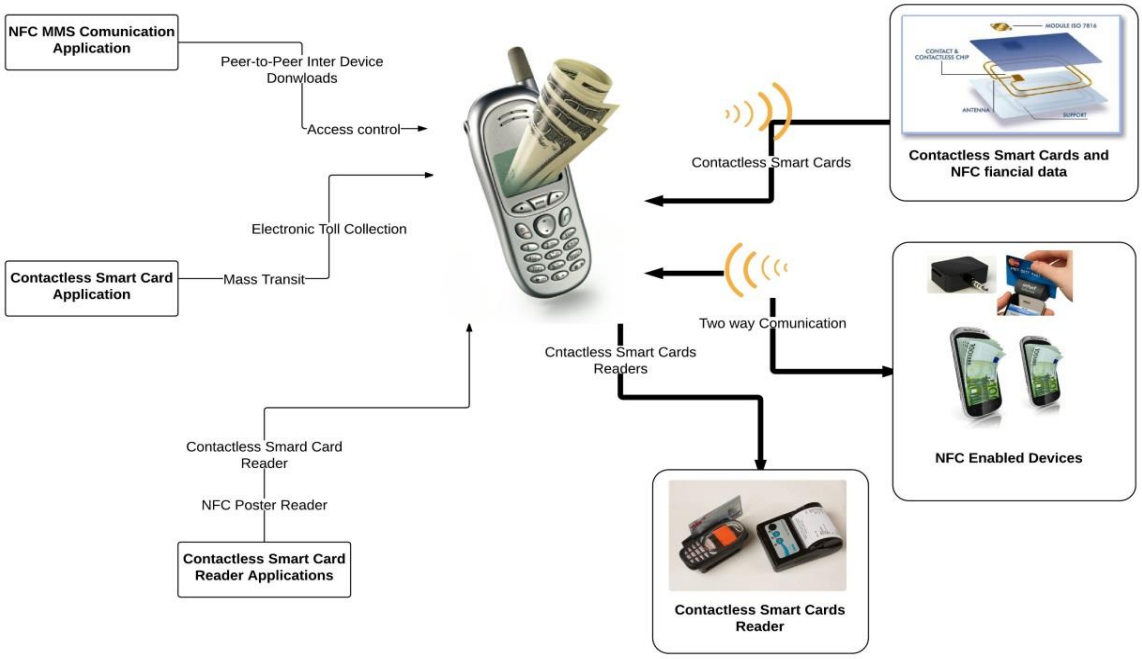
This technology is user centric rather than provider-centric and enables users to personalise their own profile (Wallet). The mobile money server is the bridge between the NFC-enabled mobile phones and the network operators (or providers).

NFC-enabled handsets usually include a contactless reader and a two way communications aerial. NFC-enabled smart phones also include a card emulation chip. Altogether, they create the interface of the NFC-enabled mobile money device that is shown in Figure 2.10. These specifications offer a wide variety of NFC applications such as micro-payments for purchases

[12] This element reflects the limited impact of manufacturers on the development of MMS. Accordingly, they have been excluded from our sample (shown in chapter 4) and led us to revise the model developed by Ondrus & Lyytinen (2011) (See Chapter 3).

and bills, receive/repay microcredit, transfer electronic money, exchange smart poster (e-tickets for games), and share other financial values (Ondrus & Pigneur, 2007; UNCTAD, 2012).

Figure 2.10: NFC Interface for Mobile Money System



This leaves us with three relevant information systems; interactivity, remote multiple application management, and a remote user management system (Mas & Morawczynski, 2009). The interplay between these three systems helps develop three transactional activity networks; retail network, payment network, and account and services platform (Mas, 2009).

The transaction usually originates in the "*retail network*" where the registered customer attends the retail agent to conduct a transaction. The key objective of this network is to attract more customers to fully utilise the invested point-of-sale infrastructure (e.g. PC, Card Readers, Printer, Internet connection, and mobile devices) to minimise the transaction cost for customers. This network includes not only registered retailers, but also Microfinance Institutions (MFIs) who act as intermediaries for mobile microcredit services. This means we have two types of customers:

mobile payment customers who attend at the retails; and borrowers who attend at the MFIs and apply for microcredit. The key challenge in the retail network is to offer all types of mobile money services discussed in the previous section to these two classes of customer. To get these services, customers register for mobile money services through the intermediaries who help upload the monetary value to the mobile wallet or (mWallet). Once registration is complete, customers receive an SMS confirming the authentication details (i.e. ID & password). Then they can use the mWallet application installed on their mobile device. This application offers two types of interface customised to the aforementioned types of customers; the first is a menu-based interface in which the local language is used to construct the dialogue for mobile money transactions. This type of interface targets legacy phone users and smart phone users as well. They operate on $100 mobile phones that low-income customers (e.g. borrowers) use to conduct different mobile money transactions (see Figure 2.11 that shows the dialogue for the pay bill M-PESA interface). This type of interface also operates in smart phones used by high-income, highly educated users. T-mobile, Vodafone group, and Telenor offer free downloads for these mWallet apps.

Some service providers such as “easypisa” (developed by Telenor Pakistan) enable a hot direct number that illiterate customers call to follow voice commands instructed in the local dialect. In doing so, they press keys such as [ = Yes,  = No, and  = Go Back to the main menu] to process transactions with the same efficiency as the menu-based interface.

The second type of interface is visual or icon-based based available for smart phone users. PesaDroid for instance is a mWallet application for Android devices. As shown in Figure 2.12, this interface helps customers in managing their wallet and tracks their transactions. It also enables them to generate monthly statements, including cash flow and profit & loss ledger.

Customers have the choice of attending the store or the MFI to upload, download, or transfer money, while they receive an SMS confirming their transaction details. Alternatively, they can

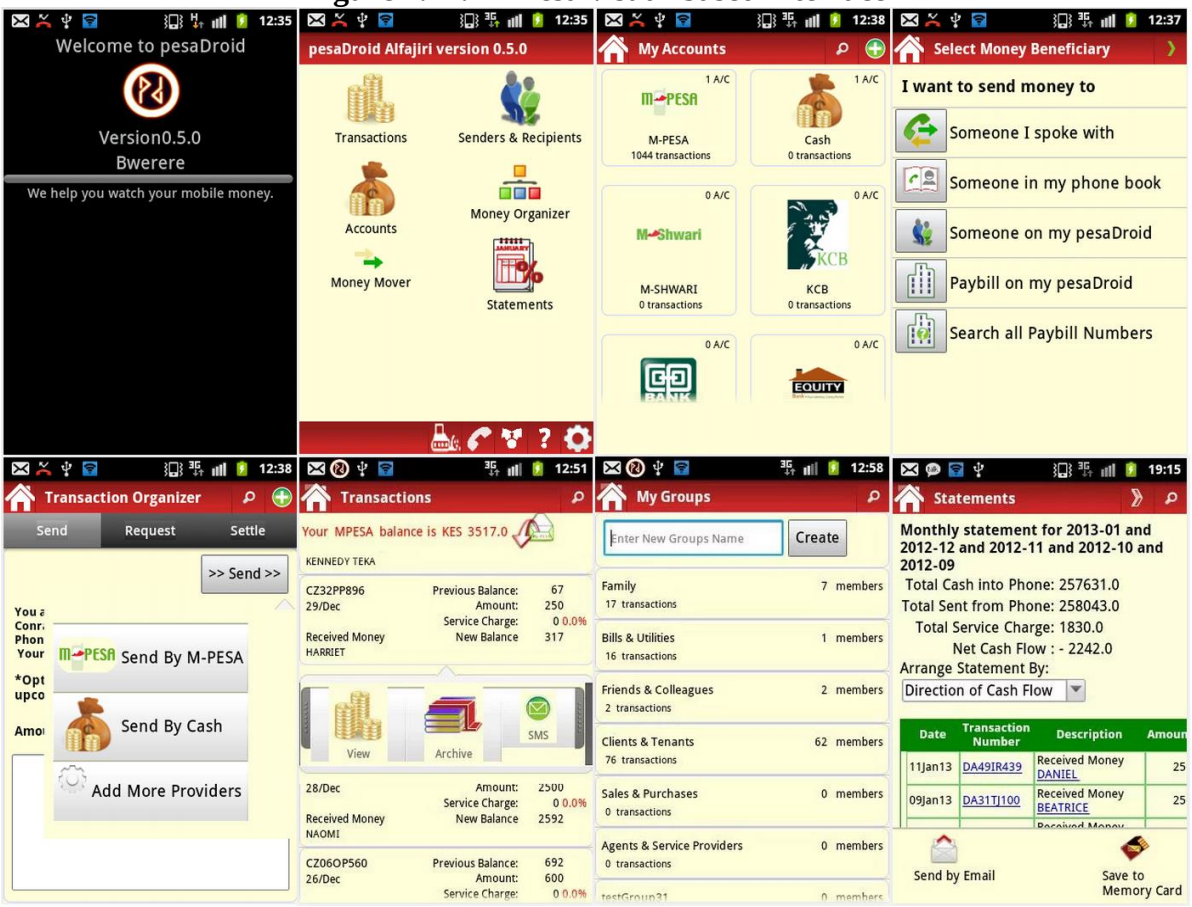
use the wallet On-device application to conduct a financial transaction directly with the service providers.

Figure 2.11: M-Pesa Main Menu for bills payment

Adopted from http://www.kenya-airways.com/

The "*payment network*" aggregates all transactions to be fulfilled in the account and service network. The key challenge in this network is to process as many transactions as possible to economise the scale of the system infrastructure invested by the providers, while link the users with more parties to conduct transactions and get linked to the banking system. The bigger the mobile money network, the more the customers are willing to use the payment network, and the service providers are encouraged to invest. On the demand side, this network usually includes producers of Fast Moving Consumer Goods (FMCGs), utility' providers, and other institutions that accept mobile payments. On the supply side, it includes non-bank service provider (mobile telecoms and/or business development company), and third party IT solution vendor.

Figure 2.12: M-Pesa visual-based interface



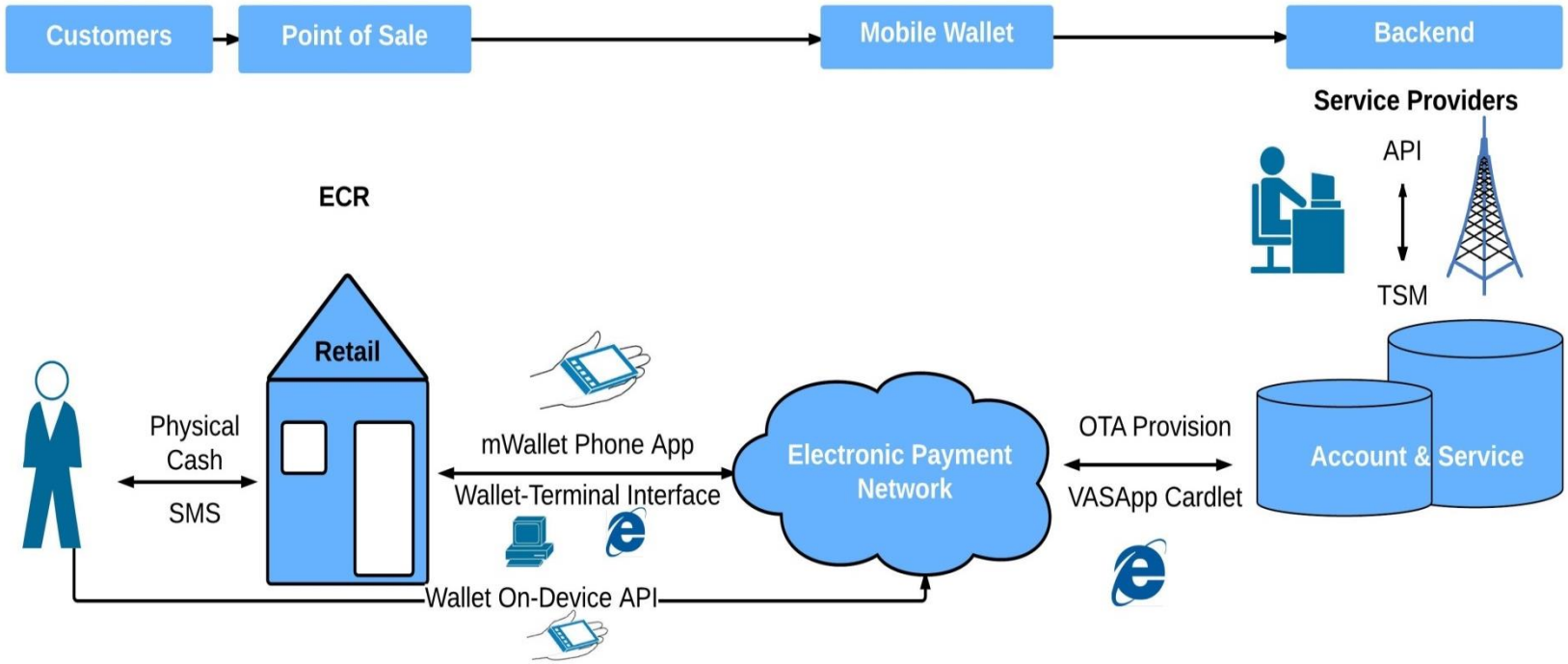
Adopted from PesaDroid App at www.play.google.com

To process customer's transactions, intermediaries use the Point-of-Sale (PoS) interfaces, including "Wallet-terminal Interface" and "mWallet Phone App". Both interfaces are standardized and downloadable for free from the service providers who periodically upgrade them to match changes and innovations in the services offered. M-Pesa for instance, replaced their "PayBill platform" or interface that was usually managed by a third party, with "Lipa Na M-Pesa platform". It makes it easier for M-Pesa intermediaries to process transactions and integrate services between the websites, mobile phones, and the wallet cloud. Intermediaries can easily enter their phone number followed by a special PIN rather than their normal agent code. Then the Lipa Na system will send two USSD message to the customer and the retailer asking them to confirm their transactions.

The last network, "*account and services platform"*, includes the software that enables real-time processing of financial data transmitted from NFC devices. It is usually designed to serve a mass customer-base and manage the accounts platform in a way that enables each user to use multiple services to satisfy his/her needs. This network is usually managed by the service providers with limited interference from IT vendors. It is also reviewed by finance and telecommunication regulators (see the stakeholders involved that explained in the literature review in section 2.7.3.2).

Data about customer's transactions gets consolidated from NFC devices and the "Wallet-Terminal Interface" through built-in VASApp Cardlet and the internet. As shown in 2.13, this network also includes Over-The-Air (OTA) provision that sends software updates to all users

Figure 2.13 : Technical Specification of Mobile Money System



API Application Programming Interface
ECR Electronic Cash Register
OTA Over the Air

POS Point of Sale
SMS Short Message Service
TSM Trusted Service Manager
VAS Value Added Service

and synchronises the information processing accordingly (see Yile & Chaskar, 2002). It assures unified configuring settings and updates the encryption icons to NFC phones (Hoffman, 2003). Then all data is fed in the Trusted Service Manager (TSM) main server where the service providers keep their database. On the server, all accounts & services get processed as a group of protocols and routines called Application Program Interface (API) (GSMA, 2012). It identifies the way that software components interact and draws the building blocks for the graphical user interface (GSMA, 2010).

The above discussion shows the multi facets of MMS including human activities (e.g. different stakeholders, conducting different transactions), human-computer interface, S-T aspect, and technical specifications. Accordingly, we can define the MMS in a more plausible way as follows:

> "MMS is an information system that stores money using the Subscriber Identity Module (SIM) in mobile devices as an identifier instead of the standard account number used in the conventional banking. The monetary value is issued by a non-bank institution (including telecoms and/or business development corporation) and monitored by financial and telecommunication regulators. This value is kept in an electronic wallet installed on the SIM within the mobile devices, while the equivalent cash value is saved in a bank. Customers (i.e. individuals and businesses) access their wallets and make e-payment for e-commerce websites and e-governmental services, and receive/transfer money from/to other customers. These transactions get processed through a network of intermediaries (retail agents and MFIs), and managed by the service providers (Telecoms, business development partners, and IT vendors)".

It is a system that includes an ultimate form of ubiquitous networks and universal devices. It is not simply an e-commerce application; rather it is a ubiquitous commerce or "u-commerce" application (Oreku, 2013). The stakeholders of this system hold different levels of authentication according to their level of authority.

2.7.3. Systematic Review of the Mobile Money Literature

The literature review is a methodological audit of the previous studies to stimulate academic research (Webster & Watson, 2002). The general field of IS, however, lacks theorisation and channels for a quality literature review (Levy & Ellis, 2006). A systematic review of the IS literature would help strengthen the explicit rigor and reproduce methods to set, evaluate, and synthesizes the existing body of scholarly work (Fink, 2005). Such a review reveals the justification of the research approach and the methods' selection, highlights the gap of knowledge, and situates the potential contribution (Hart, 1998). A high quality systematic literature review should offer deep, wide, consistent, clear, and effective analysis of the existing knowledge (Okoli & Schabram, 2010; Hart, 1998). It builds cumulative research-supported knowledge based on previous studies (Iivari, Hirschheim & Klein, 2004:314). To develop a systematic review, we need iterative cycles of inputs, processing, and outputs (Levy & Ellis, 2006). This type of review helps the researcher to engage existing debates in the body of knowledge by planning, selecting, extracting, and executing research activities[13] to produce high quality research (Okoli & Schabram, 2010). Planning and selecting resources represent the input stage, extracting and executing the analysis are the process stages, while reporting and presenting the results, and highlighting gaps represent the output stages.

During the planning stage, the researcher identifies the purpose of his/her review and identifies the databases and search protocols (key words, time scale, and type of materials) to assure it is explicit, comprehensive, and a reproducible piece of work. In the selection stage, the researcher frames his analysis and the way followed to structure and organise his review. This stage aims to improve the review practicality and make sense of the themes rising from the literature. Then, the researcher extracts the unified themes and research issues based on a justifiable theoretical lens to assure the quality of data extracted. The execution stage includes understanding and analysing the literature (manually or electronically) to build draft templates of research trends, gaps, and future directions (Di Gregario, 2000; Ridley, 2012).

Ramada-Sarasola (2012) emphasized the lack of appropriate systematic typology of the ***Mobile Money System (MMS)*** based on the relationships among the main economic agents and the possible services rendered in each transaction type. Duncombe & Boateng (2009)

[13] These stages together represent the so called "review framing" (See section 2.7.3.1).

offered a systematic review of mobile financial services in terms of the theories used, methodology, and impact assessment techniques. On the theoretical side, Duncombe referred to a candidate set of theories such as the socio-technical approach, livelihood assessment framework, and social capital (Duncombe, 2011 & 2012). While Duncombe's studies offer a well structured review, it fails to follow a clear, justifiable systematic inquiry system in the area of mobile financial services (Alampay & Bala, 2010). But again, Van Rooyen & Stewart et al. (2012) re-emphasized the lack of a systematic analysis of the role of technology in microfinance services. This quest motivated researchers such as Kent (2012), Donovan (2012), and Cernev & Diniz (2012) to offer updated reviews of the key payment models, key stakeholders, delivery challenges of mobile money and payment. Ironically, the mobile money and payment literature still lacks a systematic analysis of how to develop a MMS from a multiperspective stance. There is a missing shift from studying "*what are the factors experienced by a particular group of people*" to "*how different stakeholders see the factors they experience*". This dominant status explains factors in a causal fashion through educated guesses (hypothetical positivistic style). In contrast, our researcher highlights the key mobile money models, contexts, unified ideological visions, research methodologies, and theoretical lenses that have been adopted in the previous studies to approach different stakeholders and explore how they see challenges, uses, and sustainability features from different perspectives (TOP perspectives).

The rest of this chapter helps justify our choice of the theoretical framework (**Chapter 3**), the methodology (**Chapter 4**), the area of concern (**Chapter 5**), and the rich pictures and the CATWOE[14] analysis developed in **Chapter 6**.

2.7.3.1. Framing the Literature Review

In response to the significant call for a systematic review of the current state of knowledge concerning the mobile money and payment literature, we decided to engage with the accelerating debate of "Are we making a better world with ICTs?". Geoff Walsham started

[14] This abbreviation stands for **C**ustomers, **A**ctors, **T**ransformation process, **W**eltanschanung, **O**wners, **E**nvironmental constraints (CATWOE) as defined by Checkland & Scholes (1990).

this debate on the Journal of Information Technology, explaining the phenomenon of IS research dimensioning and what can be done to strengthen the contribution of this domain in the future information age. His debate used the ICTD (including mobile money and payment) literature as an example to explore the agenda of the IS field. He then set A unifying vision, research settings, goals and objectives, methodology, and multi-disciplinarity as main elements of his exploration. He argued that such elements will help to systematically focus more closely on the IT artifact and its sociomateriality (Orlikowski & Iacono, 2001), success versus failure (Benbasat & Zmud, 2003), diversity and cultural identities (Robey, 2003) and epistemological and methodological approaches underpinning them (Martinsons, 2011).

To employ Walsham's framework of ideas we navigated two research databases, namely, Business Resource Premier (BRP) and Google Scholar (see Appendix 1 *a-f*) to achieve the following objectives:

1) Exploring the context of MMS to identify the influential practitioners and academics (i.e. champions) who shaped the industry trends, key business models developed, key stakeholders involved in developing such systems.
2) Pinpoint the unified vision of the keystone in the MMS development process
3) Locate the appropriate research approach and methodologies and the theoretical lenses.
4) Address the key gaps in the literature, methodology, and conceptualization.
5) Identify the key challenges, uses, and sustainability features of MMS.

In doing so, we reviewed 77 journal papers, 5 books, and 150 trade publications about mobile banking (see the Table 2.11). We also consulted 70 journal papers, 4 books, 79 trade publications exploring different issues in mobile money development. According to Levy & Ellis (2006), trade publications help in pinpointing the key practitioners and boundary spanners who initiate the development of any information system (e.g. MMS). It also facilitates exploring the business models employed, and stakeholders. Overall, it identifies the problem situation and locates the practical contribution. The journal papers and academic books help addressing the research gaps and develop a statement of sufficient theoretical contribution (Ågerfalk, 2014).

Table 2.11: Literature Review Process based on Levy & Ellis (2006)

Subjects	Mobile Banking			Mobile Money		
Search Criteria	• All Text • Peer Reviewed Journal Paper • Full text • [2003-2014]	• All Text • Books/Book Chapters • [2003-2014]	•Trade Publications •PDF Full Text •Empirical Report/ Case study • [2003-2013]	• Peer Reviewed Journal Paper • Full text • [2007-2014]	• All Text • Books/Book Chapters • [2007-2014]	•Trade Publications •PDF Full Text • [2007-2014]
Business Source Premier	• 45 out of which 24 papers found relevant	• 1 out of which 1 book found relevant	620 out of which 150 found relevant[1].	• 9 papers (6 out of which found relevant)	• 1 Book Chapter	148 out of which 79 found relevant
Google Scholar	•781 out of which 53 found relevant	4 found relevant	n/a	•67 papers (64 out of which found relevant	• 3 Book chapters found relevant	n/a
Total	77	5	150	70	4	79

Our research has a time frame between 2003-2014 for mobile banking and payment literature, while it has been narrowed down 2007-2014 for mobile money literature. The cutoff point is July 2014 when the researcher had to report his final review. Both time ranges reflect the lifetime of mobile money and payment cases. All selected sources have been inserted in NVivo 10 to start developing free and tree codes to pinpoint the unified issues emerging from the literature. It is a way forward to identify the keystones for our theoretical framework in **Chapter 3** (Gilbert, 2002; Di Gregario, 2000). Using NVivo to review the literature is rare in action research and tends to improve the transparency on how the researcher conceptualises the problem situation systematically (Bazeley & Jackson, 2013). It also shows the examiner when and why the researcher has consulted the relevant literature and why he formulated the research questions this way (Bringer et al., 2004). Overall, it shows the Nicknames (or abbreviations) used to define each concept and to build the final framework for MMS development. Appendix $1_{a, b \& c}$ show initial, advanced, and final coding templates retrieved from our NVivo project.

This review is limited to studies of m-payment, mobile remittance, and microfinance services. In doing so, we employ the **TOP** perspectives to highlight the mobile money settings, the unified visions, methodologies, and conceptual lenses. As discussed earlier, TOP perspectives

help structure the system complexity and set three levels of hierarchy, namely, technical (design stage), organizational and personal (deployment stage) (Linstone, 1989). Within each level of hierarchy we can address different levels of human-machine interactions (Checkland & Poulter, 2010).

The **T** perspective addresses the functionality and efficient use of mobile technology to conduct financial services. It also addresses technical capability as a communication tool for networked business. This technical side of the literature, mostly follows the positivistic approach. Such an approach shares the causal impact of using mobile technology to enter, display, process, store, and disseminate information related to financial transactions. The **T** perspective also addresses how the MMS facilitate storing, converting, and transferring a monetary value through the NFC SIM card in light of pre-set security features.

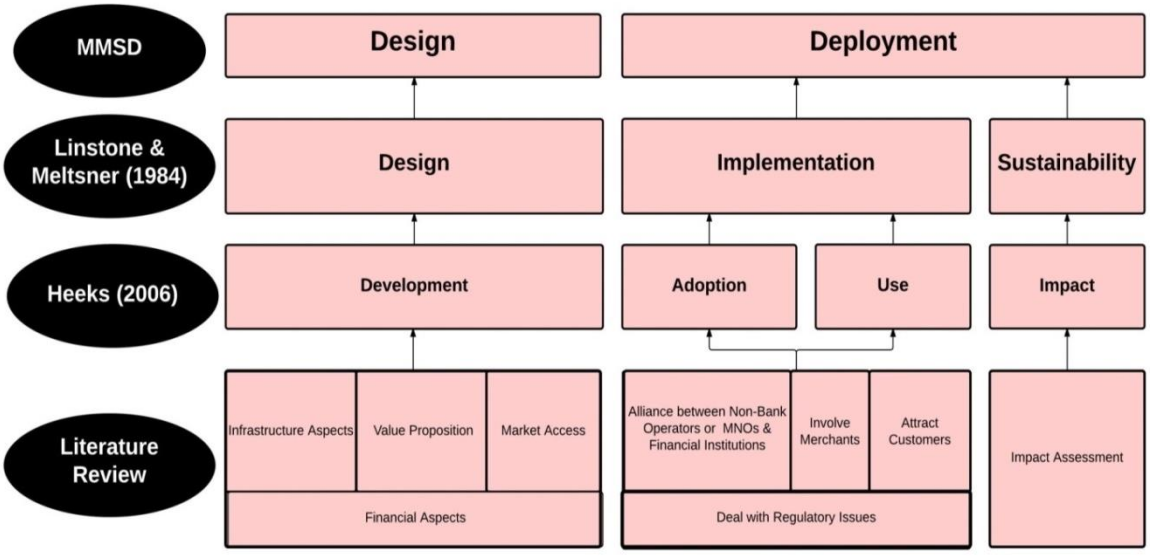
The **O** perspective covers the formal/informal relationships within three social sub-systems over the macro, meso, and micro tiers. The outer tier, macro level, includes regulators from finance and telecommunication authorities who shape the development process (Hayes & Westrup, 2012). The middle tier, meso level includes the retail agents and MFIs and intermediaries who have face-to-face interactions with the end-users. The lower tier, the micro level, explores the interaction between the individual users, intermediaries, and regulators throughout the system development process.

The **P** perspective covers how individual users utilise the mobile money system in their house holding activities and in managing their own microenterprises (Morawczynski, 2009). Each class of users has a different sectional interest that is not shared symmetrically within other classes (Linstone, 1989 & 2010).

Our discussion for the unified visions sheds light over two stages of MMS' development: system design and system deployment (see Figure 2.14). According to Linstone & Meltsner (1984), the **T** perspective helps address the design issues, while the **O&P** perspectives complement the rich picture of system deployment. Successful deployment requires a well-

planned implementation strategy and maintenance procedures that assures user satisfaction and system sustainability (Mitroff & Linstone, 1993). Heeks (2008) argued that developing ICTD project starts with a "*development stage*" in which the system developer(s) assesses the users' needs and explore the contextual factors that lead to a satisfactory design. Then the technical requirement needs to be maintained to produce what the users need during the system development. Heeks' second stage is "*the adoption and usage*" stage that investigates how the system developers ally with non-traditional partners at the BoP context to deliver the services and empower a wider usage of the system. In doing so, they try to locate market opportunities and recruit appropriate intermediaries to deliver the system to the grassroots at the BoP market. We argue that Heeks' view of the system adoption and use can be covered by the **O** perspective where stakeholders of MMS build social networks through informal and formal relationships to improve consensus and reduce adversarial languages. The final stage of Heeks' approach is "*the impact assessment stage*" where the regulators and providers measure the providers' ability to scale up and wide to improve sustainability. This last stage helps address the users' personal interests covered by the **T** perspective.

Figure 2.14: Coding the unified Visions of MMS development



As shown in the above Figure 2.14 and Appendix 1, our coding of the previous studies highlighted unified issues of system development, adoption, use, and impact. The development stage includes issues of infrastructure aspects, value proposition, market access, and financial aspects.

Concluding this section, the researcher argues that the forthcoming sections help answering the five "Ws" (i.e. Who, What, Where, When, and Why) that determine the relevant versus irrelevant literature. Overall, it answers "How" the previous studies have reached their reported conclusions and strengthens the link between the research literature and methodology. Further, it positions the research contribution along the theoretical, methodological, and practical sides.

2.7.3.2. Settings and Context

Shirin Madon explored different IS applications that target development activities (e.g. Healthcare, microcredit, digital inclusion) (Madon et al., 2009). Her expertise as an anthropologist has shown that ICT-based development projects should not be studied in isolation of its surrounding context; rather it should be interlinked to the historical development processes, policies, and the key stakeholders contributing to them. These contextual issues identify the motives of developing such projects and help build a model of governance to manage the project over time (Sen, 1999). In this section we discuss the key academics and practitioners who led the literature of mobile money and payment and identify the key dissemination channels for mobile money research, and then we explore the key stakeholders highlighted by those champions (Renken & Heeks, 2013).

2.7.3.2.1. Mobile Money Champions

Our analysis of the literature, including trade publications refers to key professionals (consultants) and academics who led the revolution of mobile money and payment systems. Those champions developed different technical, organisational and personal dimensions on the design and diffusion of MMS. Their work with international organisations such as the Vodafone Group, Gates foundation, and American banker enabled them to connect their expertise in technology advances with the needs of societies in different contexts (developing, emerging, and developed markets).

Practitioners such as Nick Hughes and Jake Kendall created M-Pesa, the raw model of MMS that was successfully replicated in other developing and developed countries. They engaged with communities in Kenya to deliver CSR projects, and uncovered a business opportunity tapping the microfinance market with mobile applications. In doing so, they crossed different organisational boundaries and extended their operations to the central bank of Kenya, Safaricom and local NGOs to build a multidimensional platform that later extended to all types of financial services.

As shown in Appendix 2a, academics such as Ignacio Mas, Olga Morawczynski, Sarasola Ramada and Kalle Lyytinen have documented the gradual transformation of mobile applications in payment and money transfer services. Top publication channels in this domain are; [CGAP/Innovations: Technology, Governance, Globalisation/ ISR/JIT/Organization/ICT4D journals].

Champions such as Nick Hughes and Bill Maurer disseminated their practical experiences in the field into highly cited academic publications that reflect how those boundary Spanners[15] bridge the design-actuality gap (Heeks, 2002). All champions found in the literature are not native African citizens, "*Can an African expert reflect a deeper view of the MMS development processes?*"; a question that stays unanswered.

The researcher aimed to develop his practical expertise in MMS through an action research project and then he published a number of papers and book chapters to reflect how he could span organisational boundaries to build an e-Masary system in Egypt (Levina & Vaast, 2005).

[15] This is a concept from the international business studies that refers to experts who crossed the road between the academic and professional domains. It refers to professionals who disseminated their practical experience in academic journals and also academics who engaged in practical projects (see Drach-Zahavy, 2011).

Lessons & Conclusions

In this section, the researcher provides a systematic record of his learning journey in reading about the system thinking approaches and their applications.

1- The contribution of the systems thinking scholars aroused from their engagement with specific areas of concern, companion thinkers, underpinning theoretical assumptions, and real case evidence.

2- SSM works both as a process and content. Our research approach follows SSM in highlighting the area of MMS development at the BoP and also ends with SSM as contents in the action case of e-Masary.

3- The multiperspectives theory compiles soft and hard system thinking to define and solve wicked problems in the area of MMS development. It offers a more contingent epistemological lens to understand the information society phenomena (e.g. MMS), than other theories of information society.

4- The Mobile Money System is a multidimensional system that cannot be developed and offered off-the-shelf. Projects like e-Masary had to be developed from scratch by boundary spanning private corporation that enhance cross-sector collaborations with government, MFIs, retail agents, FMCGs, and the low income community.

5- MMS as an information society requires a development methodology that considers both computing information systems (e.g. NFC systems or GSM system) and business systems (e.g. BoP).

CHAPTER THREE
THEORETICAL FRAMEWORK

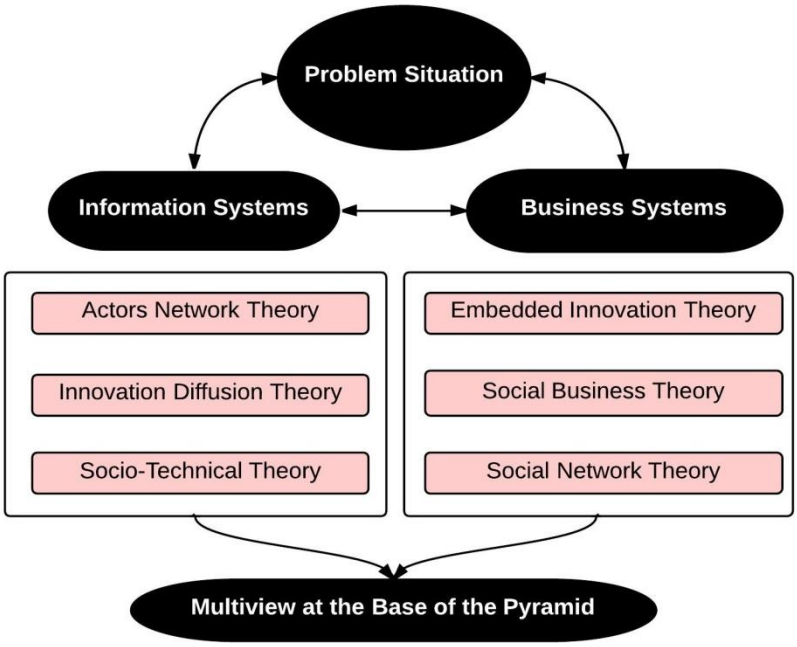
Introduction

In chapter one, we introduced the key area of concern and the key objectives and questions. Then in chapter two we conducted a systematic review of the mobile money (as an area of concern) literature to introduce a primitive conceptual frame (see **Figure 2.14**). This chapter builds a theoretical framework that tackles the complexity of MMS development through trial and error and then records our learning journey systematically (Checkland, 2000). This chapter explores different theoretical lenses adopted in the mobile money and payment literature. Two domains were rooted in this area; namely, Information Systems (***IS***) and Business Systems (***BS***) disciplines. After clarifying the ***intimacy*** between these two disciplines, we offer a critical reflection of the key candidate theoretical frameworks that could help understand the process of developing MMS at the BoP. Drawing upon them, we constructed the research problem and made sense of the data collected. Our journey book discusses each theory and justifies "*why*" or "*why not*" each of these theories was found relevant to explain our phenomenon. Based on this critical reflection, we built a ***new typology and replication features*** that could be drawn from each of these theoretical lenses to help us understanding ambiguous issues in our road map and complementing our proposed framework when needed. It was also a step forward to answer our first sub-question "***How can Multiview4 model improve our understanding of information system development at the BoP*?"**.

In the field of IS we discuss the actor-network theory (Latour, 2005), Innovation Diffusion Theory (Rogers, 2010), and Socio-Technical Theory (Trist, 1981 & Mumford, 1981). In the BS domain, we addressed Social Network Theory (Scott & Carrington, 2011), Embedded Innovation Theory (Simanis & Hart, 2009), and Social Business Theory (Yunus et al., 2010). Each has been discussed in relation to the context of a problem solving situation to offer a neutral comparison and draw replication features (Klein, 1983).

The ***structure of this chapter*** (as shown in Figure 3.1) starts with the IS & BS intimacy, followed by a thorough discussion of theories from both disciplines. In the second section, we show the origin and evolution of Multiview framework during the last two decades. At the end of this chapter, we propose Multiview framework for developing MMS at the BoP.

Figure 3.1: Structure of Chapter 3



3.1. IS & BS intimacy

The crucial objective of all information systems is to give correct and extensive support to the business of which it is a part. However, when modeling the surroundings of the information system we are no longer modeling software rather than we enter the world of business modeling (Carugati & Rossignoli, 2011). Mobile money business varies from one market to another. A successful Kenyan business model will not necessarily fit into the Middle-East or Egyptian context. Accordingly, developing IS (e.g. MMS) should align with the business logic that operates in the Egyptian context. Organizations (or business networks) that will be served by the IS have not fully matured into the form it will take, after the system operates (Avison & Wood-Harper, 1990). Typically, both of the IS and the organization will be planned to set up at the same time. This means that planning the IS takes place alongside planning the BS. In essence, developing MMS requires tackling both of the Information Systems and Business Systems (or Business Models) domains (Eriksson & Penker, 2000).

The mobile money literature (discussed in **Chapter 2**) highlighted the growing importance of the BS to reconcile the varying (and sometimes conflicting) requirements of multiple actors. It also shows the undergoing interaction between the mobile IS and BS to bank the unbanked at a boundary-less landscape such as the BoP (Al-Debei & Avison, 2010 & 2011). On the one hand this interaction helps mobile money practitioners draw their vision and understanding of the organization's business logic. On the other hand, it might help IS analysts to formally express the business system and showcase opportunities and risks from an IS perspective (Osterwalder & Pigneur, 2010). This will enable the IS analysts to fit between the 'whys' of the system to be developed and the 'whats' of the implemented system (Salinesi & Rolland, 2003).

The ***BS*** becomes a well-known – but vague – term, which can be used to understand responses to the external environment (Ghaziani &Ventresca, 2005). Researchers in banking business systems agree that a BS is a system that provides explicit or implicit novelty or differentiation (i.e. adaptation/anticipation of the new environment) (Ghaziani &Ventresca, 2005). Ikea's supply chain to distant markets with affordable prices and Nike's model of branding around the world are well documented examples of this. Shafer et al. (2005: 202) discusses the BS as a control system and design process. It is a representation of **a *firm's core logic*** and ***strategic intent of creating and capturing new value***. Such intent requires a careful design not an accidental implementation. It might be a ***structural template*** that describes the ***technical*** business requirement or ***social*** ones. Examples of the technical requirement are the basic transactions with the external constituents in the market (Zott & Amit, 2008), the financial viability (i.e. cost recovery, long-term breakeven and profit increase). Examples of the social requirements are stakeholder credibility (i.e. how the organization delivers what the key stakeholders want) and job satisfaction (Chesbrough and Rosenbloom, 2002).

Business sustainability is also a standard component of the structural template and can be addressed from both technical and social viewpoints. The sustainability BBC, for instance, can be measured by long-term asset management or stakeholder satisfaction. In the traditional banking industry, BS's sustainability relies on interest rates, securitisation, derivatives, and "marketisation of risk" (Froud et al., 2006), while outreach and user's satisfaction are the most important in mobile-based banking services (Mas & Radcliffe, 2011).

A good BS answers the questions: *Who is the customer*? *What does the customer value? How do we deliver customer value? How do we generate profit using this model?* (Magretta, 2002:3). It creates an entrepreneurial spirit by improving or transforming your organization, building new business partnerships, and by replacing the corporate old policies with innovative ones (Osterwalder & Pigneur, 2010). In the information society, BS includes the above mentioned elements combined. It reflects an abstracted map of the main arrangements for *joint architecture, operational and financial activities as well as products/services required to achieve the organizational vision* (Al-Debei, El-Haddadeh & Avison, 2008: 8).

Recent studies adopting the ***institutionalization view of technology*** found that IS is formed by policies and organizational practices. It is not just technology that can create success, but rather the way the BS of technological artifact is shaped to prompt the strategic objectives and ally them with practice (Fitzgerald, 2012). Concluding this section, we found that once the system is developed, continuous change take place and it is essential that the changed requirement and the changed system functionality continue to preserve the 'best fit'.

In the next section, we discuss different theoretical frameworks that have been brought from both of the IS & the BS disciplines to understand the process of developing mobile money and payment systems.

3.1.1. Alternative Information System Theories

3.1.1.1. Actor Network Theory (ANT)

In the original view of Latour & Woolgar (1979) ANT is a combination of the studies of science and technology as the various engineers and scientists' actions made facts and enriched knowledge from the various things that were created by them and they worked. Applying this theory to sociological studies can explain the construction of human interaction

and their relations to both technology and science. This section traces the development of ANT and its foundations.

Among pertinent ANT features are “actors (actant)”, “actor-network”, interest, translation, alignment, inscription, irreversibility, and black-boxing. Actors (actants) in general can include both human beings and non-human actors (Walsham, 1997). Actor-network is a simplified network (Hanseth & Braa, 1998), or a network of hybrid objects (Hanseth et al., 2004). For Tatnall (2003), actors are the sum of their interactions and associations with other actors and networks. Nonhuman objects are also considered actors that are powerful in establishing irreversibility or network stability and at the same time can influence the catastrophic deconstruction of the network or act as a traitor (Brooks et al., 2008).

Interest is the third feature of ANT that is considered as a force for explaining the social action and its outcomes (Callon & Law, 1982). It is also a mean of persuasion or appeals or even coercion during the enrollment of other actors (Callon & Law, 1982). It is during the creation of the network or during the process of translation that converging interests are aligned, thus creating stability and order (Hanseth & Braa, 1998).

Enrollment and translation are two interconnected pertinent features within the ANT concept. Translation is the process of aligning an actor’s diverse interests which converge into one through acceptance, thus creating truth and stability (Callon, 1986).

The alignment of interest by other actors assumes legitimacy (Whitley & Pouloudi, 2001) and power to act on behalf of the network. Stability of the network will only be achieved through the alignment of interest and continued support. In order for these ideas to be institutionalized, the interest is inscribed into material forms which are embodied in texts, machines or skills (Callon, 1986).

Developing collaborations in the mobile financial industry is a complex socio-technical phenomenon. It involves multiple stakeholders with competing interests in achieving their deliverables. ANT provides analytical clarity to the complex system (organizational)

development (Bloomfield et al., 1992), improves understanding of the design and use of technology (Hanseth et al., 2004) and also provides the opportunity to understand complex social interactions through the interpretation of social processes. ANT has been applied to the socio-technical arrangements that generate relations which come to be named ‘economic’ (for example, Muniesa et al., 2007; Caliskan & Callon 2010).

Anong & Kunovskaya (2013) examined the features and effects of mobile financial services and referred to the best practices to protect consumers in the developing context. Using ANT, the authors identified the key actors of the innovative mobile financial models in South Africa and analysed the mechanisms to deal with consumers’ disputes with providers.

Despite the aforementioned advantages of ANT, there are some concerns regarding its application. These concerns include; the problem of “symmetrical treatment of humans and nonhumans” (Amsterdamska, 1990), and “cutting the network” (Collins & Yearly, 1992). “*Symmetrical treatment of humans and nonhumans*” means treating both people and the objects of research as 'actors'. This means in our case enrolling both mobile technology and microfinance stakeholders in one list, as equally participating in the success of the collaboration in the mobile microfinance industry. In doing so, we will not be able to compare between the goals, the means and the results of enrolling such different 'allies' or eliminate differences among them (Amsterdamska, 1990).

“*Cutting of network*” is another problem concerning which actor to include and which to exclude, why to start at a certain point and why to follow some network-tracing activities rather than others (Collins & Yearley, 1992). Miller suggests that the linkages are not easily traceable and thus it is left in the hands of the researcher to select which path s/he wishes to follow and which s/he might ignore, according to the assemblages s/he wishes to chart. In this study, we found it difficult to draw boundaries around a specific list of actors and technologies in a separate network. The interactions between human and non-human actors are very complex and difficult to trace without a significant logic such as value creation and value chain (See business model theories).

3.1.1.2. Innovation diffusion theory

Our literature covered the diffusion of new technologies such as e-commerce (Campbell et al., 2013), mobile commerce (Alkhunaizan & Love, 2013), mobile payment (Schierz et al., 2010) and mobile banking (Chen, 2013; Kapoor et al., 2013). These studies consider new technologies as innovative artifacts that go through gradual diffusion steps.

> *"There is nothing more difficult to plan, more doubtful of success, nor more dangerous to manage than the creation of a new order of things. . . . Whenever his enemies have occasion to attack the innovator they do so with the passion of partisans, while the others defend him sluggishly so that the innovator and his party alike are vulnerable."*[Niccolo Machiavelli, 1910]

In 1983, Everett Rogers defined the innovation diffusion as a process of reducing uncertainties of technology adoptions. Adopters of new technologies are not usually sure about the circumstances of their decision and face different sorts of technical, institutional, and cultural challenges that make them reluctant to adopt it (Rogers, 1983; 2004). Rogers (1983) set five principles to assure the novelty (innovativeness) of the new technology over the existing ones. See Table 3.1.

Table 3.1: Principles of Innovative Technology

Principles	Definition
Relative advantage	Is the degree to which an innovation is perceived to enhance the current offering.
Compatibility	Is the extent to which an innovation is perceived to fit together with potential adopters' practices and habits.
Complexity	Refers to the degree to which an innovation is considered to be difficult and complicated to use.
Observability	Refers to the degree to which the results of an innovation are visible to others.
Trialability	Is the degree to which an innovation can be sufficiently tested.

Source: summarized from Rogers (1983)

These principles were found essential in many international studies and cover a wide variety of industries (Rogers, 1983). Chen (2013) confirms that these principles were also required to facilitate the adoption of mobile banking and payment technologies. El Sawy (1985) argued that the introduction of new technologies is usually accompanied implementation problems that need to be managed by top management. Accordingly, they need to develop an implementation strategy to a rapidly increasing number of potential users covering the overall organizational hierarchy, and for computer-based technologies which gradually multiply and change. In doing so, they need to make sure the new technologies do not tax to the existing organizational resources and do not convert the computing functions into imperialist expansions (El Sawy, 1985). In this regard, m-commerce still faces failures and their diffusion has been slow, almost absent in the most developed areas such as Europe and USA (Godoe & Hansen, 2009). Challenges found to be plausibly systematic and are related to factors that restrict building new technological regimes for m-commerce. Identifying how, why and at what rate new ideas and technology spread through a culture is the result of using the innovation diffusion theory (Rogers, 1995). Diffusion is also defined as "*a process through which innovation is communicated and disseminated through specified channels across functions and among members of a certain social system*" (Rogers, 2003). Based on this definition, Everett Rogers highlighted four stages of the Diffusion of Innovation (DOI) process; Innovation, Channels of communication, Time frame, and Social system.

The Innovation stage starts with creating a new idea, practice, or project that might be useful for individuals or a social group. The novelty of such innovation is based on three criteria (knowledge, persuasion, and decision) (Sahin, 2006). Innovation knowledge "*is an attempt by individuals to know what the innovation is and how and why it works*" (Rogers, 2010: 21). Three sorts of knowledge, usually arise; Awareness-Knowledge, How-to-Knowledge, and Principles-Knowledge (Sahin, 2006: 16).

Building ***Communication Channels*** is the second stage in which participants tend "*to create and share information with one another in order to reach a mutual understanding"* (Rogers, 2010: 5). Such communication takes place via channels connecting between individuals or institutions who originate a message. These channels (e.g. mass media or interpersonal

communication) are means through which a message gets transformed from the sender to the receiver" (Rogers, 2010: 204).

Time management is the third stage during which innovation leaders maintain the time spent on diffusing innovation, categorizing innovation adopters, and rating the level of adoption (Rogers, 2010). Once this critical element is managed, DOI will be highly successful.

Social System is the last stage in which "a set of interrelated units jointly engage in the problem solving situation to achieve a commonly accepted goal" (Rogers, 2010: 23). This affirms the mutual effect between the innovative artifacts and the social system in which they diffuse (Castells, 1996). This two way impact is conditioned by the structure of the social system. The structure in this case can be defined as "the patterned arrangements of the social units in a system" (Rogers, 2010: 24). Then we can deduce that the individuals' innovativeness is conditioned by the nature of their relationships in their community and the way they are categorized among it (Ceci & Iubatti, 2012).

In 2002, Rogers developed a new concept called "preventive innovation". It explains how adopters of innovation can "avoid unwanted consequences at some future time" (Rogers, 2002: 991). Such precautions might not be recognized in the short term, but rather delay in time and becomes relatively intangible and even a positive impact is not guaranteed. For Rogers (2002: 992), there is a set of strategies (see Table 3.2) that need to be followed to speed up the diffusion via preventive innovations.

Mahmood et al. (2012) examined the relationship between technology diffusion and improvements in business value for SMEs who first start their e-commerce websites. The authors found a strong correlation between the "*Online System Quality and Effectiveness*" in one side and "*the Perceived Business Value*" on the other side. Earlier Au & Kauffman (2008) found that early adopters of technology (e.g. ICTs) usually perceive more benefits than late adopters. The reason is that early adopters have a competitive advantage of using the new technology.

Others, such as Beattya et al (2001) have a wider view of the IT diffusion process in corporations by exploring different intra-organizational factors. Their assumption was that the institutional environment (including subunit) is homogenous and collectively performs to achieve a common goal.

Table 3.2: Diffusion of Innovation Steps

1)	Identifying the purpose of and perceived outcomes from the preventive innovation.
2)	Promoting the preventive actions using champions (e.g. individuals with personal influence over social groups). For instance, in the branchless banking community leaders and heads of local NGOs can be considered as appropriate champions to promote the service and improve people's trust (Mohamad & Wood-Harper, 2013).
3)	Gradual reengineering of the system and its norms according to the agreed preventive innovations with peer support.
4)	Using education aids and entertainment facilities to promote preventive innovations.
5)	Activating the peer-to-peer networks to assure the gradual brainstorming of preventive ideas among members of social groups. In branchless banking, for instance, this might require a monthly video conference and periodical meetings with operators and retail agents to train them how to manage technical problems and liquidity shortages (Mas, 2009).

This assumption neglects the variety of norms and values between wide disparate organizations work in the networked information society (Castells, 2011), rather defines the inter-organizational environment as a technical single face of reality. Such a view conflicts with the existing and future drivers of the world that is global and hyper-connected and imposes rapid change in the technological artifacts (Al Gore, 2013).

The evidence shows, however, that stakeholders of technology adoption (including consumers, corporate buyers, selling intermediaries and government agencies) do not always reach a consensus about the value of technological innovations.

3.1.1.3. Socio-Technical Approaches (STS)

Eason (2011) and Orlikowski (2010) conducted statistical surveys of the recent socio-technical approaches in the top IS journals. However, they failed to catch the same essence Fok et al. (1987) achieved from a comprehensive comparison between seminal socio-technical approaches (such as Bostrom and Heinen,1977; Mumford, 1983; and Pava, 1983) based on criteria like practical evidence, assumptions about organization, joint optimization, assumption about people, autonomous work group, and methods in use.

Following their trail, we offer a more flexible and inclusive review of the highly cited socio-technical frameworks in the area of mobile money and payment literature and in IS generally. In doing so, we refer to the "Process Model", "Structure", "Researcher Involvement", "Primary goals", and "Published IS examples" as criteria of comparison between the S-T approaches shown in Table 3.3:

Table 3.3: S-T approaches of ISD

• Tavistock Institute.
• Effective Technical and Human Implementation of Computer Systems (ETHICS).
• Pava (1983 & 1986)
• Bostrom (1977 & 1983)
• Social Informatics (Kling & Scacchi, 1982).
• Punctuated Socio-technical Process Model (Lyytinen & Newman, 2008).
• Discourse ethics (Mingers & Walsham, 2010).
• Sociomateriality (Orlikowski & Scott, 2008).

Process Model: S-T studies can follow three different process models that action researchers usually follow; an iterative process model, a reflective process model, a linear process model (Baskerville and Wood-Harper, 1998). The "*iterative model*" relies on the iteration and repetition of problem diagnosing and performing solutions as a way to build learning and achieve research objectives. The "*reflective model*" aims to compare between what we know from theory and what we found in the actual experiment. While the first approach builds knowledge by comparing action cycles, the second compares between theory-in-use and grounded theory. The third model is the "*linear model*" that flow as a water drop from engaging the situation, diagnosing the problem, unfreezing the situation, re-engineering, re-freezing, and disengage.

Structure: S-T studies take two extreme structures or a mix of both. The first is the "*waterfall structure*" that includes straightforward planned research activities following rigid cycles or a limited number of scenarios. The second is the "*agile structure*" where research activities flow, simultaneity or in an undefined time space.

Researcher involvement: S-T studies need to draw boundaries between the researcher/analyst subjective and objective reflection (Schwarz et al., 2014). In doing so, three forms of intervention can be followed; collaborative, facilitative, and expert/consultant involvement (Baskerville & Wood-Harper, 1998). The "*collaborative involvement*" requires an even contribution of both the analysts and the major stakeholders in the research process to develop a shared vision. In this form, the analyst might take a pragmatic (objective/subjective) position to objectively interpret the actors' views and subjectively entwine his own view of the ISD as a key actor. The "*facilitative involvement*" means a clear boundary between the analyst and stakeholders' responsibility for the problem situation. While analyst cooperates in defining the problem situation and potential exits, the stakeholders carry the burden of implementing the appropriate promising solution. In this form, the analyst takes an external position and objectively interprets the stakeholders' views of the problem and potential solutions. The "*expert involvement*" draws the analyst as a consultant who is in charge of solving the problem, despite the willing cooperation of the stakeholders. In this form, the researcher identifies the time and the degree of his/her involvement according to the context. However, this framework of analysis is not supposed to be fully comprehensive and could envisage a number of additional features.

Primary goals: the S-T studies progress to fulfill three types of objectives; organizational development, system development, building scientific knowledge or training. "*Developing an organizational system*" requires profound improvement in the human organization (i.e. the regular patterns of community interaction). In the information society, organizational development is a process of creating innovative communication channels to include the disenfranchised social group in the community's social interaction process. Consequently, new opportunities for expression will be created; given the levels of trust and confidentiality this medium offers (Castells, 1996). Examples of these opportunities are creating new information content, better information flow, structural efficiency and effectiveness, or

innovative services. "*System development*" includes setting-up or restructuring the structural artifacts (i.e. computer systems) based on which the organizational system performs routine tasks (Baskerville, De Marco & Spagnoletti, 2013). This goal includes system design, deployment, and implementation. "*Building scientific knowledge*" is another goal of S-T studies where researchers aim to build a deep generalizable understanding of the phenomenon to fill theoretical or practical gaps. "*Training*" is another goal that reflects an individual learning journey a researcher might have.

3.1.1.3.1. Tavistock Institute

The S-T system started with the Tavistock Institute (London), a group of social psychologists, who led the post-war reconstruction of the mining industry in Yorkshire (Ramage, 2009). The Institute's work has been influenced by Melanie Klein's psychoanalysis. Two action research projects led the group's seminal work. The first project aimed to deeply understand group relations among all levels in a single private engineering company. The second project aimed to explore the impact of diffusing innovative work practices and organizational arrangements that did not require major capital expenditure but gave promise of raising productivity. Overall, the Institute's members succeeded to transform the "*technological paradigm"* in which engineers design whatever organization the technology seemed to require (Davis, 1966), to the "*socio-technical paradigm*" in which "people cost" and the "technological artifacts" are separated and evaluated based on their economic performance and employee job satisfaction (Trist, 1981).

In Australia, Fred Emery also emphasized that the S-T is an emerging paradigm of work that requires a particular mix of S-T elements shown in Table 3.4.

Cummings & Markus (1979) emphasized that these principles aim to create A *socio-plus-technological whole* that must adapt to its environment to be sustainable (Cummings & Markus, 1979). Fok et al. (1987) explains that socio-plus-technological whole as a mix of two joint sub-systems; the *Social System*, which includes humans performing negotiable organizational tasks motivated by their attitudes, skills, and values. They build relationships among themselves and enact their roles, laws, reward systems, authority, and communication

structures to function their organization. The main concern in this sub-system is to improve the humans job satisfaction and quality of work life by empowering fair psychological job criteria and promoting mutual commitment and high performance (Fok et al., 1987). The *Technical System* is the other tier of the whole that addresses the necessary process, tasks, and technology that transforms input into potential output. In doing so, it tends to capture deviations between the expected and the actual activities before, during, and after the conversion process as a step forward to narrow down the gap and meet the target.

Table 3.4: Emery's principles of the S-T design

- A *work system,* including a set of interrelated activities to function the organization rather than decomposable single tasks.
- A *work group* that leads the individual jobholders.
- The *Internal regulations* to be negotiated and agreed by the group members rather than to be forced by the external individuals (e.g. Supervisors).
- The *redundancy of functions* (in the design process) to replace the severance of parts in order to develop multiple skills in the individual and improve the group performance.
- Individuals act *complementary* to the machines.
- Increasing variety for the individuals and organizations to increase of decentralization rather than the traditional bureaucratic mode.

Summarized from Emery (1967 & 1978)

The S-T approach considers humans as complementary to machines rather than an extension (Emery and Trist, 1973). This means human's judgement is core to improve job design and machine use. Hence, it creates a variety of functions which not only improves the humans' satisfaction, but also improves their ability to adapt to the external environment (Pava, 1983).

The contribution of the Tavistock Institute to the socio-technical approach has been summarized into nine rules by Chren (1976), Clegg (2000), and recently by Baxter & Sommerville (2011) as shown in Table 3.5.

Table 3.5 shows, however, that this approach follows a *waterfall/linear process* as explained by Chren & Emery. It has a closed loop and ends to the start point, but the *idea of iteration* was essential to proceed from a stage to another. This process requires that the researcher acts

as an *external observer* or a facilitator who identify the tools that the actors can use to improve the problem situation (Pava, 1989). A limited intervention from the researcher would be attempted to close the socio-plus-technological whole. Tavistock's work aimed to develop an organizational system that improves the quality of the work place.

Table 3.5: The Contribution of the Tavistock Institute

1) Compatibility between the design process and objectives must be maintained. For instance, participatory design and prototyping are best followed when the objective is to create a participative social system.

2) The minimum technical resources and specification have to be set, so the design team needs to follow them. Then they have a great deal of flexibility to perform that task in various ways (as stated in principle 4 that is written below).

3) The boundaries between the technical system and the social system need to be clarified to highlight the gaps, trace their origin, and narrow them down if elimination is difficult. Examples of these gaps can be quality of raw materials, actions in the crisis time, or machine failure. Once gaps are closed, less supervision and control will be required.

4) Multifanctionality needs to be maintained in both humans and machines to increase the agility and adaptation to the dynamic or the turbulent environment of the 20th century. Instead of following a job specification mechanically, organic ways of performing functions using available resources can be adopted. In other words, organizations can improve their efficiency by "equifinality" among different methods that lead to the same goal (Chern, 1976).

5) Boundary location and grouping of both people and machines in terms of technology, territory, and time. Technology-based grouping can be achieved by putting similar machines on separate divisions to perform the same function such as Milling and Grinding functions. Time-based grouping takes place when we put a set of machines that complement each other and cover a full product line in one place. Locating switchboard operators in the same location is an example of territory-based grouping. This final type is more common in the information society where outsourcing and foreign direct investment exist in specific places rich with natural resources or labour force (Al Gore, 2013).

6) Information system is mainly designed to offer the necessary information flow among people to guide their actions. The computing system should have the capacity to provide the whole organization with detailed routines and practices of decision making.

7) The system of social support and motivation should be congruent with and reinforce the behaviour of the organizational structure. For instance, organizations structured based on group or team work, does not align with individual systems for selection, training, conflict resolution, work evaluation, resource allocation, or compensation systems.

8) The organizational design should offer a sense of responsibility, task variety, involvement, social support and growth to assure a high quality of workplace environments.

9) The system design is an iterative and endless process. When a stage reaches to a closure a new stage reveals itself, until we go back to the starting point. After each stage is implemented the multifunctional team evaluate and review it and indicate to a necessary redesign.

The next approach developed by Enid Mumford builds upon the strengths of Tavistock's approach, but extends the role of the researcher, increases the stakeholders' participation and serves other objectives than organizational system development.

3.1.1.3.2. ETHICS

Mumford (1981) emphasizes that technology is flexible enough to provide humans with solutions to their social problems rather than having them adapted to the technology and its determined features. Enid Mumford is one of the champions of the socio-technical approach who had a five decade career developing critical research and the ETHICS methodology in IS. ETHICS stands for "*Effective Technical and Human Implementation of Computer Systems*" that encompasses job design as part of the systems planning and implementation efforts.

In 1968, Mumford co-authored a 'liveware' oriented book, "Computers: Planning for People", that offered a new socio-technical lens of computer systems in contrast to the engineering orientations that dominated management science at that time (Mumford & Ward, 1968). The book offered a typology of integrated approaches to computer planning and revealed the fact that computer technologists are change actors rather than merely designers or implementers of electronic data processing systems (Elbanna & Newman, 2013).

Mumford had been inspired by David Hums's thesis of "*experimental morality*" and dedicated her life to change reality and promote emancipation in the work environment (Stahl, 2007). She believed that S-T design offers a view of what comprises quality of working life and morality at work. It enables flatter hierarchies, multi-skilling and group decision-taking, which in turn improves organizational innovation, human freedom, democracy and creativity, and brings justice to people (Mumford, 2003: 262). Harvey (1990) referred to class, gender, race, and power as the main issues of emancipation not only in the work environment, but in daily life practices. These issues have been strongly considered by Mumford's work on the ETHICS oriented STS design (Mumford, 2003).

Wood-Harper (1989: 56) describes the ETHICS approach as a process of diagnosing, setting, developing, choosing, and designing. Diagnosing economic and social needs and highlighting

their challenges through a systematic analysis of the short and long-term job satisfaction. Setting economic objectives to improve the efficiency of the work system and identifying social objectives to improve work effectiveness; developing a set of alternative design approaches and the necessary procedures required for achieving the pre-set objectives; choosing the optimal approach the reconcile both of the economic and social objectives; and finally designing the information system in detail.

Mumford founded the "*participative approach*" in technology design. Successful change in technology design requires not only a long term plan, but also unfreezing the current structures of the work situation, a conversion to the desired ones, and the refreezing of this structure in the desired form (Mumford, 1999). The participative approach of STS requires collaboration between different organizational stakeholders where an appropriate employment environment exists. Accordingly, it was not widely accepted in the UK, where the relationship between employers and employees is traditionally more conservative in comparison to Scandinavian and other western countries (Mumford, 2003). This participative approach in IS improves the chance for achieving humanistic missions (Mumford, 2006). This is why she engaged in the action research methodology that is commonly known as changing the situation by progressively solving problems through collective efforts (Reason & Bradbury, 2001).

In 2006, Mumford conducted a historical study tracing the evolution of STS since the 1960s. During its first ten years, the STS approach witnessed improved working practices and mutual agreements between workers and management. Later between the 1980s and 2000s a harsher economic climate and the emergence of ICTs shifted the socio-technical approach to lean production, downsizing and cost cutting in a global economy. She also set future scenarios where STS might return in a different semblance to humanize the expected impact of technology in the work environment where unstoppable organizational and economic changes are the norm (Mumford, 2006). Her view suggests intertwining heterogeneous stakeholders, including non-humans that together contributed to the shaping of ETHICS approach. These elements reflect multidisciplines that later changed and dissolved. More recently, a few attempts aimed to restore the ETHICS approach, and hence the method is in decline.

Elbanna & Newman (2013:2) adopted the vascular system of science to critically evaluate Mumford's contribution to the STS. Latour (1999) set five interconnected loops for this system: *Mobilization* of the world artifacts (as instruments), *Autunomisation* of human actors to build community, *Alliances* (strong collaborations and partnerships with other communities), *Public Representation* (engaging social debate), and *Triangulated Conceptual Elements.*

Mobilization is concerned with the way the analyst collects his/her data and locates the key information resources to fully understand the phenomenon of concern. It enables the analyst to control the problem situation and grants him/her the authority and assurance to advance the argument to both of the academic and the practice communities. Applying this lens to our discussion of Mumford's view[16], we found that Mumford as an industrial practitioner could uncover more information about job satisfaction after long-time engaging in the mining industry studying job design. After more time aiming to develop evaluation mechanisms to the employees' job satisfaction, she discovered that introducing computer tasks (e.g. data entry and perpetual reporting) to the mining workers added burden, wasted their time and decreased their efficiency. Adding these tedious tasks to the job design reduces the employees' job enrichment, job enlargement, and in turn decreases their job satisfaction. She then argued that tailoring an appropriate computer system to employees' social needs and the overall functional logic would improve job satisfaction. This gradual approach to build knowledge enabled Mumford to *mobilize* the traditional job design set by the Tavistock Institute to her research quest to evaluate job satisfaction and improve workplace conditions. She then published a series of papers showing her action research applying ETHICS. In addition, she exchanged with colleagues, students, and practitioners some videos for interviews conducted with project members in her cases and questionnaires allocated to know about their S-T needs. This evidence and resources of knowledge helped her convince academics and practitioners and *autonomies* an ETHICS community in highly recognizable events such as the IFIP TC9 and the IFIP, WG 8.2 Colloquium (Mohamed, Wood-harper & Ramlogan, August 2014).

[16] Further discussion of Mumford's view of ISD is found in Chapter two.

Mumford succeeded to build extensive networks of allies in business and academia. After World War II, she joined businesses and trade unions and also led a movement for workers' rights protection in Britain and Europe. Performing this role, she introduced her new approach as a tool for achieving successful transformation for projects that could leverage the integration between technology capability and human tasks to have effective business performance rather than an efficient one. Documenting this era was published in an empirical report (see Mumford, 1985). In academia, Mumford succeeded to publish with mainstream scholars in the change management and strategy science, such as Andrew Pettigrew and Karen Legge (see Mumford & Pettigrew, 1975; Legge & Mumford, 1978).

In addition, Mumford launched a social campaign (or *public presentation*) to increase the awareness for work humanization and effective management through her membership in the Quality of Working Life Council. The campaign included executives and volunteers from India, USA, and Australia to spread the message through workshops, training programmes, and published books. The last loop works as a central knot integrating the four loops together. While, the ETHICS evolved as a participatory approach, it has been improved through a series of action research cases, recommended by the academic community, endorsed by allies from the trade unions and employees' movements, and approved by the wider international community.

Stahl (2007) criticizes the ETHICS approach as lacking a strong grounding in ethical theory and failing to undertake meta-ethical reflection (Stahl, 2007). Ellen Christiansen has another view and argues that ethics arises from practice and validity increases as the analyst interacts with the phenomenon and participants. Her view is based on Aristotle's critical philosophy of "mimesis" that explains how the analyst and participants follow imitative representation of their own experience in the participatory design and in turn collaboratively develop ethical positions (Christiansen, 2014).

Also, Avison (2006) claims that Mumford's realization of technology as a tool for achieving humanistic mission (e.g. Workers' satisfaction) was merely conceptual and she did not develop new forms of technology which might require different forms of social organization. She did not draw on the rich alternative views of technology offered by discourses in science

and technology studies, social shaping of technology, critical theory of technology, actor-network theory, and others. Instead, she black-boxed technology and assumed that existing and available technology was neutral to her aims. The participative activities of ETHICS were found costly and time consuming and also add to the complexity of the development process. Stahl adopted the ETHICS approach in his innovative research cases, and found that participation hinders radical innovation because users, customers and other stakeholders may not be able to relate to a technology that they are completely unfamiliar with (Stahl, 2014).

The above discussion shows that the ETHICS approach follows an *iterative process* model and *agile structure* where research activities flow, simultaneously or in undefined time space. Mumford's approach has been developed as *system development* and *training* methods to be performed by a *collaborative* researcher who invests effort in engaging with participants to improve users' satisfaction and empowerment.

3.1.1.3.3. Pava Methodology

The third method we discussed in the S-T approach has been developed by Calvin Pava (1983a, 1983b, 1986). Pava began research in the S-T design methods in the late 1970s, when advanced computerized information systems replaced the mechanical office technologies. His contribution has started by mapping the advances made to the S-T approach since the early 1950s. He pointed to the areas of economic development (Trist, 1976), clerical work (Emery & Trist, 1971), temporary project team (Emery & Thorsroud, 1976) and education reform (Emery, 1982).

In mobile money, the back-office functions within the MFIs and retailers are still mechanic. Service providers also keep parallel mechanical and traditional computerized IS in the accounting division to improve security and save a back-up record of transactions. Software design and social networking with borrowers are also examples for back-office work or the so called "*white-collar*", professional "*knowledge-work*" (Wastell & White, 2014). In order to capture the full utility of such technology, Pava's view can help develop a more appropriate system other than the above mentioned S-T approaches. He adapted the STS theory to

develop several new methods to guide information systems design in a variety of routine, non-routine (i.e. emergent), and mixed office tasks. He argued that the above mentioned S-T approaches can help analyze routine office work, but the non-routine office work requires a new analytic method that tackles the non-sequential free-flowing work. While the routine office work can be developed by following a waterfall sequential process with one step inexorably following the previous one, the non-routine office work requires an iterative process, because it embeds *multiple concurrent conversion processes, non-routine conversion flow, vocational separatism, and highly qualified manpower* (Pava, 1983b, 1986). An example of this conversion is the rotation among many tasks at the same time. In this environment, it becomes difficult for system analysts to map the variations in either technical roles or the psychological job criteria to be able to control them. Closing gaps (i.e. solving a problem) with non-routine office work is nonlinear, complex, uncertain, and follows disjoint patterns. It is more a zigzag process that requires *highly trained workers who possess the unique expertise and a high degree of job empowerment.*

In order to develop a computing system for both the non-routine as well as the routine office work, Pava added extra two concepts to Tavistock's approach; ***deliberation*** and ***discretionary coalitions***. The former refers to a reflective and communicative behaviour concerning a particular emergent work problem. Such behaviour encompasses mechanisms of exchange and communication through which a network of individuals (or discretionary coalitions) interacts to decrease the equivocality of a problematic issue (Pava, 1983b: 58). In software development, for instance, deliberation addresses issues of systems minimum requirements and specification. With mobile money systems, this could help with "*the system response and maintenance at peak time where the mobile wallet faces non-standards overload*". In social work, the assessment of "*how mobile money improves the borrowers' assets building capacity, or training needs*", can be explained using Pava's approach. The later, discretionary coalitions is the network of individuals who reconcile their conflicting interests and make trade-offs for the sake of shared strategic objectives.

Maheshwari et al. (2012) discussed Pava's approach as a S-T methodology followed by 192 software development teams around the globe. They emphasised two key steps that teams followed to develop software during the last ten years; technical analysis and social analysis. During the technical analysis, the development teams identify the deliberations, investigate the organizational context in which they happen to draw a stakeholder map. Then

deliberations get analysed and information pinpointed. During the social analysis, teams prepare a task audit that identifies the humans' interaction and briefs the essential values and needs of each party. In summary, Pava's methodology optimizes the co-design of the deliberations (technical system) and the role networks (social system) (Wastell & White, 2014).

The above mentioned discussion shows that Pava follows a linear structure to analyze the routine office work and iterative structure for non-routine ones. Then he compares and contrasts between them in a ***reflective process*** to compromise peoples' interest in the non-routine office control of the overall system behaviour. Pava's approach serves as a methodology for ***system development*** as well as ***staff training***. His approach assumes a ***joint participation and responsibility*** between users and researcher to optimize the system's S-T outputs.

This approach offers a less comprehensive analysis of the social intervention in the technology's design and development. It also concerns more the internal process of the technical change, while dropping the effect of the external environment and the strategic change in the S-T system. Accordingly, we discuss Bostrom and Heninen's approach that offers the most comprehensive analysis of the social system.

3.1.1.3.4. Bostrom's Methodology:

The fourth S-T approach being reviewed was developed by Robert Bostrom and Stephen Heinen. In the mid-1970s, Bostrom & Heinen investigated the key reasons for IS failures when they found that systems designers possess inadequate frames of reference (Bostrom & Heinen, 1977a). To fix these inadequate frames of reference and avoid their consequential conditions Bostrom and Heinen (1977b) and Bostrom (1983) offer a framework of system design. It is a step by step guide, which explains the process to the system designers and practitioners and helps them improve the user's quality of work life. Three phases have been offered as shown in Table 3.6. This guide has been suggested as a "newspaper" that be circulated within and across departments (Lu & Ramamurthy, 2011).

Unlike the aforementioned approaches, this framework offers the most comprehensive analysis of the social system in terms of internal and external antecedent conditions. Bostrom also added four dimensions to the social system analysis: "*individual needs and abilities*, *internal work system characteristics*, *external environment*, and *support systems for the work system"* (Fok et al., 1987: 328). He emphasises addressing the individual social needs to increase the job satisfaction and quality of working life.

Table 3.6: Bostrom's Three Phases Framework

Phase 1: Strategic design phase:
The purpose is to explicitly define the design goals and responsibility. System boundaries, interaction, and problems are identified. The issues of user participation and responsibility, organizational climate, and business mission or goals are considered by a steering committee and a design team composed of people from various job levels and viewpoints.
Phase 2: Socio-Technical System Design Process:
The design team needs to perform an extensive diagnosis of the technical and the social systems. A list of technical and social goals is obtained which later serves as criteria for evaluating the systems alternatives. Possible options are generated and examined for their contribution to the joint optimization of both social technical goals. These design procedures are concerned with the product aspect of design (i.e. The S-T system). However, the success of the information system change also depends on the process aspect (i.e., The change process itself).
Phase 3: Ongoing Management Process:
The new system is constantly examined against the list of goals that it needs to meet. If problems are found, adjustments may have to be made by going back to previous phases.

Summarized from Bostrom & Heinen (1977a: 14-15).

Bostrom assumes that workers are willing to contribute to the organizational goals and acquire new skills. Workers also have the capability to master their environment. Because of the assumptions and goals mentioned above, a new design concept evolves *autonomous work groups* (Cummings, 1978).

This approach is another systematic analysis of both social and technical systems, where system designers strive for joint optimization of both systems. It follows a *linear process* (three consecutive steps) to analyze both systems, but follows a *waterfall process* as explained in the three phases discussed above. The role of the researcher is usually *reflective*,

but can be *collaborative* if more authority can be negotiated with the system owners and the top management. Finally, it is concerned with *developing the organizational system* and *system design*.

3.1.1.3.5. Social Informatics:

Rob Kling was a renovator who reoriented the socio-technical view into a key stream called "Social informatics". Kling's focuses on a number of "big" ideas – "*multiple points of view*", "*social choices*", "*the production lattice*" (and its corollary, the problematization of the user), "*socio-technical interaction networks*", and "*institutional truth regimes*" (Ramage. et al., 2009). Kling sees computing development as a complex social object constrained by its context, infrastructure, and history (Horton et al., 2005: 69).

Using four theoretical perspectives (e.g. Rational, Structural, Interactionist, and Organizational politics) and empirical case studies from the workplace, Kling offered twelve propositions for the S-T approach (see Table 3.7).

.

In their seminal work, Kling & Scacchi (1982) developed the web/discrete entity model as a valid construct for analyzing the social context within which system development operates. This model offers strategies to develop four theoretical perspectives into effect.

The "*formal rational*" is the first viewpoint that discusses the organizational structure and hierarchy of the formal decision making process as a set of systematic regulated processes (extreme reductionist thought) (Wood-Harper & Wood, 2005: 29). The "*structural perspective*" is the second perspective which highlights the formal subunits that shape each information situation and draws a communication map between them. The "*interactionist perspective*" is the third perspective that shows the flow of information resources across the organizational boundaries and among interest groups. The final viewpoint is the "*organizational politics*" which explain the network of powers within and between different organizations and how they reconcile varying objectives.

Bill, Herb & Neil (1988: 1269) adopted Kling's principles to develop the layered behavioral model aiming to analyze large software systems through a detailed exploration of the humans' behavioral process. They argued that the role of humans is still generated by humans themselves rather than by machines.

Table 3.7: The Twelve Propositions of the Social Informatics Approach

1	Computer based service is specialized
2	History of commitments constrains choice
3	Narrow incentives and opportunities motivate choice
4	Macrostructural patterns influence local computing
5	Computing systems evolve through fitting and packaging
6	Adoption is selective
7	Innovation is continuous rather than discrete
8	Costs are often underestimated and economic payoffs overestimated
9	Different technical arrangements reflect political and social value choices as well as 'technical rationality'
10	Weak infrastructure often impoverishes the quality of computer-based services and systems actually provided
11	The infrastructure of computing services is often unevenly developed in organizations. The quality of infrastructure will also vary across organizations, across applications within an organization and across modes of computer use
12	Outcomes of computer use and strategies for computing management are context-sensitive

Adopted from Kling & Scacchi (1982, pp.39-40)

This layered model explores the behaviour of those creating the artifact, rather than on the evolutionary behaviour of the artifact through its developmental stages. It helps explore the psychological, social, and organizational processes of productivity and quality in developing IS. Above all, it sets the individual, team, project, and company as frames in his analysis.

Kling's web-based system relies on the SSM as a tool to institutionalize the critical thinking as proposed by Habermas (see **Chapter 2 & 4**). In doing so, it considers the Social Shaping of Technology (SST) where human innovation delivers new technologies that reflect their social needs (Mackenzie & Wajcman, 1985). SST explores the *dual relationship between people and technology*, and how different social groups and individuals recognize problems in the development of technology. Society is not only dependent on technology, but also shapes technology.

Kling's approach has been recently adopted in exploring the social challenges facing knowledge workers adopting wireless technologies in a nomadic work environment (Kling 2007; Singh & Wood-Harper, 2010). The study reached to five problem areas facing these workers: "work and life balance, addiction, organizational involvement, nomadic work and control, and individual productivity" (Singh & Wood-Harper, 2010: 143). After discussing these problems using various elements of S-T design, the authors called for better role boundary management, self-discipline, work negotiation, and e-mail communication skills as the main requirement for the knowledge workers to manage their nomadic work. Singh & Wood-Harper's study contributed to theory by suggesting new socio-technical principles that facilitate nomadic work by empowering workers to accommodate their work preferences and life situation as well as by improving their participation in the development of various work policies and systems in the organization (Singh & Wood-Harper, 2010: 155).

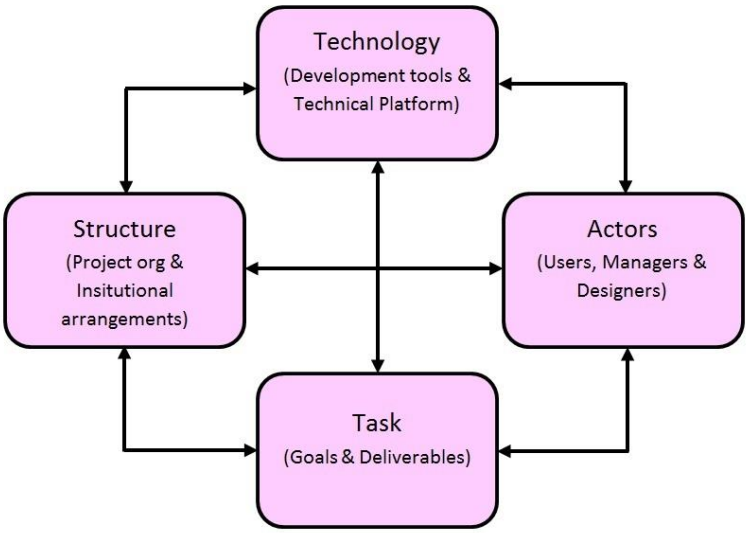
3.1.1.3.6. Punctuated Socio-technical Process Model

The factor analysis, structural equation modelling were the dominant approaches used to identify the key success and failure factors of IS implementation until the early nineties (Lyytinen, 1987; Kanter & Walsh, 2004). Despite the valuable insight that these hard methodologies provided to map the cause-effect in the IS implementation settings and answer "*what are the factors*", they found them limited to understand "*how the outcomes are shaped in different settings*". In their attempt to fill this gap, Newman & Robey (1992) triangulated between Leavitt's socio-technical change model of (1964), the social process model (Newman & Robey, 1992) and the punctuated equilibrium model (Eldredge & Gould, 1972) to develop the so called "*Punctuated Sociotechnical IS Change Process Model*" (PSIC). The new model tends to understand the S-T change in the implementation process and opens the black boxes in the social change activities by exploring the related antecedent conditions to the project outcomes (Newman & Zhu, 2007).

On one side, Harold Leavitt developed a diamond shape model to understand the varying equilibriums between structure, technology, actors, and task and how they provide different outputs (Leavitt, 1964). This model has been brought from organizational psychology and then has been heavily adopted in the change management, the strategic management, and later in S-T studies of IS (Schein, 1996; Pan et al. 2006). On the other side, "the punctuated

equilibrium theory", helps explore how technological development arises from a trend of incremental improvements over time. It also addresses the short radical innovation incidents in long-term ISD projects (Loch & Huberman, 1999). The punctuated equilibrium was first drawn from biology into IS literature by Tushman & Anderson (1986). Lining both sides, the social process model explains the outcomes of IS implementation and relates them to the incremental and the radical changes in the whole implementation process (Newman & Robey 1992; Lyytinen & Newman, 2008; Lyytinen, Newman & Al-Muharfi, 2009). It helps to conceptualize the system change as a series of incidents that represent periods of stability and instability within inter and outer contexts (Pettigrew & Whipp, 1991; Lyytinen & Newman, 2008).

Figure 3.2: Levitt's Socio-Technical model



Adopted from Lyytinen & Newman (2008: 594)

The system internal layer reflects the deep structure, including the key elements into which its units will be arranged. Humans in the system follow this structure to perform specific activities (tasks) in patterns and principles of interaction that will maintain the system. In doing so, they use the artifacts (e.g. technologies) to perform these activities. According to Levitt's hard methodology, these four components of the S-T are strongly correlated and maintain the system overall stability. Positive outcomes and reference to best practices improve the persistence of the system owners to keep the same deep structure and reinforce it

as a current structure for the activity patterns. Consequently, the system internal layer remains stable in their original status inherited from history (see Figure 3.2).

The system change proceeds into three levels, namely, work system, building,and organizational system (Lyytinen & Newman, 2008: 592). The "*building system*" includes the four elements and clarifies all resources and daily procedures required to perform the change and identify the risks (e.g. uncertainty, ambiguity, and complexity) in reaching the change objectives.

The "*work system*" is a map of information requirements to perform the key S-T activities in response to the external social, economic, political, regulatory, and competitive context (Davenport, 2013). The "*organizational system*" is the middle layer that includes events concerning system capacity, actors' authority, culture, and politics that affect the building system.

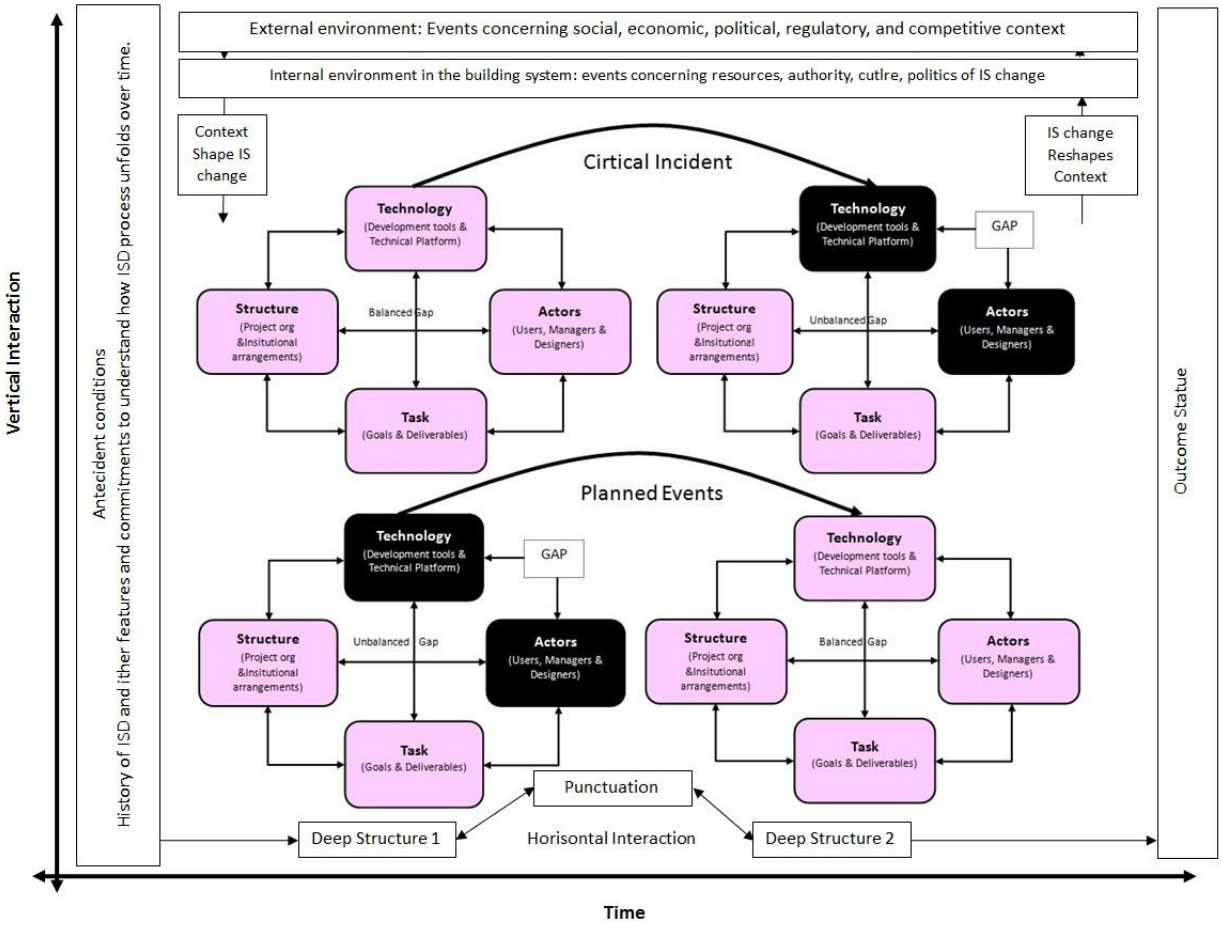
Change events in the work or the organizational systems such as financial crises, people redundancy, lack of top management support, technical system failure cause unplanned change in four components of the building system. In turn, they create a gap(s) where the system becomes unbalanced (see Figure 3.3). These changes take place during critical incidents (events) that transform the system status and decrease or increase its performance. As gaps expand and close, perturbations dialect (or progress) through alternative behavioral laws (Hegel, 1969; Marx, 1973) that Lyytinen & Newman called punctuated system change.

The S-T system can misalign at each system level, which results in multiple change levels and outcomes. Lyytinen & Newman (2008) see IS change as a set of heterogeneous and somewhat haphazard vacillations that seek to de-stabilize, establish, or maintain balance at any of the above mentioned levels in a way that matches the surrounding environment.

These perturbations take either "*incremental*" tone or a "*punctual*" one. The first reflects how the components of the S-T system adapt to the critical incidents, but within the inherited deep

structure. The second describes how a system structure gets reformed and its composition rules reset. The incremental change takes place when unexpected turbulences affect the system's components, while the punctuated change follows a planned misalignment to improve the nature of the system. The way the system responds in both scenarios depends on the system texture, composition rules, and history, which needs to be flexible to maintain the system sustainability.

Figure 3.3: Punctuated Sociotechnical IS Change Process Model



Revised version of Lyytinen & Newman (2008: 598)

In a number of industries it is also observed that long periods of incremental improvement tend to be interrupted by short periods of radical innovation (Abernathy & Utterback, 1978). Based on the above discussion, we found that the PSIC consider different inputs to the ISD process, how they shape multiple changes in the system deep structure, and highlight the system outcomes that reshape the surrounding context. It also considers the time dimension

and the degree of cohesion (vertical integrations in the deep structure), based on which the system punctuates to the environment. The PSIC model offers a realistic device to understand the proprieties, dynamics, and role of different critical incidents in the ISD context to uncover their significance, and to organize them into "why" or "how" elucidations. In doing so, visual maps are used as holistic techniques to offer a toolkit describing those events, their sequences, gaps, contents, system levels, interventions and punctuations.

One of the key limitations to the PSIC is that it requires an iterative research approach such as longitudinal and grounded theory strategies (Lyytinen & Newman, 2008). The ad hoc approach, for instance, cannot evaluate the feasibility of the temporal balance between four elements of information system development: technology, task, people, and structure (Aziz, Lyytinen & Newman, 2011; Lyytinen & Newman, 2014). Accordingly, the researchers revised the original model into planned and punctuated changes to clarify the iteration process and emphasise that both changes can take place at different modules of the system in different divisions or different functions.

3.1.1.3.7. Discourse Ethics

An ethical act is one that holds intrinsic rightness and right consequences (Ulrich, 2008). The deliberation of the ethical aspects in business is credited to Adam Smith (1759) who used his Moral Sentiments theory as grounds to justify the moral nature of human action in the and its effect on the nations' wealth creation (Smith, 2008).

Ethics are important for IS professionals (Wood-Harper et al., 1996; Damianides, 2005; Chang et al., 2008) and academics (Brey, 2000; Capurro, 2008). The Sarbanes-Oxley Act (SOX), the United States federal law governing the ethical conduct of all American public organizations had a direct effect on the work of IS professionals (Chang et al., 2008). The Association for Information Systems (AIS), a premier international association for IS academics, formed a special interest group in year 2012 to implement an ethical agenda and work as a pressure group influencing academic and other organizations (Hirschheim & Klein, 2012).

Smith & Hasnas (1999) conducted a literature review covering the era of the 1990s to highlight the main positions in IS ethics (e.g. stockholder, stakeholder, and social contract). They found a theoretical gap as to how to deal with these positions *"whether as managers, IS professionals or academic researchers, we ignore these ethical dilemmas and their theoretical assessment at the risk of our own community's credibility"* (Smith & Hasnas, 1999: 125). Wood-Harper et al., (1996) pointed to the existence of multiple ethical perspectives on the part of the analyst, the organization, the rulers, the stakeholders, and the world society. Each party has different interests and meanings of good IS. However, these interests vary and sometimes conflict. The traditional systems development methodologies failed to address such conflicts among the individual, organizational, and societal perspectives. Walsham (2006) built upon the ethical discourse in business and argued that IS research needs to track not only how IS behave, but also how it affects the human subjects involved. He then suggested that the generally accepted ethical principles set by Beauchamp & Childress (2001) have to underpin IS development and implementation. These principles are non-maleficence (not harmful), beneficence (providing some benefit), autonomy (respecting the individual in terms of gaining informed consent, confidentiality, no deception), and justice (fair to all especially minorities) (Beauchamp & Childress, 2001).

The IS literature refers to two predominant ethical approaches deontology and consequentialism each of which has a degree of variety within it (see Mingers & Walsham, 2010; Mason & Simmons, 2014).

Deontology is a normative ethical position that judges the morality of an act based on the act itself not its consequences. There are two approaches for deontology; the Kantian ethics and contractarian ethics. The former concerns the individual act, whereas the latter addresses the process of making consensus and social contracting among all concerned with this action. Kant argues that some humans think of their actions as a hypothetical scenario in which they behave responding to some particular circumstances, while others have categorical thinking in which they follow common sense and universal laws (Guyer, 2006).

This categorical thinking leads humans to improve their concern about each other and the public solidarity (Kant, 1991). In fact, the Kantian approach is grounded on the rationality

principle and accordingly similar critiques. The first was raised by Baron et al. (1997) who questioned humans' ability to use rationality as the ultimate foundation of moral behaviour. He exemplified his criticism by the wide and growing differences between humans in their religions, beliefs and feelings. The second contestation was raised by Hursthouse (1999) who argued that categorical approaches cannot help ordering these differences and conflicts among humans' norms and duties. It gives no guidance as to how people should choose one imperative over the other (Hursthouse, 1999).

Contractarianism is the second type of deontology in which actors set a group of rules that could govern their collective act (within society). These rules derive their normative force from the idea of contract or mutual agreement (Cudd, 2013). This approach has two fundamental elements "the state of nature" developed by the modern political philosophers and "Rawlsian theory of justice" initialized by John Rawls. The latter element reflects the embryonic situation where no agreement has been reached among individuals. In such a situation, when individuals lack knowledge of their own personal characteristics or the position they hold in the society, they cannot choose a set of rules that is fair to all (Rawls, 1971). Advocates of modern Contractarianism such as Nozick criticized the Rawlsian theory of over concerning itself with the redistribution of resources (Nozick, 1974). Habermasians might also see a defect on presumed wide commonality of agreement across communities (Leeper, 1996).

Examples of business theories that follow the contractarian ethics are theories of corporate agency, stakeholder theories, and theories of neoliberal capitalism (Nicholson & Sahay, 2009; Minger & Walsham, 2010). The agency theory, for instance, discusses how the corporate board as agents behave in a way that is legitimate to different stakeholders. Pushing such a theory into management studies gave an ironic anti-ethical view of academics and professionals (Ghoshal, 2005).

Consequentialism concerns itself with actions that maximize the overall good or minimize the overall harm (Laudon, 1995). Bentham built upon the work of David Hume and Adam Smith to develop the concept of consequentialism to utilitarianism. He argued that an ethical act is more about improving human happiness and social goodness. Measuring the degree of

goodness that results of human action define its ethicality (Bentham, 1948). Mill (2002) extended this view of goodness from the materialistic view (pleasure of the body) to intellectuality, creativity, and spirituality. Habermas (1993) explains consequentialism as the process of raising pragmatic or purposeful questions about the best ways to achieve pre-set goals. How to get rich? How to get promoted? Answering such questions is challenging and requires information, expertise, and resources. In this case, actions' ethicality is judged based on their effects and consequences, but only in the self-interests of the actor(s) concerned (Habermas, 1991). Critiques for consequentialism have been reported by Mingers & Walsham (2010) as follows: First, it is difficult to predict all possible consequences, especially in the long-run. Second, there is no unified form of utility based on which we can identify the maximum impact (i.e. the greatest good). Third, it is found elusory to identify the degree of actor's premeditation and awareness of unforeseen results. Finally, maximizing the greatest good for the majority of humans involved risks injustice for the minority people and disenfranchises them from the community and its resources.

In business, the consequentialism ethics have been adopted by the Bowen (1953) who called the private businesses to utilize their power and capacity to alleviate society' misery and improve their well-being. Instrumentalists like Friedman and Jensen have been inspired by the approach resulted in developing the stockholders' wealth maximization principle (Friedman, 1970; Jensen & Sandström, 2002: İyigün, 2014). Later, consequentialism depended on competitive advantage strategies (Prahalad & Hammond, 2002; Porter, 2011).

In his widely debatable commentary, Walsham (2012) emphasized that the IS discipline is responsible for making a better world and not be content with (mere) contributions to knowledge. He criticized the traditional view of IS that focused on helping organizations use ICTs effectively than on how they make a better world with ICTs. His future view of IS discipline adopts an ethical orientation using ICTs and addresses who benefits and who is disenfranchised. This trend extends the ICTs beneficiaries beyond the formal sectors and the economically well off to the poorest poor or the so called "bottom of the pyramid" (Prahalad Hart, 2002).

For decades, the IS literature discussed different office systems, ERP systems and web-enabled systems. However, implementing these systems proved to have selfish, uncaring, business-for-profit view while neglecting their ethical implications (Avison, 2012a). The main focus was about ERP's component modules, their integration, how they relate to the supply chain, their implementation and their potential efficiency gains for the firm. In doing so, the negative impact of such systems on the people's quality of life has been neglected.

3.1.1.3.8. Sociomateriality

During the last five years, the term "Sociomateriality" has emerged as a complementary and sometimes as a synonym to the Socio-technical conceptualization. This concept was vague until Orlikowski (2007) investigated this phenomenon to understand the entanglement of the social and the material artifacts (e.g. technology, managerial technologies, devices, cognitive schemes, and symbols) in everyday life. Orlikowski & Scott (2008) examined the presence of technology in organizational life through a desk analysis of 100 articles published in the top management journals between 1997 & 2006. Following Kling's web/discrete entity model the authors classified the presence of technology into "*discrete entities*" and "*mutually dependent ensembles*" as key streams of technology in the working life (see Table 3.8). The former treats technology as a catalyst of the organizational processes, but myopias how all organizational practices and relations inherits technological/material intervention. In this sense, technology is considered as a distinct organizational phenomenon rather than an integral part of all organizational processes, activities, and events. It also sees "humans/actors" and "technology/objects" as primarily self-contained entities that interact (Orlikowski & Scott, 2008). The latter stream focuses more on the agencies of both humans and technology how they fuse with each other to achieve daily routines, processes and objectives. *"Humans and technologies have no inherent properties, but acquire forms, attributes, and capabilities through their interpretation"* (Orlikowski & Scott, 2008: 456). This study concluded that technology, work, and organizational life should be conceptualized mutually independent and a multiple view of technology development in work environment is essential.

The second wave of Sociomateriality tackled the social-materiality dichotomy by focusing on the practices within organizations (Mitev & Howcroft, 2011; Gaskin et al., 2015). These practices are not only shaped by, but also create, material and social dynamics (Lyytinen & Damsgaard, 2011). In this sense, Sociomateriality is defined as the relationships between the human rules, the IT artifacts, and practices. The third wave highlighted the issue of time that mediates the relationship between human rules, IT artifacts and practices (De Vaujany et al., 2013). Both of these waves have been influenced by ANT by Latour (2005) and the time dimensions by Pickering (1995). Leonardi (2013) argues that material as physical form (or digital materials in particular) is shaped by humans.

Table 3.8: Two Streams of Research on Technology and Organizations

	Research Stream I	Research Stream II
Ontological Priority	Discrete Entities	Mutually Dependent Ensembles
Primary Mechanisms	Impact; Moderation	Interaction; Affordance
Logical Structure	Variance	Process
Key Concepts	Technological Imperative Contingency	Social Constructivism Structuration
View of Social and Technical Worlds	Humans/organizations and technology are assumed to be discrete, independent entities with inherent characteristics	Humans/organizations and technology are assumed to be interdependent systems that shape each other through ongoing interaction
Examples	Blau et al. (1976) Huber (1990) Aiman-Smith & Green (2002)	Barley (1986) Prasad (1993) Boudreau & Robey (2005)

Adopted from Orlikowski & Scott (2008: 438)

Selecting which material, its format, and the way it functions is decided by someone. However, full control is notional because humans do so within the constraints of an organization's formal structure. Leonardi & Kallinikos (2012) used the lens of organizational theories to explain the way organizations adapt to the pressures of the surrounding environment. In doing so, they followed the "*Holism versus Atomism*" principles of the GST, discussed in chapter two, to discuss the micro and the macro levels of the organizational context. The authors argue that the micro-level environment, including (*composition of the social groups who construct the artifacts, the processes through which an artifacts reaches a*

Table 3.9: Comparison between different seminal S-T approaches of ISD

S-T Frameworks	Process Model *(Iterative/ Reflective/ Linear)*	Structure *(Waterfall/ Agile)*	Typical Involvement of the researcher *(Collaborative, Facilitative, Expert)*	Primary goals *(Organizational Development, System Development, Building Knowledge, Training)*	Published IS examples
Tavistock Institute (Standard)	Linear	Waterfall	Facilitative	System & Organizational Development	Davis (1966), Trist (1981), Emery (1967 & 1978), Emery and Trist (1973), Cummings and Markus (1979)
ETHICS	Iterative	Agile	Collaborative & Expert	System & Organizational Development	Mumford (1981), (Mumford, 2003), Avison (2006), (Stahl, 2007 & 2014), Elbanna & Newman, 2013), Christiansen, (2014)
Pava	*Reflective*	Waterfall for routine office work. Iterative for non-routine office work.	Facilitative	System Development & Training	Pava (1983 a&b), Pava (1986), Maheshwari et.al (2012), (Wastell & White, 2014).
Bostrom	Linear	Waterfall	Collaborative	Organizational & System design	Bostrom & Heinen (1977a&b), Cummings (1978) Bostrom (1983), Fok et.al (1987), Lu & Ramamurthy (2011).
Social Informatics	Iterative	Agile	Collaborative	System & Organizational Development	Kling & Scacchi (1982, pp.39-40) Bell (1996) Kling (2007)
PSIC	Reflective	Waterfall	Facilitative	System & Organizational Development	Newman and Robey (1992), Lyytinen & Newman (2006 & 2008), and Aziz, Lyytinen & Newman (2011).
Discourse ethics	Reflective	waterfall	Facilitative & Collaborative	Scientific knowledge	Ulrich (2008), Walsham (2006) & Mingers and Walsham, 2010
Sociomateriality	iterative	Agile	Collaborative & Expert	System Development	Orlikowski (2007), Orlikowski & Scott (2008), Leonardi & Kallinikos (2012), Leonardi (2013)

point of stabilization and closure, and *the structure of the technological frames shared by designers*) react to the pressures of the macro-level environment (Leonardi, 2013). Accordingly, both technology and organizations are social as well as material. To analyze "technology" we need to study the artifacts and the people interacting with it and around it, while analyzing "Organization" means studying people interacting with each other and the artifacts that enable/disable their interaction.

We argue that studying the Sociomateriality nature of ISD embeds "*what*" as well as "*how*" questions that require an inclusive theory and a mix of research methods, which have not yet been offered.

3.1.1.3.9. Adequacy of STS to the current research

Amongst several IS theories, the *S-T theory* provides a comprehensive and a structured view of how different stakeholders' organizations should work within the organization (i.e. the *social system*) while using different technologies such as: mobile and web technologies. (i.e. the *technical system*) (see Table 3.9 that compares between different S-T approaches of ISD). The concepts behind the theory are useful for this study as it covers both social and technical aspects within the organization (i.e. in our case, the use of mobile technologies in the financial inclusion industry can be seen as a technical system; while the network of different stakeholder organizations that are using the mobile wallet system can be referred as a social system) (Duncombe & Boateng, 2009; Maurer, 2012). From the "*ethics perspective*", STS can be used to propose suggestions to the organization (i.e. mobile telecoms, MFIs and government) to make proper use of technology or to improve the current use of technology (i.e. mobile technologies) while considering the social factors (i.e. how people behave with the use of these latest technologies within the organization) (Mumford, 2006). From "*Walsham's ethics approach*" the STS help explore how effective organizations use MMS to make a better world (e.g. social inclusion and women empowerment) (Mingers & Walsham, 2010; Walsham, 2012). Overall, Mumford's approach offers underpinning assumptions that the interests of different stakeholders can be reconciled, which means bringing economic and

moral benefits together with the service users. These assumptions are consistent with the new capitalism and the main argument of the BoP business approach (Prahalad, 2009).

Since, the basic concept of socio-technical theory fulfils the requirements of current research; therefore, it is further considered to analyze the research findings and to propose suggestions to the mobile money and the microfinance sector in Egypt in order to make proper use of mobile technologies and the mobile wallet system. Furthermore, the concepts of the theory are also useful to the second research question "*What are the benefits of MMS in the Egyptian base of the pyramid market?*"

The STS, however, would not be completely appropriate for our research in respect of the mobile technology design. The mobile wallet cannot be programmed by stakeholders as it is controlled by vendors (in this case "*Sybase"* and "*Razy Mobile solutions"*[17]). Neither of Masary.Co nor their partners can design even a module of the system without the consent and support of the external vendor. Therefore, this theory cannot be utilized as it is unable to address the complete research domain.

3.1.2.Alternative Business System Theories

3.1.2.1. Embedded Innovation

This concept started when Erik Simanis & Stuart Hart set a protocol of a best-practice for the BoP in 2004. It was an action research project at the Centre for Sustainable Global Enterprise at Cornell University's Johnson School of Management (Simanis & Hart, 2008). This manual discusses a second generation of the BoP (BoP2.0) through bottom-up business co-creation instead of the early top-down version suggested by Prahalad & Hart (1999). The protocol revived the word "Bottom" that refers to the bottom of the socio-economic pyramid that is

[17] "Sybase", one of SAP companies, that is dedicated for mobile commerce solution such as m-Banking, m-Payment, m-Remittance. "Razy" is local mobile solutions company and that is owned by Masary's Chief Communication Officer (CCO).

targeted by MNCs to get them out of poverty to the word "Base" that reflects the co-venturing of upward development.

Aiming to contrast between the BoP1.0 and the BoP2.0, Simanis & Hart (2009) introduced the idea of "***business intimacy***" that creates two extremes for corporate innovation strategy; "***the Structural Innovation Paradigm***" (SIP) Vs "***Embedded Innovation Paradigm***" (EIP).

Business intimacy is a sort of relationship in which the interest of a community is merged with that of a company. This shared interest is a co-constructed vision of a better life and community built around a new business. Accomplishing such a vision is tangled with the business's success that relies on the mutual responsibility between the company and community for the new enterprise. Building this intimacy requires innovative ways to understand the business value than to follow the traditional way of searching the customer needs or to mass-customize outputs to match individual tastes. It is about co-creating a new community from the ground up, with the company rooted in its base (Simanis & Hart, 2009).

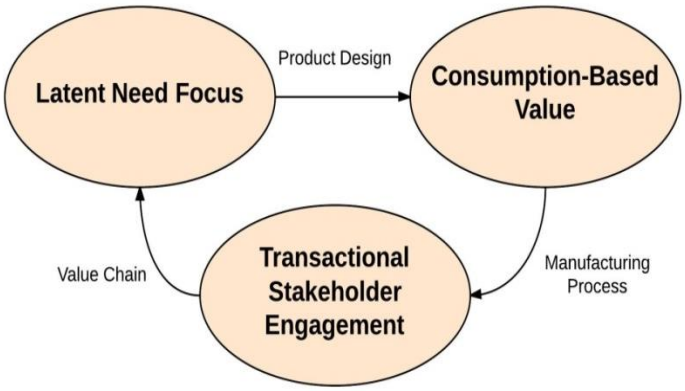
In traditional ways, companies consider relationships as transactions and deal with people and the environment as factors of production. The whole ecological system is treated as a resource of raw materials. Improving people's welfare means a market opportunity and huge demand. To fill this market gap companies conduct sophisticated forms of consumer research, business re-engineering and scientific management.

According to Simanis & Hart (2009), this old approach is called Structural Innovation Paradigm. SIP is an incremental, radical or architectural change that a company makes to its business system to solve customer's problems "better, faster and cheaper" than competitors (Simanis & Hart, 2009).

Figure 3.4 shows the three building blocks of SIP. The first is the *latent need focus* in which the company develops solutions (new products and/or services) to match up with society's unmet basic needs. However, identifying these latent needs is difficult even for the consumers themselves with different cultural and psychological factors that have to be considered. Tackling all these issues requires an ethnographic account that despite the cost and time needed, provides a rich snapshot about the behaviour of targeted consumer groups in relation to its context.

"Google Wallet", for instance, delivers a variety of mobile payment services for individual users, merchants, and companies. In doing so, Google follows the "push" approach to promote their free services to the existing mobile users, while covering their operating expenses from commercials. The risk behind this business system is the single-sided interpretation of the consumer needs that Google creates. The company relies either on their R&D divisions or the community elites to know about the customer's needs. This one way interpretation limits innovation and underestimates the power of grassroots knowledge to come up with the correct solutions (London & Anupindi, 2011).

Figure 3.4: Structural Innovation Paradigm



Adopted from Simanis & Hart (2009: 79)

The second building block is "*consumption-centric value"* via which the company maintains its value chain (i.e. network of the company's operations) to deliver a balance of fair quality

and fair price for products/services. According to Porter (2011), this balance can be achieved by following cost leadership or differentiation strategies. While the former relies on finding innovative ways to improve the operational efficiency, the latter relies on the R&D and marketing activities to deliver the same core components but with different images and social value.

Google Wallet, offers two types of services; "*same-day offers*" that enable users to purchase products/services already available in their area at a discounted price, and another service called "Nearby offers" that lists the "Eat and Play" deals provided by other registered nearby shops and show them through Google mapping. In addition to these two services, Google Wallet offers a platform for major payment credit and debit cards such as Visa, MasterCard, American Express, and Discover. To deliver these services efficiently, Google partnered with Citibank to issue the electronic value, with MasterCard as payment network, with Sprint as a mobile operator. The critique that still rising to Google Wallet is "What does it offer that is new to the community?".

The third building block is the "*transactional stakeholder engagement*" that aims to get the stakeholders' feedback about knowledge, resources, and capabilities, based on what the company delivers in their products/ services. This first loop feedback helps identify the following elements shown Table 3.10.

Google Wallet considers one way feedback from their major stakeholders. Citibank's executives offer feedback about the quality of the financial packages, companies such as "Sprint, TNS and Neustar" follow up the technical issues (e.g. service speed), and "First data" is responsible for reporting the efficiency level of the point of sale system. Samsung is also one of the key stakeholders that give feedback about required updates for the mobile handset. Above all, Google merchants such as American Eagle Outfitters and Foot Locker give feedback about customer satisfaction and operating problems (Handa, Maheshwari & Saraf, 2011).

Table 3.10: Cornerstones of the Transactional Stakeholder Engagement

Knowledge Gap: "how to improve the fit between customer's functionality and the delivered value".
Resource Gap: What resources (both tangible and intangible) that can be used to improve this fit. Tangible resources like cutting-edge technology,or networks of intermediaries who promote the product/service. Intangible elements such as corporate culture, trust, security can be also identified at this stage.
Capability Gap: What capabilities (both internal and external) need to maintained to improve the fit. Internal capabilities can be an efficient supply chain or qualified customer service team, while external capabilities can be public relations with government and business partners.

A key critique directed to the SIP is the disembodiment of the delivered value from the indigenous social values and the BoP environment (Arora & Romijn, 2012). In this case, disenfranchised communities become an economic target and the indigenous market becomes a stock of raw materials. It also catalyzes the community's reliance on the MNCs and hinders all efforts toward shared commitment.

The Embeded Innovation Paradigm (EIP) is the other extreme of business intimacy, where a community of diverse institutions and individuals collaborate to create and sustain interdependent lives (Simanis & Hart, 2009). This inclusive community makes up the so called third generation corporation (Hart, 2011_b). Unlike the SIP this paradigm starts with exploring potential forms of business enterprise and market (i.e. *Latent Potential Focus*). The role of MNCs is not to replicate their business model to the developing countries, but to create an ever-expanding range of socioeconomic opportunities for the community and involve them to manage and experiment these opportunities (Altenburg, 2009).

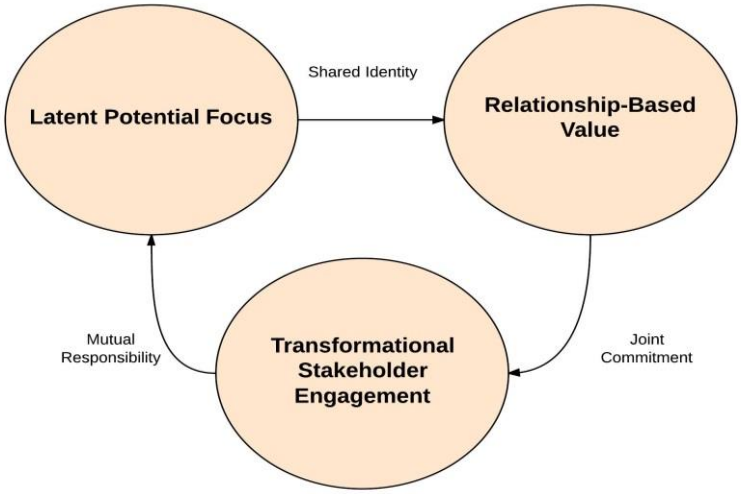
M-Pesa, for instance, is the largest non-bank mobile money and payment service that was created by the local Kenyan mobile operator "Safaricom" to bank 90% of the population who have lived for long isolated from the banking system. The story started in 2002 when GAMOS Research Institute and the commonwealth telecommunications organization launched Safaricom, engaged the airtime market in Sub-Saharan Africa and found that the

accelerating airtime credit transfer among Africans can be exchanged by e-money transfer. Later, the Department of International Development UK (DFID) proposed a project to Vodafone's head for CSR, Nick Hugese. The early aim of the project was to allow the microfinance clients to borrow and repay loans using the retail network of Safaricom to save their transportation expenses and reduce the labour costs for the MFIs. This shows a diversified service that mobile telecoms offer to capture the potential benefits of the branchless banking.

The company teamed with the largest Tanzanian mobile operator, Vodacom, to create a platform that allows individual users to upload, download, and transfer cash using their mobile devices. Using their national ID or passport, users could be linked to the formal economy, a potential that had been lost (Hughes & Lonie, 2007).

The second building block for the EIP is to create "*Relationship-Based Value*". During this stage, sustainable corporations aim to build strong ties with individuals, organizations, places, and resources (the BoP context) to build a shared understanding of the unmet needs and create aspirations. Once the MNC becomes a member of the community they get a sense of the problem and have a different vision of business value. Then they proceed in a dialogue with the community and build the so called dominant logic (Prahalad & Bettis, 1986). Next they formalise long-term partnerships to cover the market need and scale-up or wide.

Figure 3.5: Embedded Innovation Paradigm



Adopted from Simanis & Hart (2009: 82)

The M-Pesa system was an extended version of students' software development. Beside partnering with universities, Safaricim engaged with the villagers who used to work in the cities while travelling back to pay for their family's living (e.g. food, shelter, and education). This was not intended for M-Pesa, rather it was a new service developed by the villagers.

Hughes & Lonie (2007) explained another side of partnership with local groceries and other retailers who work in a win-win deal. They take almost 3% out of the transaction cost, while promoting the service to the Kenyan slums and widen the footprint. In 2004, Vodafone purchased 40% of M-PESA's shares in exchange of secure and fast technical services.

Another clear example of this is Airtel in Ghana who engaged with the retail agents across the country to facilitate customer's access to electronic cash through e-top-up, e-payment of bills and money transfer among villagers. As said by Donald Gwira, the Head of Corporate Communications and External Affairs of Airtel Ghana " *We also have more than two thousand (2000) Airtel Money dealers, ensuring the widest availability of Airtel Money throughout Ghana*" (BusinessGhana, 16th April 2014). To scale-wide and to extend the Airtel money's footprint, the company partnered with Ghana Post (GP) to deliver the service nationwide where a mass of customers can send, receive and transferring funds in real-time and in a secure manner. To expand more and scale-up in the mobile money supply chain, Airtel partnered with Databank, Ecobank, Energy Bank, Fidelity Bank, GT Bank, Standard Chartered Bank, Unibank, United Bank of Africa and Zenith Bank to assure the delivery of Cash-Out services, that enables customers to exchange their e-value for cash at any Fidelity and Ecobank ATMs, Airtel shops, partner banks, or even one of the 2000 registered agent outlets across Ghana.

The third building block in the EIP is the "*Transformational Stakeholder Engagement*". At this stage, the MNCs tend to create a mutual commitment with and among their stakeholders. In doing so, they create an ecosystem that works toward a sustainable impact and invests on stakeholders' personal and institutional expertise to deliver better value. The engagement with those stakeholders in the corporate identity creates gradual consensus, harmony, and

self-management. Their "must-do-lists" becomes less consequential and get accomplished through indirect approaches and social capital.

In M-Pesa, engaging stakeholders resulted not only in the spread of the service to the hands of 17 million customers (within 5 years of operation), but also to replicate the initiative in Tanzania, Afghanistan, South Africa, and India. It was only noticed that such engagement developed the financial and technical performance of the service, despite the short-term experience of Safaricom in the banking industry. Mbugua Njihia, member in the Safaricom innovation board, revealed that a technology consultancy firm based in Cambridge led the iterations of M-Pesa system from MFI loan tracking, to P2P transfer service and ends with the full platform of mobile money. This firm developed a small dedicated team to coordinate between Safaricom and Vodacom (Njihia, 24th April 2014).

To clarify the difference between the SIP and the EIP, Mohamad, Wood-Harper, and Ramlogan (2014), conducted a comparison between Grameen Bank and a rising mobile money case, e-Masary, in terms of their business intimacy and how this facilitates varying approaches of innovation in mobile financial services. The business intimacy allowed Grameen Bank to successfully overcome tremendous social tensions involved in making loans to women living in predominately conservative Muslim villages. Similarly, it helped Masary.Co to get access to the poor unbanked women who live in rural areas. Many new value propositions have been resisted by consumers. But Grameen created an upsurge of demand by pulling the business into new rural areas and allowing Grameen to achieve rapid outreach while grasping more profits. Lacking its prepared business model intimacy, Masary has followed a resource-based strategy pushing their customers through creating a distribution presence across thousands of villages along 8 governorates (Mohamad, 2011). Only in the long run Masary can accelerate its profit following an upward trend in rural consumption.

Grameen bank could diversify its business into entirely new family industries such as energy and telecommunications to textiles and fisheries. On the other hand, Masary, is unlikely to grow into anything more than an electronic channel for financial

services. The company's management conducted deeper consumer research strategies for the use of mobile wallet enabling poor people to get banking services. The main aim was to search different customers' needs and customize the provided services accordingly.

In conclusion, there are two key paradigms, the SIP & EIP. Both can be compared based on the type of business strategy, degree of change in this strategy, the market structure, embodiment of indigenous culture, locus of control, and the degree of inclusiveness.

Some key research questions for the future, therefore, include: What is the best way for industrial corporations to acquire this new capability? Can such "on-the-ground" skills be taught or is it necessary to "learn-by-doing"? Are there current employees who can rise to this challenge or is it necessary to look outside of the existing corporation to find people and organizations with the requisite motivation and skill set? How do we create incentives for people to step up to this challenge without derailing their careers?

Table 3.11: Comparison between SIP & EIP

Paradigms / *Criteria*	**SIP**	**EIP**
Type of business strategy	Industrial strategy & BoP1.0.	Sustainable strategy & BoP2.0.
Degree of change	Incremental improvement in the value chain.	Radical/disruptive change in the business model.
Market Structure	Centralized and driven by the economies of scale.	Decentralized and utilizes the diseconomies of scale.
Embodiment of indigenous	Follows the business best practices and traditional interpretations of the socio-cultural traditions.	Embeds the indigenous and native traditions that currently take place in the market.
Locus of control	Motivated by external economic rational.	Motivated by internal social meanings and values of the community.
Degree of inclusiveness	exclusive and extractive thinking.	co-creation and sum thinking.

In the literature review and specifically in the ISD (BoP section), we discussed the rise of the third generation corporation reconcile trade-offs among their stakeholders, to build upon their native culture and knowledge, and rely on the diseconomies of scale (Hart, 2011_b). They develop fully contextualized business solutions to poverty and consider the natural diversity of the local cultures to reduce the resistance and maintain sustainability. Those corporations simply, follow the EIP, by engaging in *"constructive inclusive behaviour*" with local communities to co-design businesses systems that are truly *"embedded"* in the local context. Such companies will come to view the communities they serve as partners and colleagues, rather than merely as "consumers". This mindset shift requires the development of a new, "native capability" to complement the competencies in global efficiency, local responsiveness, and learning-transfer that most corporations already possess (Simanis & Hart 2009).

This framework, however, does not explain the technical specifications, data modelling techniques, nor the mobile-human interface required to develop the value propositions intended by the business system. It explains how to change the way we develop business systems from exogenous to indigenous ones in an innovative way. It also does not explain how to reach a trade-off between social and economic orientations currently taking place in the general area of financial inclusion and mobile money.

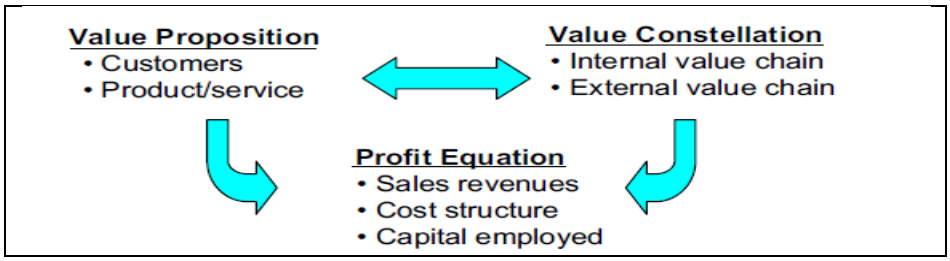
3.1.2.2. Social Business Enterprise

Some people in society have always violated the rights of others. Accordingly, a social contract among people who aim to remove misery in the world is required (Conry, 1995). Social business is a form of social contracting that follows communal principles to remove social stratification (Selinger, 2008). The main actors in social business contracting are MNCs, NGOs, the state, and communities. Social business has products/services, customers, markets, expenses and revenues like any conventional business. However, social business gives higher priority to social wealth creation over economic wealth creation (Yunus & Moingeon et al., 2010: 4). So, social business locates in the middle between for-profit organizations on one hand and subsidized non-for-profit NGOs on the other hand. According

to Kelly (2009), a social business is a for-benefit enterprise that aims to achieve social goals and use the business "for-profit logic" to self-finance and sustain itself.

SBM shares three main pillars with the for-profit models which are; value proposition, value constellation, and positive profit equation[18] (Magretta, 2002) (see Figure 3.6). Integrating social profit into these pillars is Yunus' idea. His business model of the Grameen bank is the origin of the SBM. However, some other business models satisfy the aforementioned elements of SBM. Since Grameen's initiatives started in the 1970s, Yunus and his team spent a long time to extract, their ethnographic accounts into abstract lessons and steps to build a successful SBM.

Figure 3.6:Elements of the conventional business model



Adopted from Yunus & Moingeon, et al. (2010:5).

In his recent publication in 2010, Yunus came up with five main steps for building SBM. In doing so, he used three qualitative case studies: Grameen phone, Grameen Veolia, and Grameen DANONE.

The first step is "*Challenging conventional model*", a process of double-loop learning (Argyris and Scho, 1978), during which firms should rethink the nature of their customers, the type of products/services they produce (value proposition), and the way they deliver it to poor users (value constellation) (Yunus & Moingeon, et al., 2010: 5). This transformation may produce a competitive business value (Yunus, 2007: 46). In order to support their own

[18]Magretta (2002) defined the three pillars of conventional business model as follow:

- Value proposition explores who the customer is and what the customer values.
- Value constellation explores how we deliver customer value.
- Positive profit equation explores how managers generate profit using this model.

argument, they discussed how the Grameen bank recognized the needs of poor people in Bangladesh. In doing so, Grameen bank provided new value propositions (free-collateral microloans) via new channels (clientele loan groups)[19].

The second step is "*Finding complementary partners*". For example, Grameen built a partnership with Telenor to utilize their long experience in building wireless phone networks that helped Grameen to build mobile networks in Bangladesh and build village phone initiative. In return, Grameen exchanged their social networks, reputation, trust, and knowledge of the country with Telenor, which increased the spread of mobile telecommunication in the country. This type of synergy created an entry barrier against newcomers and reduces business risk (Andreasen, 1996). An example of choosing the wrong partner and its consequent high business risk is Grameen's partnership with Cerevit to produce weaning and baby food instead of exporting it. Cerevit's technical capacity was not sufficient to provide a huge market with affordable products. Based on Conry (1995: 189) Yunus & Moingeon et al. (2010) did not recognize the problems with this type of social contract. Mohammad Yunus argued that a civilized humanity tends toward relatively uniform moral orientations. Conflicts among partners are expected to rise due to varying interests (e.g. social versus financial interests).

The third step is "*Strategic experimentation*". At this stage Yunus follows radical approach and logical model to measure the outcomes in order to revise the inputs (McLaughlin & Jordan, 1999). This can be fundamental to solve problems where sufficient information is unavailable or solutions are uncertain (Kim & Mauborgne, 1999). A critique of this experimental approach has been raised by Remus (1986), who emphasised the production-scheduling problem and the difficulty in achieving the optimum solution until managers can collect the necessary data (i.e. losses are expected until profit can be achieved).

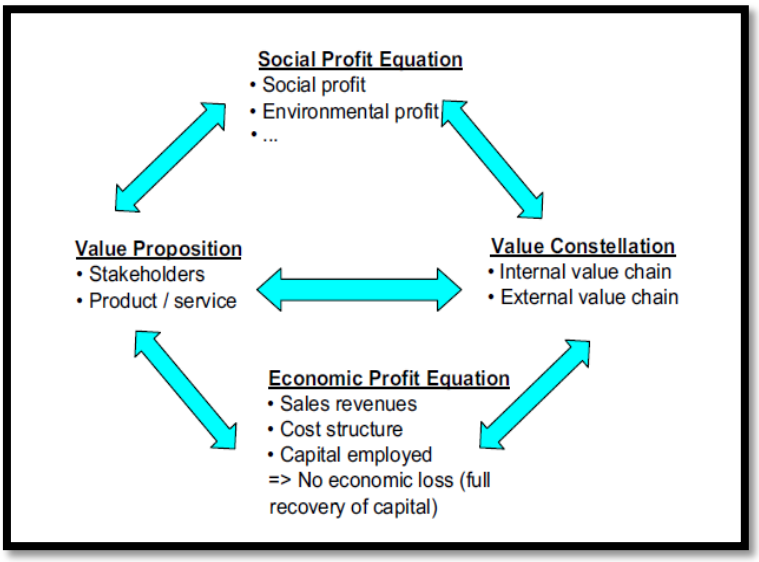
The fourth step is "*Recruiting social profit-oriented shareholders*". The principal-agent problem among managers and shareholders dominated the corporate governance literature in the post-colonial era (Eisenhardt, 1989). The emergence of social entrepreneurship broadened the scope of agency theory toward stakeholder capitalism (Freeman & Liedtka, 1997). In

[19] Clental group is a group of five people who need money to generate small enterprises.

SBM the value proposition and value constellation must reflect a consensus of all stakeholders (Yunus & Moingeon, et al., 2010). Accordingly, selecting socially oriented partners is essential to avoid any violation of the agency principle. An example of principal-agent problems is the situation of Telenor refusing to sell its shares to poor users. Critiques of this step have been put forward by Thompson & MacMillan (2010) who believed that Yunus' SBM is built around MNCs who have CSR and are not willing to gain from access to new markets. Consequently, the participation of the private sector in poverty alleviation will be limited (Thompson & MacMillan, 2010). Private companies may be less attracted to invest in rural areas (Khavul, 2010).

The last step is "*Setting clear social profit objectives*". Many cases of social business faced conflicts between the demands of economic and social objectives (Zimmerli, Richter & Holzinger, 2007). These conflicts are facts of life for social businesses.

Figure 3.7: Social Business Model



Adopted from Yunus & Moingeon, et al. (2010:12)

This raises the problem of how we interpret human behaviour, and how people from different backgrounds can understand the social nature of other people (Conry, 1995). In answer to this problem, Yunus (2003) argues that if we set the degree of selflessness as a profit measurement, we will be able to estimate the social need of those who are deprived. In a

2010 article, Yunus gave Grameen DANONE as a successful example of setting social and environmental goals that do not necessarily conflict with long-term economic goals. He also believes that conflicts can appear at any point in time, and are subject to factors such as the prices of raw materials, supply chain efficiency, and competition. An example of this is when Grameen DANONE could not reach breakeven due to unexpected increases in milk prices during 2008. He asserted that reconciliation between economic and social profit is a matter of contingency (Yunus & Moingeon, et al., 2010). His concerns are similar to Porter's five forces: supplier power, buyer power, threat of substitution, competitive rivalry, competitive power, and the threat of new entry (Porter, 2011).

Figure 3.7 summarises the main components of SBM that need to be considered in the aforementioned stages. Despite the small number of those case studies and the difficulty of replicating them in other developing contexts, they are unlikely to be seen as intellectual property and can be easily copied by other MNCs that are socially oriented (Thompson & MacMillan, 2010). Grameen Bank itself has done other recent social businesses that proved to be successful.

In conclusion, the contribution that Yunus makes is about how the social business model can be built through conducting three changes in any traditional for-profit business. Yunus' social model depends on case studies in the context of Bangladesh, in which the poor are victims to some capitalists, such as moneylenders. However, income poverty may be due to a lack of national resources rather than an unequal distribution of resources (Zimmerli et al., 2007; Selinger, 2008). Karl Marx built his theory of communist society around social insects that lack reproductive independence: *"Worker ants are sterile and individual ants cannot reproduce without a queen, so ants are forced to live in centralised societies"* (Marx, 1967:25). Humans possess reproductive independence and can reproduce without a "queen". According to Darwinian Theory, humans enjoy the maximum level of fitness only when they look after themselves and their families, and find innovative ways to utilize resources in their societies for their own benefit (Frank, 1977). The BoPisa business model helps avoid the cons of Yunus' SBM model and grants more freedom for actors in development initiatives.

3.1.2.3. Social Network Theory (SNT)

Social Network theory (SNT), often referred to as network theory or network analysis, is concerned with the examination of social relationships amongst actors in a network. A central tenet of the SNT is that individual actors are not as important as the relationships and links with other actors in the network (Tichy et al., 1979, Powell et al., 1996, Borgatti & Li, 2009). By definition, the individual actors within a network are referred to as ***nodes***; whereas, the relationships between actors are known as ***ties***. The social network can be defined as a chart of all of the possible ties between the nodes under concern (Barnes, 1954). Such a chart can map the social capital of individual actors and their social exchange.

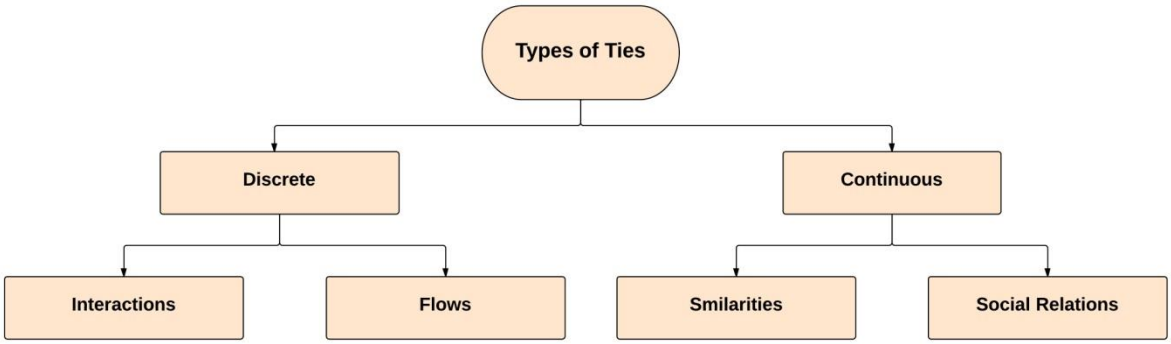
The significance of SNT arises from different sociology theories, which assume that individuals' attributes (e.g. personality dimensions) shape the output of their social interactions. The individuals attributes themselves are less important than the ties that extend across the network. From a theoretical perspective, the level of analysis employed in SNT research can be an individual, an organization or an entire network. Seminal works within the SNT literature stream also include Granovetter's (1983) examination of weak ties within the context of the adoption of innovations, Powell et al.'s (1996) inter-organizational level analysis of networks within the biotechnology arena as well as Valente's (1995) work pertaining to the diffusion of innovations from a network perspective.

Despite the accelerating success of this theory in explaining the phenomena of the 21th century, it does not address the issue of individual agency, and the individual's ability to manage his/her own success. It relates human behaviour to the collective structure of their networks. SNT has also been adopted to investigate how companies invest on the informal relationships to build collaboration. This type of relationships exists between executives, individual employees, and organisations across different economic segments. These networks provide a huge source of business information that enhances the businesses' competitive advantages, but in some other events it facilitates collusion pricing and other business policies.

Incentives for firms to become involved in networks and actively engage in network activities are innumerable as the perceived value of networks extends beyond the individual, firm level during a social exchange (Peppard & Rylander, 2006). Borgatti & Li's (2009) analysis of a supply chain context using SNT established a suitable framework as well as relevant constructs upon which to frame an exploratory examination of inter-firm relationships.

As such, SNT is an ideal lens through which to frame the current exploration of inter-organizational alliances within the mobile money context. Adapted from Borgatti & Li (2009), Figure 3.8 provides a typology of ties among entities studied in social network literature. The basic units of analysis are *pairs of nodes*. These pairs of nodes, known as *dyads*, form the underlying framework upon which a social network is constructed. According to Borgatti & Li (2009), these *dyads connect with each other to form the paths of varying lengths*. Their interactions are not homogeneous. Moreover, thoughtful inquiry into interactions and relationships between nodes within inter-organizational alliances deepened the researcher's understanding of critical success factors and impediments related to mobile payment alliances. Finally, the current research sheds light on crucial considerations of regulatory enablers, assessment of economic opportunity and maturity of banking and telecommunication infrastructures within the mobile payment inter-organizational alliances.

Figure 3.8 Key types of Ties in Social Networks



Adapted from Borgatti & Li (2009)

Applying this to our study, we aim to cover the personal and organizational perspectives of the MMS stakeholders. We can then consider the stakeholder groups (i.e. service providers,

software vendors, regulators, intermediaries, and users) as nodes within the mobile money context.

Unprecedented convergence among multiple industries and sectors is currently underway within the mobile payment framework given the complex nature of mobile payment solution delivery. Even so, the pace of mobile payment engagement has been comparatively slow as compared to the overall proliferation of wireless technology and mobile commerce innovations across the globe. Therefore, an exploratory examination of nodes yielded useful and insightful information regarding key considerations and factors influencing organizations' engagement in mobile payments.

3.2. Proposed Framework: Multiview at the BoP

A "***theoretical framework***" is a tool to understand the phenomenon under investigation and to answer the main research enquiries (Miles & Huberman, 1994). It also helps the researcher organise and integrate the various elements of a problem situation in a simple and consistent way; and ensures the attainment of the pursued outcomes (Montagna, 2005). It is a rigorous collection of concepts, beliefs, values and principles supported by epistemological assumptions to help a problem-solving group to perceive, generate, assess and carry out in a non-random way changes to the information situation (Checkland & Poulter, 2010).

In the IS domain, the research framework represents a tool to manage and incorporate the different symptoms of a problem in an understandable and rigorous way, ensuring the achievement of the proposed outcomes (Dahlberg et al., 2008). Oates (2006) argues that a framework is a sort of model that a researcher uses to explain the main issues under investigation. It is a map identifying issues to be discovered in the fieldwork (Miles & Huberman, 1994). Others, such as Walsham (1993) and Kawalek & Wood-Harper (2002) see the theoretical framework as a foundation to interpret empirical data, to predict the impact of future trends and needs, and to ignore issues irrelevant to the main quest. Bell & Wood-Harper (2003) argue that a framework is a methodology for solving a problem situation (e.g.

misfit of a new information system). Such a framework is best being tailored to the problem situation and being contingent in the way the investigator interacts with participants and the problem situation (Avison & Wood-Harper, 1990). The key question that we try to answer in this following section, is "***How can Multiview4 model improve our understanding of information system development at the BoP?*****".**

For decades the IS researchers used to follow traditional ISD approaches such as the data analysis (Rock-Evans, 1981) and structured analysis (Gane & Sarson, 1979), Wood-Harper et al. (1985) wedded them to new approaches such as human activity analysis (Checkland, 1984) and socio-technical analysis (Mumford, 1981) to enable researchers to take into consideration the different social needs and viewpoints of all the people involved in using a computer system. This shift into socially constructed processes assures that ISD was not a step-by-step (waterfall process), but iterative and sometimes applied in a different way as circumstances dictated (Avison & Wood-Harper, 2003). The rise of ICTs and the more complex social networks they create makes the world full of ill-structured problems. Such problems challenge the development of information system. Defining those problems requires socially constructed methodologies such as soft system thinking that rely more on contingency (a trial-and-error exercise) and hypothetical framework of actions to be solved (Bennetts, Wood-Harper & Mills, 2000) (see **Chapter 2**). This justifies how appropriate the Multiview model is to solve these problems and why action research is the appropriate method to reach to the best fit solution. The rest of this chapter explains the story of Multiview framework as a S-T lens that wedded different ISD approaches that was discussed in **Chapter 2**. Multiview **1**, **2**, and **3** are critically discussed and a proposed Multiview**4** is presented.

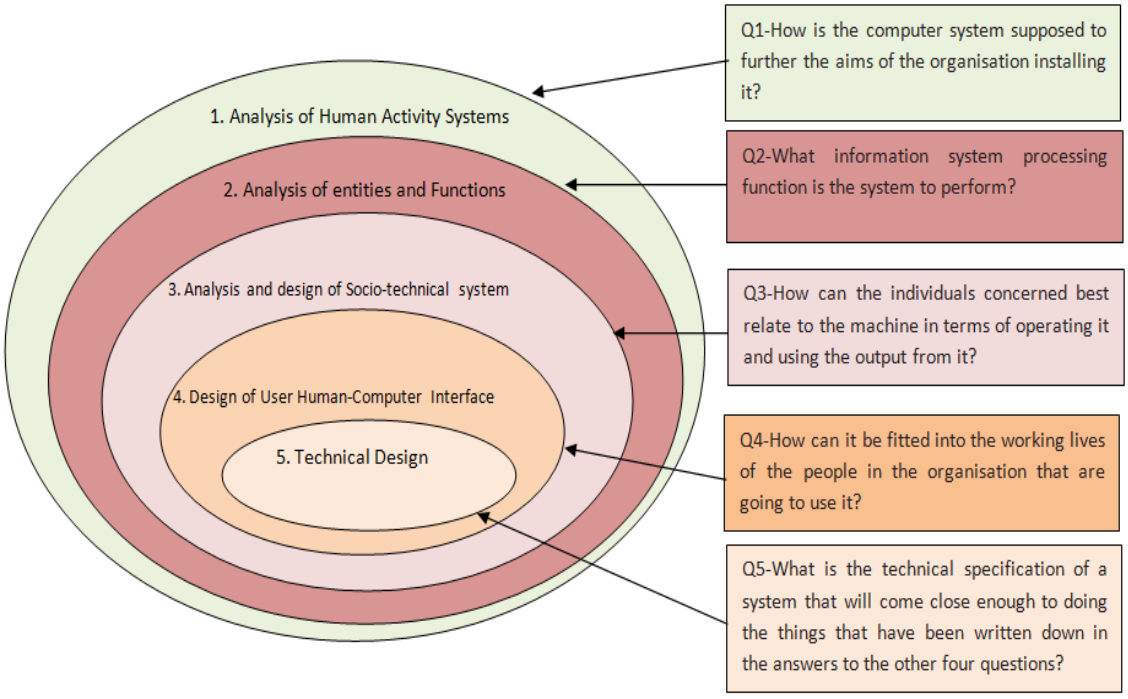
3.2.1. Multiview1

Wood-Harper et al. (1985) described the first generation of Multiview (Multiview**1**) as a set of five interrelated stages shown in Figure 2.9. Operating from the core outward we see a broader focus and a wider understanding of the problem situation and its related technical and social characteristics. Each of these stages answer a particular enquiry facing IS practitioners

and academics (see Table 3.11). However, answering these five questions, does not guarantee a full explanation of the phenomena under study.

The external tier, Human Activity Analysis (HAA), aims to define the business's raison d'etre, problem situation, and states the main motivation for developing the new system instead of the old legacy system. The next tier, Information Analysis (IA) analysis the entities and functions of the proposed problem situation discussed in the HAA. The middle tier, Socio-Technical Analysis (STA), shows the process of choosing the social and technical settings and the appropriate approach for the system development. The Human-Computer Interface (HCI) addresses the technical requirements of the user interface (Avison & Fitzgerald, 2006). The inner core, the technical tier, shows the technical requirements of the system design such as computers, internet servers, databases, and maintenance.

Figure 3.9: Multiview1 Framework



Adopted from Avison et al. (1998: 25)

Together they capture different issues, assumptions, and tools of the ISD approaches discussed in **Chapter 2**. However, we briefly summarise which of those issues, assumptions, and tools have been borrowed from the ISD approaches.

3.2.1.1. Analysis of Human Activity System (HAA)

This stage is based on SSM (as discussed in **Chapter 2**). Human Activity Aanalysis (HAA) aims to highlight the way organizations develop and how IS can operate to achieve its objectives. Such organization might be a functional team, a division, a company, or a business web of different institutions (Vidgen et al., 2002). Each has different motivations for computerised IS inter and intra-organizations. The central focus of this stage of the analysis is to search for a particular view (or views). This ***Weltanschauung*** will form the basis for describing the systems requirements and will be carried forward to further stages in the methodology (Avison & Wood-Harper, 1996). This world view is extracted from the problem situation through debate on the main purpose (raison d'être/mission) of the organization concerned (Checkland & Scholes, 1990).

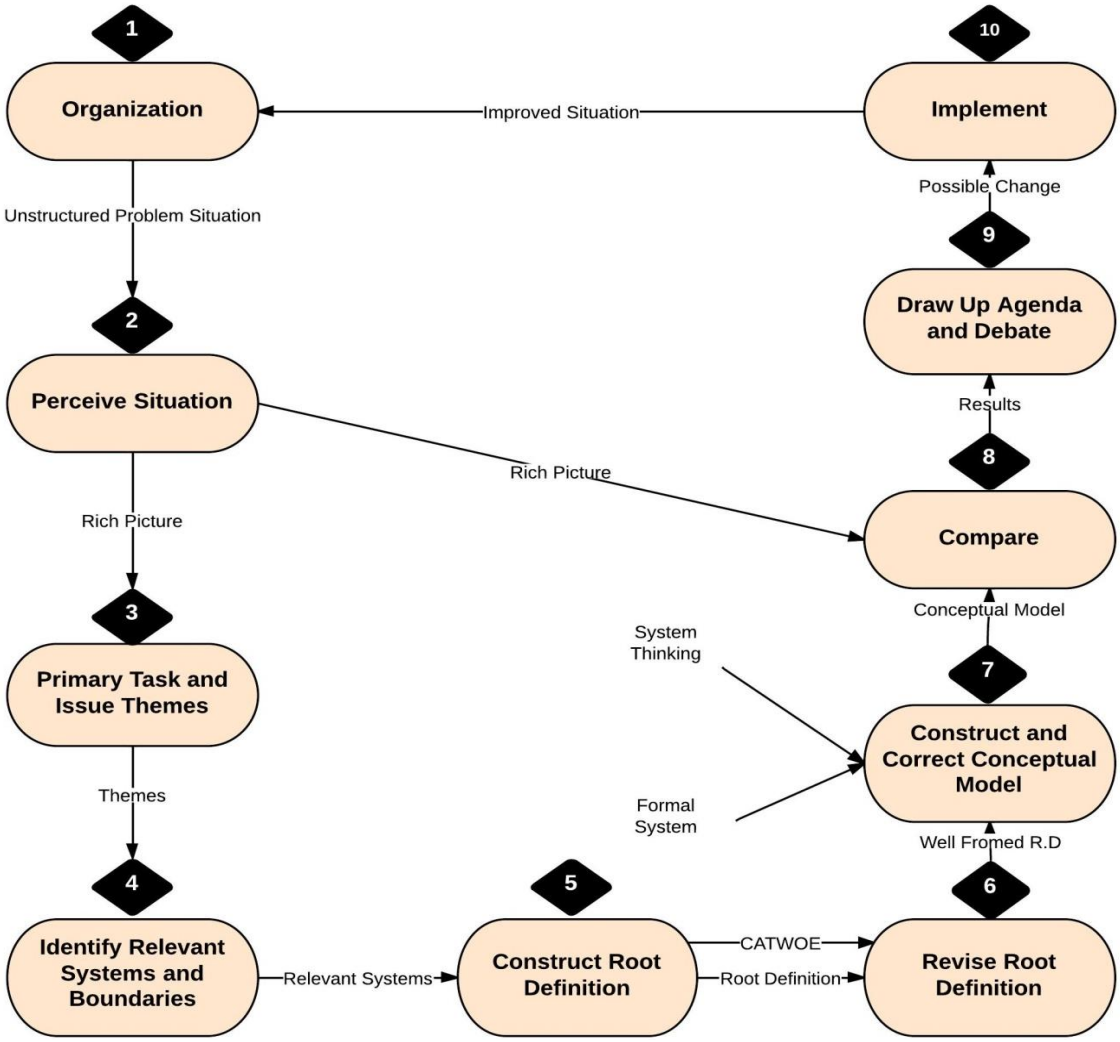
As shown in Figure 3.10, the HAA starts by identifying the problem situation. In doing so, the problem solver (e.g. an individual research or a research team) engages with the problem owner (i.e. the person or group on whose behalf the analysis has been commissioned) to form a Rich Picture (RP) of the problem situation. RP is a graphical representation of all elements of the problem situation and explanation of different types of human interactions and their relationships between the elements in the situation (Benyon & Turner, 2005). This visual tool helps the problem solver better understand the problem situation. It also stimulates a debate about the system boundaries and key objectives of developing an offline or online IS. A discussion between the problem solver and the problem owner can then be constructed to set a future plan for a problem solution (transformation).

Developing a RP consists of gathering, sifting, and interpreting data which is sometimes called "***appreciating the situation***" (Bell & Wood-Harper, 2013). It is an iterative, continuos improvement process until a ratified picture is developed and agreed by both the problem solver and owner. The first step to construct a RP is to highlight the organizational structure, departmental boundaries, types of activities, and geographical footprint (Wood-Harper et al., 1985). This will facilitate exploring the implicit issues and process in the second stage.

During this stage the analyst tries to make sense of what is going on and how the organization deploys the system development (Huisman & Iivari, 2006).

In addition to the structure and process, RP should reveal the stakeholders' implicit social roles and expected behaviour (Wood-Harper, 1985). The mismatch between the structure and process highlights the climate of the situation, including new events and threats.

Figure 3.10: Analysis of Human Activity System



Adapted from Chackland & Poulter (2010)

RP usually includes "*a large bubble*" that refers to the system owner. Then representative "*symbols of humans*" involved can be drawn and connected by "*arrows*" that refer to the

types of relationships within and beyond the organization under concern. "*Cross-words*" refer to the conflicted views of stakeholders that can be clarified more through the think bubbles attached to each character and stakeholder.

The structure of the RP is not usually linear and can be interpreted in different ways. Imposing a particular order in the RP limits our understanding of the wicked situation and turns it into a positivistic tool. There is no such thing as a "***correct***" rich picture. The RP represents a subjective and objective perception of the problem situation in diagrammatic and pictorial form, showing the structures and the processes and their relationship to each other (Wood-Harper, 1989:82).

Out of the rich picture, the problem solver extracts problem themes, that is, things noticed in the picture that are, or may be; causing problems and/or it is felt worth looking at in more detail. The picture may show conflicts between two departments, absences of communication lines, shortages of supply, and so on. Taking these problem themes, the problem solver imagines and names relevant systems that may help to relieve the problem theme. The relevant system can be a function, a division, an institution that requires an information system to manage their operations. Can it be a network of different level actors (i.e. regulators, developers, vendors, and user)? This will be discovered further in our research.

Using the CATWOE analysis discussed in **Chapter 2**, a root definition can then be co-written and approved by the analyst and the owner. Based on the root definition a conceptual model, clarifying how the system development works, should be constructed (Avison & Fitizgeral, 2006). Such a model should identify the minimum activities required to make the transformation agreed in the root definition stage.

3.2.1.2. Data Modelling (DM)

This considers the data entities required to develop the system. In doing so two models have to be drawn; namely, a functional model and an entity model (Avison & Fitzgerald, 2006).

The functional model reflects all processes and functions and their interplay as clarified in the conceptual model. Every function includes sub-functions and detailed tasks, documents, and data flows. The data flow diagram is a process technique that identifies data transmission and processing between individuals and devices (Avison & Fitzgerald, 2006). It is usually constructed using arrows that flow from a data box (i.e. source or destination of data). It might also include data stores, external and internal sources of data.

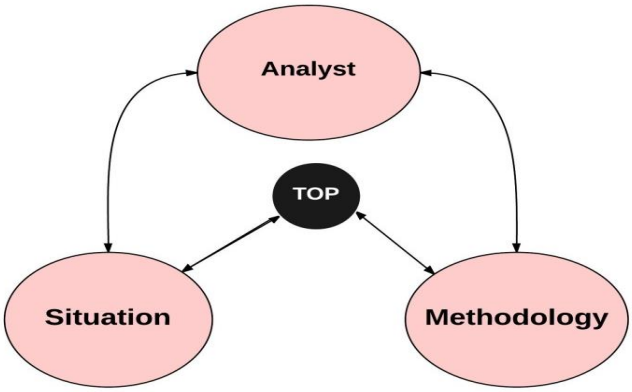
The second part of this analysis is to develop an entity model that reflects types of data attributes and entities. The analyst needs to explore the key tables of data and the relationship between them. How, for instance, the customer ID helps customer service use to get access to recent transaction and sent the updates to the accounting division. So, two types of tables can be accessed by two divisions to process different tasks using a table key (e.g. Customer ID). see **Section 2.2.4**.

Following action research, usually enables the analysts to get different entity relationship diagrams with different levels of complexities as s/he engages with the company's data attributes.

3.2.1.3. Sociotechnical Analysis (STA)

The central concern at this stage is the identification of alternatives: alternative social arrangements to meet social objectives and alternative technical arrangements to meet technical objectives. Avison & Wood-Harper (1990) suggested that parts of this relationship were missing in many descriptions of IS development and that methodologies often contained unquestioning assumptions about the unitary nature of both the problem situation and those involved in investigating it. Despite this criticism of other methodologies, Multiview1 offered no further guidance on how any given instantiation of the triad (analyst-methodology-situation) comes about in actual practice. Mitroff & Linstone (1993) is used to inform the particular occurrence in Multiview**2** under any given set of circumstances (Figure 3.11).

Figure 3.11: Multiview2 Basic Philosophical Assumption



Adopted from Avison & Fitizgerald (2006)

As shown in Table 3.12, the key objective of the STA is to assure that system users have a degree of control over the system functionalities to enrich their jobs and life. It explores the extent to which users are involved in the system design and diffusion.

The S-T fit increases when the developed system considers the users' task definition and increase their job satisfaction. In doing so, the analyst needs to identify the social versus technical objectives of the system owner. Each type of objective requires alternative tools to implement through user involvement in the problem solving process. Once identified, these alternatives should be ranked in terms of their effectiveness in achieving the listed S-T objectives. Afterward a cost-benefit analysis needs to be conducted to choose the best solution(s) that can be performed by the technical specification of computer, people tasks, and appropriate computer interface.

3.2.1.4. Human Computer Interface (HCI)

Following our discussion in **Chapter 2**, the HCI uses the outputs of the DM and STA to develop a user friendly computer interface. The user's acceptance of the new system versus the legacy system is dependent on the ease of system use and interaction. An effective user interface offers various options in a familiar language with easy to understand meanings.

Table 3.12: Stages of Multiview 1.0

Stage 1: Analysis of human activity
a) Based on SSM (Mode 1 in Checkland 1999) b) Central focus: Search for a particular world view • Form rich pictures of the problem situation • Let rich pictures stimulate discussion between the problem solver and the problem owner • Extract problem themes from rich pictures • Form root definition • Construct a conceptual model • Compare the completed conceptual model to the representation of the "real world" in the rich picture. • Debate possible changes to improve the problem situation.
Stage 2: Analysis of information
a) Takes as input the root definition/conceptual model from stage 1 b) Two main phases: • The development of a functional model: ○ *Identify the main function* ○ *Decompose functions successively (4-5 levels)* ○ *Provide hierarchical model and DFDs as input into stage 3* • The development of an entity model ○ *Extract and name entities from the area of concern* ○ *Establish relationships between entities* ○ *Construct an entity model and provide it as input to stages 4 and 5.*
Stage 3: Analysis and design of the socio-technical aspects
a) Based on Mumford (1981) & Land and Hirschheim (1983) b) Philosophy: people should be allowed to participate in the analysis and design of the systems that they will be using c) Human considerations: job satisfaction, task definition, morale d) Consider both social and technical objectives e) Specify both social and technical alternatives f) Match socio-technical alternatives g) Rank in terms of meeting socio/technical objectives h) Consider costs/resources/constraints and rank accordingly i) Select best socio-technical solution j) Define computer task, role set, and people tasks for solution.
Stage 4: Design of the human-computer interface
a) Takes as input the entity model from stage 2, and the computer tasks, role-set, and people tasks from stage 3 b) Philosophy: the ways in which users will interact with the computer will have an important influence on whether the users will accept the system c) Works on the technical design of the human-computer interface • Batch vs. online facilities • Conversations and interactions with particular types of user • Necessary inputs and outputs, error checking, minimization of number of keystrokes.
Stage 5: Design of the technical aspects
a) Takes as input the entity model from stage 2 and the technical requirements from stage 4 b) Takes a technical view towards an efficient design of the system c) Final outputs are: • Application subsystem (impl. functions in the function chart) • Information retrieval subsystem (responds to data enquiries) • Database (and db maintenance subsystem) • Control subsystem (alerts for user/program/operator errors) • Recovery subsystem (repairs system after error detection) • Monitoring subsystem (records all system activities)

Summarized from Avison & Wood-Harper (1990) & Avison & Fitzgerald (2006)

Using this interface, users can input data such as customer username and password to login to the mobile wallet. It also enables users to issue instructions (e.g. conduct money transfer transaction or print a report of monthly transaction).

The cultural and psychological factors affect the extent of user's acceptance of the system. Showing an error code on the screen does not deliver the right message to non-technical users. The language of the system interface is important on how the user interacts with the technology (e.g. mobile handsets, smart tablet).

In developing countries, user's illiteracy reduces the chance of using a system that offers a structured language interface. Rather, icon-based interface that offers visual representative symbols is important. Such a pictorial interface can fit within traditional computers and handsets as well as smart devices where touch screens are built in.

The analysis of the HCI should reflect the interface dialogue that can be explained to users through face to face training, videos, or printed manuals. It also states the error prevention mechanism to assure the system's technical sustainability.

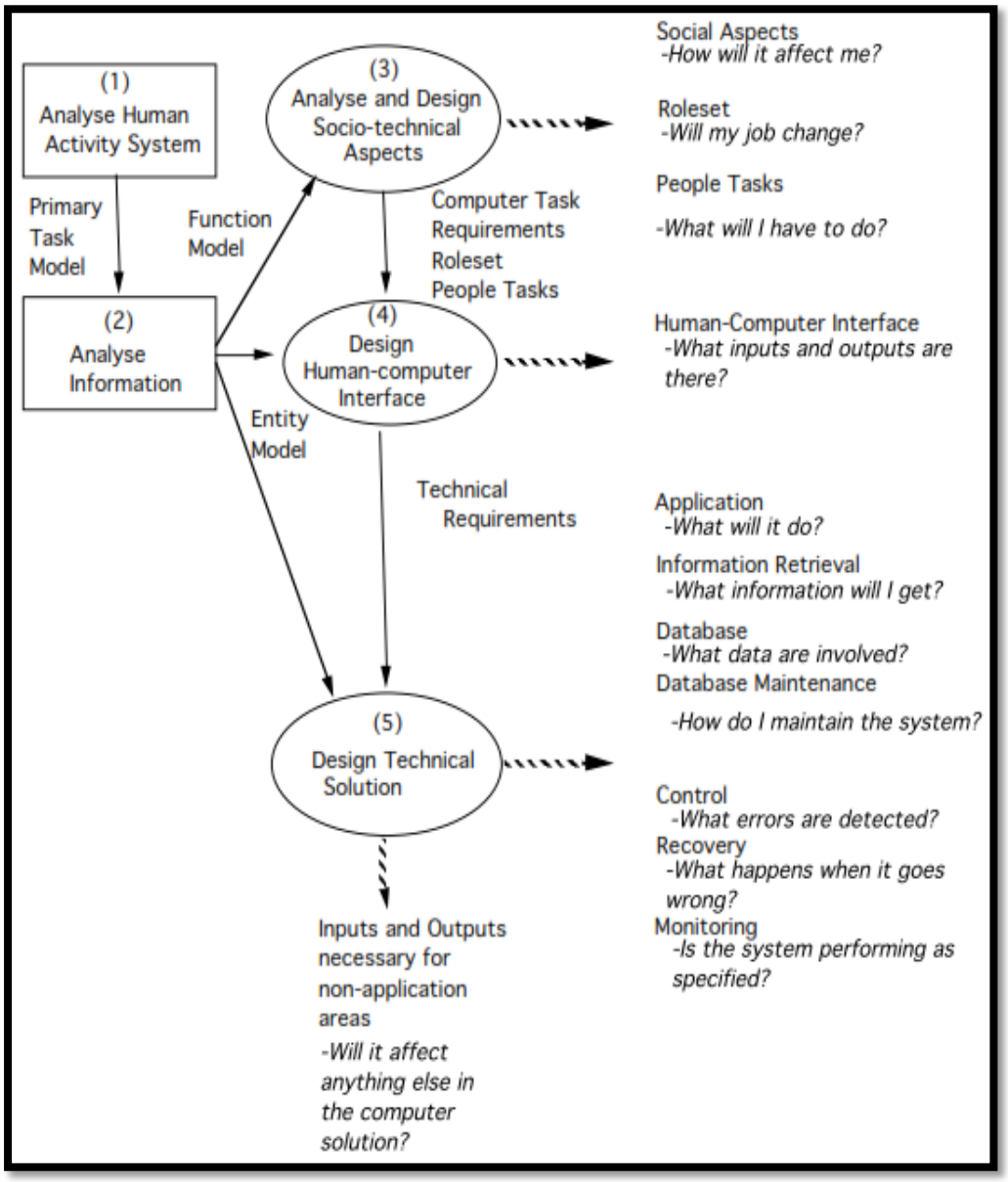
3.2.1.5. Technical Specifications (TS)

Following our discussion in section 2.2.5, the technical specification is the final stage of Multiview exploration. It begins from the entity relationship modelling drawn in the DM analysis and the technical features in the HCI analysis.

At this stage, the analyst has to realise the inputs and outputs of the proposed IS and plan. It starts when the analyst lists the function of the system as the application of the computing subsystems. Then a detailed map of information retrieval needs to be constructed to facilitate the way data are stored and the files organised in the database.

Sustainable systems require detailed maintenance procedures for the database to allow required updates in the technical specifications and system functionalities. Afterward, the analyst needs to set system controls and inform the system owner. This control system states types of programs, users, operators, and error prevention steps. Then the analyst proceeds with designing a backup database that helps recover the system in case of any technical breakdown. Then a detailed monitoring plan can be developed to improve the trust of the system owner, users, and regulators on the new system.

Figure 3.12: Multiview1 as Methodological Framework



Adopted from Wood-Harper et al. (1985:17)

Figure 3.12 explains the links between the five stages of Multivew**1** and their outputs in terms of social aspects, role setting, people tasks, HCI, application of technology, database building, system control, system recovery, and system monitoring (Avison & Fitzgerald, 2006).

Multiview1 has been considered as a holistic approach of system definition that works before the actual ISD takes place and the system installation thereafter. Each of the above mentioned stages; HAA, IM, S-T, HC, and TS is supported by rigorous tools and techniques (Wood-Harper et al., 1985).

3.2.2. Multiview2

Kawalek & Wood-Harper (2002) used Multiview**2** as a diagnostic device (a method) for developing Enterprise Systems (ESs) such as SAP in Rosebud projects. The authors aimed to understand how adopting Multiview**2** is different from traditional information systems approaches. In doing so, they engaged end users in the development process and recorded their experience along the four stages of Multiview**2**; "*Organizational Analysis, Socio-technical Analysis, Information System Modelling, and Software Development*" (Kawalek & Wood-Harper, 2002: 14).

In that paper the authors offered brief definitions of each stage. The first stage, *the organizational analysis*, pinpoints to the system requirements through rational top-down analysis (Kawalek & Wood-Harper, 2002). The potential results of this stage are system diagnosis and business understanding. The second stage, *the socio-technical analysis*, explains how system requirements fit into the day-to-day work activities, and explores the tactical problem solving and best practice of involved stakeholders. This stage records the bottom-up user issues such as work satisfaction and productivity (see Mumford's work mentioned above). The third stage, *Information Modelling*, offers data flow charts or blueprints of information cycles. Mapping workflow and electronic reporting are common results of this stage. The fourth stage, *Software development*, tends to create systems of programming activities to assure the minimum requirements for users is involved. In another meaning, it explains how the system operates after installation. For instance, in a financial

module, how long it takes to receive a reminder of the due bills. The additional stage of "*Mediating*" the previous four stages has been applied in the analysis section, but not discussed earlier in the methodology part.

Kawalek & Wood-Harper (2002) placed the main implementation activities of the Rosebud project within Multiview**2** framework. However, they decided to exclude issues of "*communication*" and "*users' training*" from the system development process and argued that they are more related to the system deployment. This step is not consistent with Laudon & Laudon (2006) who argue that communication is essential to maintain the S-T fit in ISD process. Further, Brandsma & Chaouali (1998) and Sumner (1999) emphasised the correlation between training as part of system design and the concurrent assessment of users' acceptance.

Kawalek & Wood-Harper (2002), however, considered user acceptance in the ISD process, but not training users to assess their acceptance and ease of use. Recent studies of Multiview2 reconsidered these issues under the umbrella of S-T analysis (e.g. Abbas, 2011).

Wood-Harper & Wood (2005) stated seven key lessons in applying the Multiview framework by professionals and experienced academics. Some of these lessons are also common with the S-T approaches. In the eighties, Calvin Pava found the concepts and methods used to analyse the work systems "*follow a linear consequence of rigid steps*". He then reformed nonlinear methods to analyse the emerging "*manufacturing systems, direct client transaction systems, artificial intelligence, total work habits and the drive to cultivate entrepreneurial effort*" (Pava, 1986: 218). Mumford & Ward (1999) found challenges in applying the ETHICS approach without the acceptance and participation of the change actors. Learning from the aforementioned lessons the authors developed a revised version of Multiview framework based on the socially constructed assumptions in Burrell & Morgan's[20] epistemological typology and Kling's web/discrete entity models.

[20]Kling model of web/discrete entity is discussed as a part of the socio-technical approaches and Burrell and Morgan's epistemological typology will be discussed in Chapter 4 dedicated for research methodology

Recently, Harrop, Gillies & Wood-Harper (2013) adopted Multiview framework to investigate and assist the practice of healthcare commissioning in the United Kingdom. Commissioning is the gradual restructuring of the NHS arrangements for planning, procuring, evaluating health care provision.

Table 3.13: Key Lessons from the field work applying Multiview2 framework

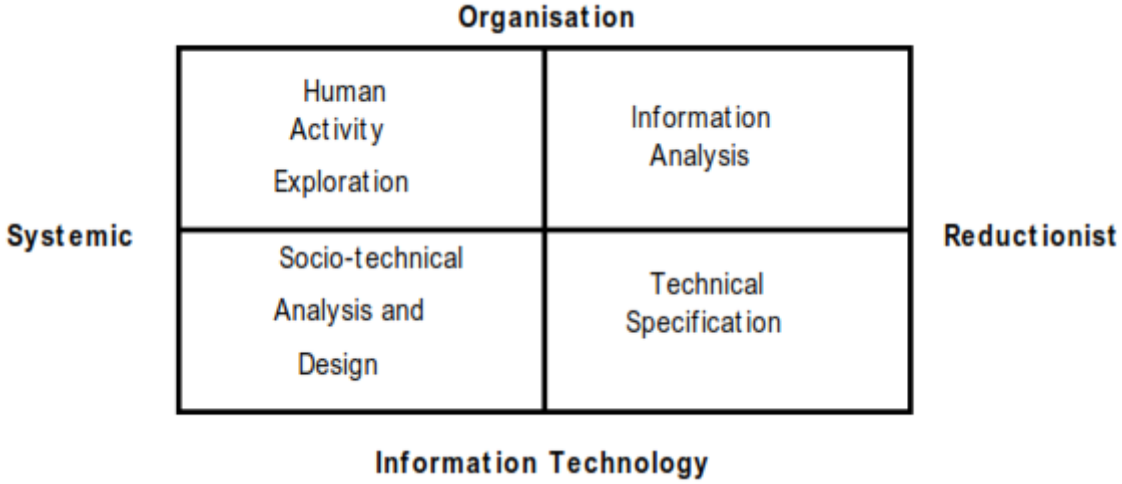
Lessons	Title & Explanation
L1	A methodology takes time to learn
	The initial formulation of the methodology (Wood-Harper, 1989) took four years to develop through a mixture of practice and fieldwork and it was evident that the participants only fully understood it after using the methodology in an action-learning situation (Wood-Harper, 1989).
L2	The Waterfall model was inappropriate
	This methodology, as evidenced by the fieldwork, did not in practice exhibit the step-by-step, top-down nature of the waterfall model. Prototyping thus allowed the phases of the methodology to be used in a flexible manner without losing the coherence that the methodology provided.
L3	The methodology was not a "guarantor of truth"
	Images within the views of the methodology were interpreted and selected depending upon the context.
L4	The political dimension was important
	The manipulation of power, i.e., the political dimension is important in real-world situations and this transcends the rationale of any methodology.
L5	Responsible participation was contingent
	A high level of responsible participation, where appropriate, is a positive ingredient of successful information systems development.
L6	In certain situations the methodology gave insufficient guidance
	The methodology did not give sufficient guidance. For example, it was difficult to identify the interest groups and also to provide non-rational information in order to support activities. Additionally, the methodology did not give guidance to evaluate the change processes and the changes to the problem situation.
L7	The methodology was interpreted by users/analysts
	The users/analysts affected the perception of the situation and they interpreted the methodology in use.

Adopted from Wood-Harper & Wood (2005: 27)

Multiview**2** offers a clearer view of the ISD process through the interaction between the human activity exploration, S-T analysis and design, the information analysis and the technical specification. The fifth element, the HCI, has been part of the information analysis stage (see Figure 3.13).

The human activity analysis in Multiview**2** reflects an organizational analysis that incorporates boundary and stakeholder analysis (Coakes & Elliman, 1999). The organizational analysis addresses the process of *value creation including the business model and strategic orientation of the institution investigated.*

Figure 3.13: Multiview Framework for ISD



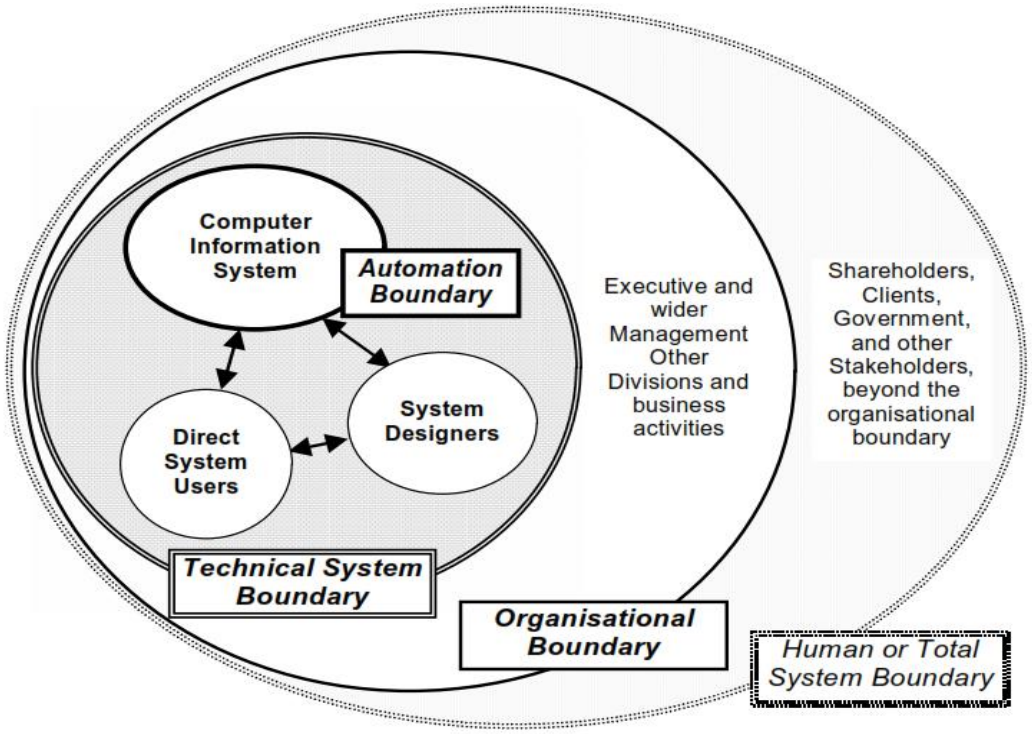
Adopted from Avison & Wood-Harper (2003)

Midgley (1992) uses the concept "critical system boundaries" (including technical, organizational and human boundaries) to formulate the strategic linkages among a broad range of stakeholders who co-create the system value (see Figure 3.14 below). Technical system boundary includes system designers, direct system users, and the system technological tools. Organizational boundary includes executive and wider management, other divisions and business activities. Human or total system boundary includes clients, government, and other stakeholders beyond the organizational boundary. In mobile-based information systems and other disruptive technologies those boundaries are fused and actors move between layers in response to the surrounding environment and create a stakeholder web of space (Coakes & Coakes, 1994; Castells, 2011).

Once these linkages are drawn, the root definition and rich picture (described above) can be represented to manifest only as perceptions by those actors who are free to attribute meaning to what they perceive. Drawing these linkages and root definitions of how the problem is recognised by the varying stakeholders is based on SSM discussed in chapter two.

A systems approach does not rule out goal-driven business strategies, but these are seen as a subset of a broader aim of relationship maintaining. Traditional business strategy framework, such as Porter's five forces and the many e-business models that have emerged, are pre-packaged models that provide specific content.

Figure 3.14: System Boundaries of Computer Information Systems



Adopted from Coakes & Elliman (1999: 6).

The information analysis in Multiview**2** discusses the formal specification of the information and how it is processed to match the organizational needs. The specification might be in the form of a document with graphical notations, but it might also be in the form of a software prototype (an executable specification).

Bell & Wood-Harper (2014) argue that adopting Multiview**2** methodology requires long-term experience with IT and software development which is easily found in Europe and especially in the education learning disciplines. However, a more flexible version of Multiview is needed to explain the ISD process in the developing context. Avison & Fitzgerald pointed out the key differences between Multiview **1&2** in terms of their four building blocks.

The advances of the modelling languages and web technologies were not the only changes. Rather, the ethnographic reflection of system analysts as experts and change agents reflected Multiview as a methodology of ISD.

Table 3.14: Changes in the content from Multiview1 to version Multiview2

Stage	Change	Rationale
Organizational Analysis	Inclusion of strategic assumption surfacing and testing (Mason & Mitroff, 1989).	To strengthen the conceptual analysis of SSM with real-world stakeholders analysis (Vidgen, 2002).
	Radical change and business process redesign.	IT as business enabler, rapid change in business environment (Wood et.al, 1995).
	Introduction of ethical analysis.	Stakeholders can have different moral ideals (Wood-harper et.al., 1996).
	Consideration of non-human stakeholders.	To support a symmetrical treatment of social and technological factors (Vidgen and McMaster, 1996).
	Inclusion of technology foresight and future analysis.	Consider the impact of the intervention on stakeholders (Avison et.al, 1995) and the potential role of technology.
Information Modelling	Migration of Object-Oriented Analysis (From structured methods).	The principles of OO are more compatible with systems thinking than are the process/data separation and data flow metaphor of structured methods (e.g. the notion of systemic transformation and state change).
Socio-technical analysis and design	Ethnographic approaches to supplement ETHICS (Mumford, 2006).	Ethnographic approaches to socio-technical design (Randal et.al, 1994; Avison and Myers, 1995) aid the analyst in understanding how work is accomplished (Sachs, 1995).
Technical design and construction	Construction of technical artefacts is incorporated within the scope of the methodology (Multiview 1 stopped at the technical design).	Prototyping, evolutionary, and rapid development approaches to system development require that analysis, design, and construction be more tightly integrated (Budde et.al., 1992).

Adopted from Avison & Fitzgerald (2006:547)

3.2.3. Multiview 3

A third version of Multiview has been developed between the years 2003 & 2014 by Simon Bell and Trevor Wood-Harper to guide international non-professionals on how to develop an IS. The authors argue that Multiview**3** is a sustainable planning methodology. This version is

based on the stakeholders' involvement principle of Chambers (2002). The participation and engagement of different classes of stakeholders in the system analysis and design stages are found crucial to improve the system sustainability (Cordoba and Midgley, 2008).

This model has been replicated in the areas of climate change (Kloprogge & Van der Sluijs, 2006), forestry (Kangas et al., 2010), policy making (William et al., 2002) as well as in mainstream IS literature (Kreps, 2010; Reid et al. 2010) and represented specifically in the development of the Agile IS approach (e.g. Kent et al., 2001, Balijepally et al., 2006, Doerflinger et al., 2013).

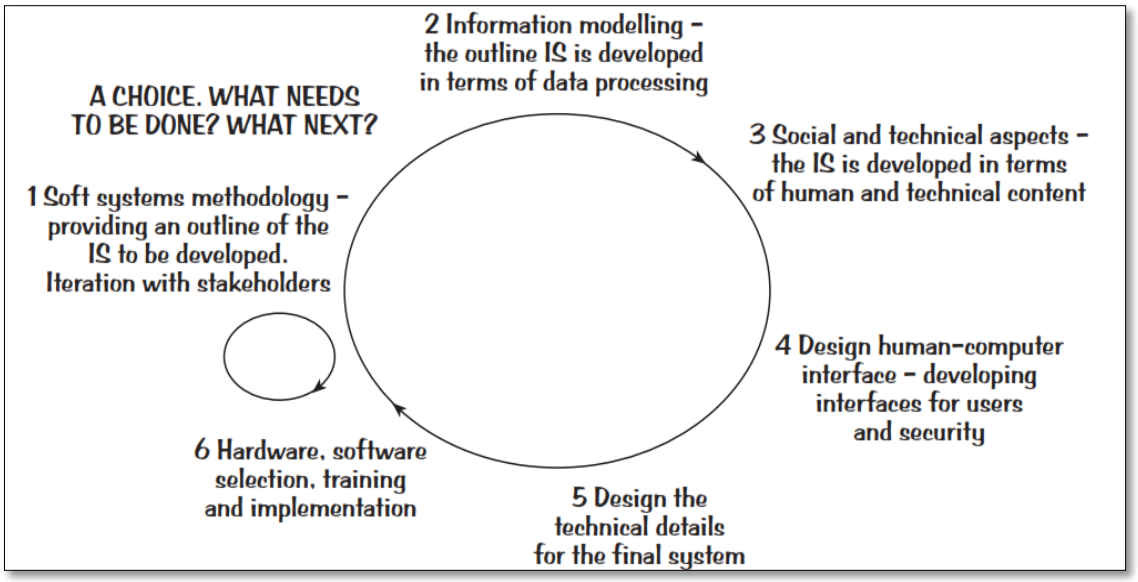
Much of the innovation in Multiview**3** has been in response to the accelerating trend for stakeholderism in identifying, structuring and managing IS problems. Multiview**3** also exemplified an early expression of concern for methodology to be positioned in terms of practitioner awareness and its impact on local processes within macro political-economic contexts (Reilly 2011, Avgerou 2010). This orientation helped justify the RP as a tool to reveal human interactions in socially oriented organizations and shed light on hidden political conflicts into the mind of pan-humanity (Bell & Morse, 2013). The Mutliview**3** suggests two types of rich pictures: paintings and diagrams. The former type relies on graphic images and hand drawings to extend the participative thinking process (Mavor & Pew, 2007; Walker et al., 2008). A rich picture can reflect a thousand words, *so why different stakeholders cannot paint themselves in a collective group picture*?

The adoption of rich pictures in Multiview**3** reflects a deeper view on sustainability and economic development problems where stakeholders' engagement is necessary to define and solve problems. The RP has been developed into an inclusive exercise where focus groups can discuss the construction of a group picture. After more than one focus group, the final RP becomes clearer and commonly agreed. All participants reflect their inner life and the RP reflects the soul of the group (Sheffield, Sankaran & Haslett, 2012; Weaver, 2013).

The Multiview**3** methodology also offered a new technique on how stakeholders co-develop an "*information audit*" that later leads to a cost effective entity model (Bell & Wood-Harper, 2003 & 2013). It maps the essential needs of the stakeholders within the project structure and vision. It needs to be simplified, so all stakeholders can understand it. Overall, Multiview**3**

offer a continuous system development cycle (see Figure 3.14). However, it lacks the iteration and contingency nature that flows from soft system thinking.

Figure 3.14: Multiview3 as a sustainable planning methodology



Adopted from Bell & Wood-Harper (2003: 50)

Multiview**3** employs more flexible RP in the HAA via mixing the symbols with images and photographic representation (Bell & Wood-Harper, 2007). We argue that Multiview has been developed for three reasons:

1) To offer an "*academic-free*" guideline for the IS practitioner/ learner on how to engage with a wide range and challenging set of analysis, design and development skills.
2) To develop a planning toolkit that practitioners can use in an ISD methodology.
3) To offer a deep insight for practitioners in the area of economic development in the developing countries.

We wonder, however, if Multiview**4** can give insight on how multidimensional (networked) IS can be developed in a way that best serves all stakeholders (Madon, 2005). *How can such a system offer a win-win situation for developers as well as users*?

In contrast to the long-term ISD cycle adopted in Multiview**3**, we argue that strategic planning is a mirage (Dearden, 1972). Rather, we believe planning is a learning process that should be considered when we develop a methodology for ISD (De Geus, 1988).

As discussed above, Multiview**1** is a five stage methodology that follows a waterfall structure. Multiview**2**, however, offers a rich implementation of multiperspectives in an iterative process. The scope of Multiview**2** is broadened to include software development, implementation and production operation. Multiview**2** provides a systematic approach to ISD which is reflective, constructive and unifying with respect to the analyst, the situation and the methodology. Multiview**2 & 3** employ multiperspectives theory. Therefore, the following section will describe the relation between the Multiperspectives theory and Multiview2 in detail.

3.2.4. Integrating Multiview framework with the Multiperspectives theory

Based on the above discussion, Multiview framework found contingent upon the methodology, the situation and the problem solvers (Wood-Harper & Wood, 2005:28). Accordingly, any situation where Multiview framework might be used there are contextual factors (e.g. culture, language, semiotics and education) which also have to be taken into consideration. Such factors are located at a higher level, which is that of the Multiperspectives theory previously described. Therefore the use of Multiview in practice is a hermeneutic process in which is led by the researcher and how he reads the problem situation (Argyris et al., 1986).

The aforementioned discussion clarifies the limitations of Multiview**1** (see Table 3.13) and the missing linkages between the five stages in addition to the unclear and untested assumptions about the mediation of the problem situation, the analyst and methodology in use. Multiview**1** failed to offer an appropriate toolkit that helps triangulate the triad (analyst-methodology-situation) in practice (Avison & Wood-Harper, 1990). Multiview**2**, however, tended to overcome these limitations by recalling the Multiperspectives theory of Mitroff & Linstone (1993) to inform the mediation and break with the waterfall paradigm. It offers a

thorough explanation of organizational analysis, socio-technical analysis, technical design, and the information modelling as a modifier (and a bridge) between them. The web version of Multiview returned the HCI back as a mediator with the information modelling (Vidgen, 2002; Vidgen et al., 2002). It also permits the analyst to choose his/her involvement style either as a consultant (e.g. doctor), as a facilitator (e.g. implementing partner), or as a social warrior depending on the setting (Baskerville & Wood-Harper, 1998). This revised version of Multiview has been used as a basis for constructing a situation-specific method, which arises from a genuine engagement of the analyst with the problem situation (Wastell, 1996).

Further, it transforms the technical conventional wisdom (rational view) to a socially constructed mode of thinking (Churchman, 1971). Furthermore, it helps justify the contingent flow of Multiview in random/uncontrolled system development. The word technical means a rational approach from Mitroff and Linstone's view, whereas Avison and Wood-Harper saw it as a synonym with computer system design and construction (Avison & Fitzgerald, 2006). In unbounded system thinking it would be more feasible to have a T perspective of the analysis of human activity and work system (Avison & Fitzgerald, 2006: 547). It would also be feasible to offer personal and organizational views of computer system design and construction (Linstone, 2010). Recent ICT-based systems such as mobile cloud computing underpinning the development of MMS might require a new version of Multiview that highlights these wicked situations. However, we do not want to impose a new version of Multiview unless our data analysis reveals new issues that can be explained by the second version. Then we will use the IS definitions, theories, and strategies to develop a third version that fit the information society at the BoP.

3.2.5. Multiview 4: Developing Mobile Money Systems at the BoP

Wilson (1990) suggests that the right analytical framework always questions culture, concepts and language of the organizational problem situation more than techniques and tools. It develops through debate with the stakeholders of the system (Avison & Fitzgerald, 2006). It also highlights S-T metaphors of organizational phenomena including artifacts, organisms, mindsets, cultures, political views, psychological status, flux and transformation, and power

mechanism (Morgan, 1986). In MMS development the demonstration of context and subjectivity has become necessary. It is an inter-organizational system that supports automated payment, credits and transfers which require each participant to understand the other participant's context and interpretation of recorded "facts" such as maximum daily transaction size, transaction cost, transaction types, and credit methodology to avoid disputes. The radical redefinition of Multiview takes into account the updated experience of IS analysts, literature and recognizing the new era of the domain of networked information systems (Avison & Fitzgerald, 2006).

The use of Multiview in practice is a hermeneutic process which is led by the researcher and how he reads the problem situation (Argyris et al., 1986). According to the literature review discussed in **Chapter 2**, the MMS includes both Web/cybernetic and mobile clouds that expand beyond the single user-developer relation in designing usability to a multi-layered usability through a distributed network of relations between multiple and diverse actors (Nielsen & Herstad, 2005). The nature of these relations is even different at the BoP context where MNCs deal with mostly illiterate users and non-traditional partners to deliver services in slum areas. Accordingly, we need a refined edition of Multiview that explains the development of mobile-based money systems at the BoP. Referring to the Mobile Money literature discussed in chapter two, we selected two conceptual models that help explain the MMS development process and explore the benefits, challenges, and sustainability associated with it.

The following stages explain how we developed our framework:

1-We developed a conceptual framework for MMS development through a systematic review of the literature. This framework reflects the design stage, including technical infrastructure, value proposition, market access, and financial aspects. It also explains the deployment stage, including how the MMS can be effectively deployed at the BoP context.

2-We explained how the five elements of Multiview help developing a coherent framework using the above mentioned models.

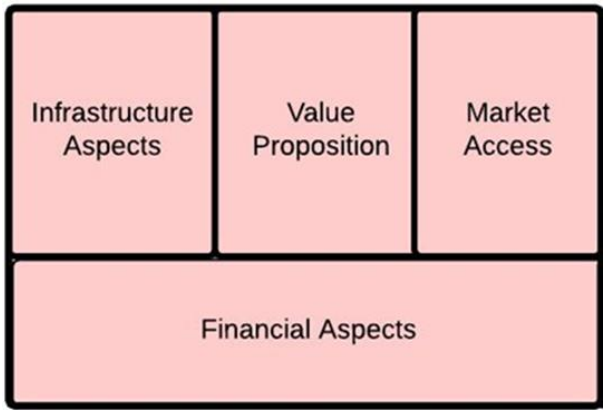
3-We present the refined version of Multiview**4** to explore the challenges, benefits, and sustainability issues in the development of MMS. It is worth noticing that Multiview**4** might be more extension to Multiview**2** than Multiview**3**. We argue that Multiview**3**

offered no insight on the networked society and multidimensional systems that arise at the BoP context (see section 2.5)

3.2.5.1. The development of MMS

As shown in Figure 3.15, the design of the MMS includes four elements: First, the ***Market aspects*** focus on the target customers and the channels to reach them. Second, we need to look at the ***Value Proposition***, which comprises the service/product and the value perceived by the target customers. Third, to describe the technical issues, we use an ***Infrastructure perspective***, and, finally, fourth, we discuss the ***Financial Aspects*** (i.e., costs and revenues).

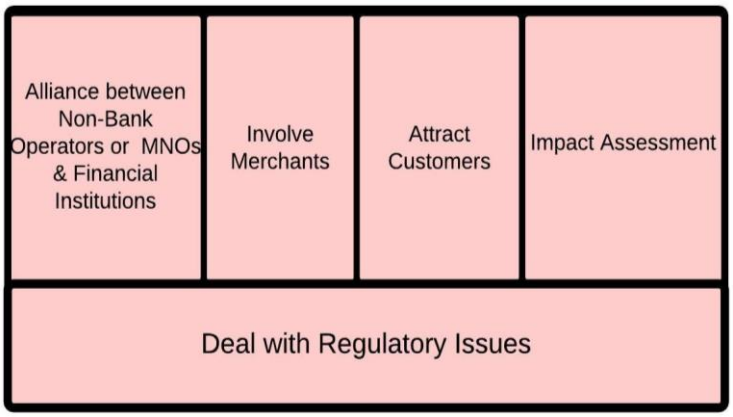
Figure 3.15: The Design of MMS



In order to assess the insurgent strengths and weaknesses, we developed a framework presented in Figure 3.16. This framework supports the analysis ex ante of the dynamic process of the diffusion of mobile payment solutions. As our selected case is coming from actors evolving in other industries, we adapted the framework slightly to fit our needs.

This framework has been designed to take into account the different diffusion steps that a sustainable MMS has to go through in order to succeed. First, an alliance between *mobile network operators (MNOs) and financial institutions* needs to be established. In our case, we would like to know if the solutions provided by the insurgents are cooperative or independent from what is being done by the incumbents.

Figure 3.16: Diffusion of MMS



This stage also considers the partnership with IT vendors who are critical as they will enable mobile payment solutions to scale up and wide by providing interoperability. Second, we analyze how the newcomers are able to *involve the merchants and business intermediaries*. In order to succeed, it is essential that a critical mass of merchants accepts mobile payments. Third, we examine the value that the insurgents provide to *attract consumers*. In fact, without a mass adoption on the demand side, it is unlikely that a solution succeeds. Fourth, we examine the regulatory aspects which can hinder or accelerate the deployment of the MMS. Finally, we explore the overall impact including challenges, benefits, and sustainability features associated with the MMS.

The TOP perspectives will be adopted in our research to solve problems rather than just to define those (Mitroff & Silvers, 2010). As previously discussed in Multiview**4**, the ***T*** perspective relies on observation, quantification, and relationship modeling. The ***O*** perspective depends on consensual, dialectic, bargaining and compromise processes and focused actions than the problem solving reductionist approach, and the ***P*** perspective is based on individual intuition, learning, and experience of varying stakeholders. Each perspective elicits views that cannot be obtained by the others (Allison & Philip, 1971; Mitroff & Linstone, 1993). In widely diverse, economies the T perspective will help address the unified long-term view, while the P perspective will capture the short-term horizons of people (Linstone, 1999).

Table 3.15: Integrating Multiview into the MMS development

Multiview	MMS Development
Human Activity Analysis (HAA)	**Value Proposition:** • Financial Innovation • Social Innovation **Market Aspects:** • Key stakeholder groups • Target customers • Supply Chain **Regulations:** • Political issues • Legal framework • Alliances with intermediaries (Financial institutions, MFIs, and retails).
Socio-Technical Analysis (STA)	**Value Proposition:** • Mobile-based technology for financial inclusion. • Users satisfactions. **Market Aspects:** • Transaction costs (for payment and transferes). • Interest rate (for microcredit). • Financial and Organizational partnership. • Different Institutional issue of MMS diffusion. **Financial Aspects:** • Transaction costs. • Operating costs. • Revenues & Pricing. • Compensation & Payroll.
Data Modelling (DM)	**Value Proposition:** • Information needs (i.e. Flow charts). • Entity relationship modelling.
Technical Specifications (TS)	**Technical Aspects:** • Technical infrastructure of Global Mobile System. • Technical features of mobile handsets. • Mobile Money software. • The electronic wallet cloud.
Human Computer Interface (HCI)	**Technical Aspects:** • User Friendly Mobile Interface • Web Interface for the MMS cloud

Collectively, the TOP perspectives offer a meta-inquiring system that includes all other modes and it is at once both holistic and pragmatic (Linstone, 2010; Mitroff & Silvers, 2010). However, widely diverse economies are dominated by engineers who prioritize the T perspective over the others (i.e., O, P perspectives).

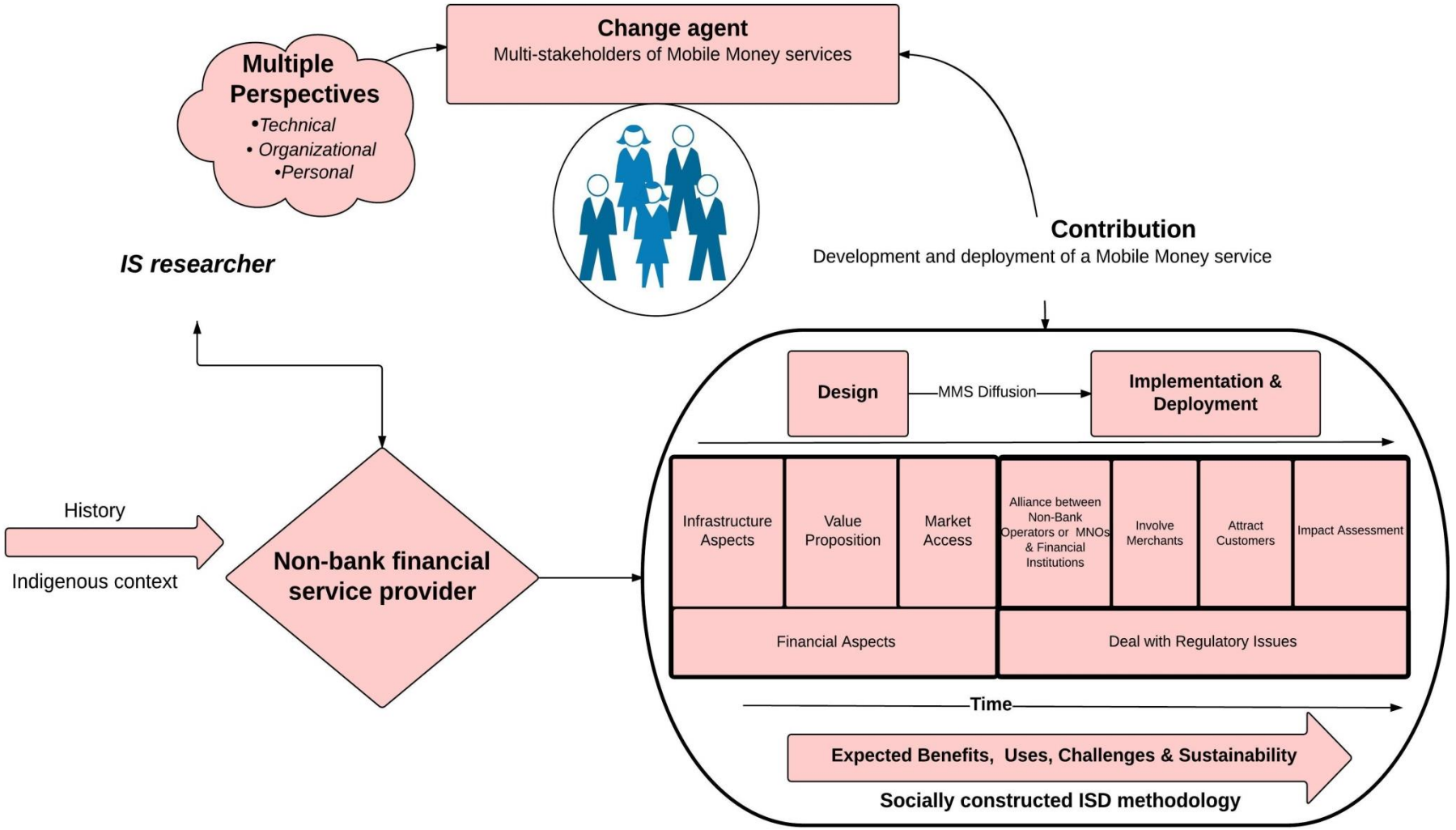
Throughout Multiview story, we found that the four S-T metaphors might not be used equally as lenses to understand and explore the ISD process. Rather, they are pragmatic, and as

argued by Goldman (1994:622) "*the standard for these metaphors is utility and focus, not comprehensive explanation*"

As shown in Table 3.15, we adopt the five stages of Multiview iteratively to analyze different aspects of the MMS business model and technology features. The HAS and Work Design will help analyze social issues in the system design, while the Information Analysis, Technical Design and Human-Computer interface will be used to analyze the technical aspects of the MMS. The HAS addresses "what we hope to achieve for the system owner (or Masary.Co) as a result of installing a mobile and cloud-based MMS". The other stages describe what job the MMS is going to have to do.

The BoP context in general and the financial inclusion market in specific encompass a continuous rotation of stakeholders who get involved in one or more of the development stages. Further, each one of them might adopt technical (rational), organizational, or personal views.

Figure 3.17: Multiview4 for MMS Development



Lessons & Conclusions Lessons & Conclusions

1. The marriage between the IS and BS facilitate the multiperspectives systemic thinking and lead to sustainable and flexible ISD methodology.

2. S-T schools of thought need to be revived to address the emerging phenomena of the networked society.

3. The Multiview**4** is an inclusive, pragmatic, and contingent methodology that developed from the academic debate about a hybrid ISD methodology (see Avison, Fitzgerald & Wood-Harper, 1987) and offers new insights into the rising phenomena of the information networked society (see Nickerson, Varshney & Muntermann, 2013). Further, its action research orientation makes a holistic approach that considers business strategy, embedded innovation mechanisms, and social impact of ICT on individuals, institutions, and society.

4. Multiview**4** incorporates the elements of business system development at the BoP in the processes of ISD. In doing so, it offers not only an ISD toolkit, but also a toolkit for BS development. We found that Multiview**4** (Wood-Harper et.al, 1985; Avison & Wood-Harper & Antill, 1990; Avison & Wood-Harper et.al, 1998; Wood-Harper & Avison, 2003; Bell & Wood-Harper, 2003 & 2014; Wood-Harper & Wood, 2005; Mohamed et.al, 2014) is a descendant of both IS & BS domains. MMS have been challenging to analyse and implement because of the complexity of the multidimensional markets that underlie payment solutions (Rochet & Tirole, 2003). Such complexity requires adopting a multiperspective inclusive approach such as Multiview (Ondrus & Pigneur, 2006; Ondrus & Lyytinen, 2011).

5. It might be difficult to draw one RP to represent a single perspective (i.e. Technical, Organizational, or Personal). Drawing a RP might recall and testify different views in a situation and a wide variety of visualization tools (e.g. Social networks, visual brainstorming, imagery manipulation, and avatar simulations), which can help achieve one of those two objectives.

6. Action research is a valid scientific methodology that has been adopted to develop different IS & BS theories. Our research requires an inclusive methodology that embeds the multiperspective view of MMS development and facilitates the deployment of Multiview**4**. In our view, Multiview is a "contingent methodology" that can be integrated with other IS and BS developments, tools and techniques that are used within them (Bell & Wood-Harper, 2003). Accordingly, we tracked the origin, history, and the epistemological assumptions behind this ISD approach, to propose a new version customized for the BoP context. This version includes the Multiview methodological toolkit, the mobile payment design (Pousttchi et.al, 2009) and the mobile payment diffusion (Ondrus, Lyytinen & Pigneur, 2009).This improvised edition might contribute to other versions developed by Trevor Wood-Harper, David Avison, Bob Wood & Simon Bell.

7. Our Multiview**4** considers how the technical perspective might incorporate the HAA and S-T analysis (Avison & Fitzgerald, 2006: 547). We see Multiview**4** as a methodology for exploring and developing IS.

CHAPTER FOUR
RESEARCH METHODOLOGY

Introduction

In **Chapters 2 & 3**, we reviewed previous studies covering the mobile money literature to find the research gap and build a relevant theoretical framework (i.e. Multiview4). Both chapters offer the framework of ideas to identify the problematic situation discussed in the area of developing mobile money system development in **Chapter 1**. This chapter offers the Methodology, including our philosophical assumptions, the choice of research approach, research strategies, data collection, and data analysis methods.

As shown in Figure 4.1, this chapter starts with a systematic typology of IS methodologies and philosophical foundations. It reflects the researcher's learning journey between different typologies of "*Information System philosophical paradigms"*. Developing a typology of IS methodologies, however, is a complex process that might require a comprehensive literature survey in IS methodologies (Nickerson et. al, 2012). In contrast, the researcher pinpoints the key taxonomies such as Burrell & Morgan (1979), Galliers & Land (1987), Hirschheim & Klein (1989), and Geels (2010) that have been adopted in the development of the candidate theoretical frameworks and the proposed Multiview model discussed in **Chapter 3**. In doing so he tended to avoid the generalization of a particular typology rather he provided purposeful evidence to justify the choice of research methodology in the following sections.

The interpretative action case design has been followed (Vidgen & Braa, 1997; Braa & Hedberg, 2002; Braa, Monteiro & Sahay, 2004). Qualitative interviewing (Myers & Newman, 2007), Focus groups (Krueger, 2009; O'hEocha et al., 2012), Participant Observation (Mingers, 2003), and Archival analysis have been used as methods for data collection. **Tables 4.3 & 4.4** show the variety of data sources and their justification. Before taking the aforementioned decisions (the qualitative approach, case study design, and the proposed set

of collection methods), I explored alternatives and written a justification as to why these decisions have been made this way. In summary this set of methods aimed to collect a socially structured (inclusive) account of varying stakeholders' experiences.

Figure 4.1: the Structure of Chapter Four

4.1. Problem Solving in Information System Development

Developing an information system at the BoP requires a middle position between understanding, intervention, and explanation mindset. Such a context requires a methodology that helps design, control, and explain the construction of the technical artefacts in an organisational context where stakeholders' perspectives need to be reconciled (Mahroum, Bell & Yassin, 2013). Our research identified a problem situation in developing MMS where the technical side is positioned in the background and the organisational and personal sides brought forward to understand social behaviour. In doing so, we require a methodology that

taps the objectivity of the technical/rational view and the subjectivity of the social activities viewed from organisational and personal lenses (Braa & Vidgen, 1999).

Influential approaches such as structuration theory (Giddens, 1991; Orlikowski, 1996) and actor network theory (Walsham and Sahay, 1999; Latour, 2005) revealed a linkage between action and agency in understanding how information technology, organizations and practice shape each other. Such elements require careful choice of ontological and epistemological positions to be able to solve a problem in the ISD domain. In the next section, we explain these positions and justify our choice.

4.1.1. Ontology in Problem Solving Research

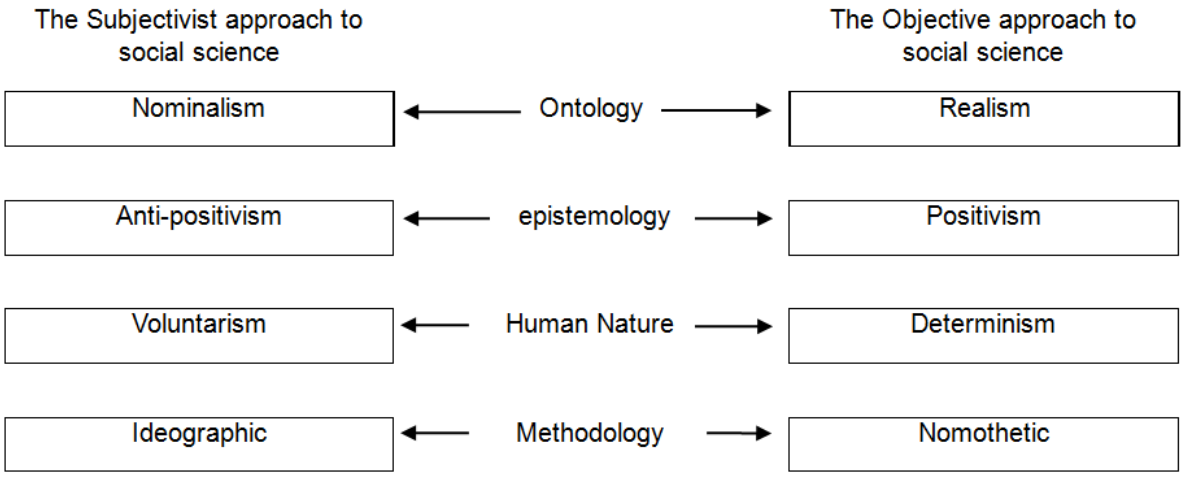
Hirschheim & Klein (1989) refers to four steps in conducting IS research, including paradigm identification, setting an inquiry system, identifying ontological & epistemological assumption, and methods. In the next paragraphs we explore the key philosophical concepts in problem solving research in general and in ISD specifically.

Kuhn defines "*paradigm*" as generally accepted scientific achievements that for a time provide practitioners with models for problems and solutions (Kuhn, 1970). Alternatively, Burrell & Morgan (1979), see paradigm as a set of theoretical assumptions about the nature of the subject matter. Hirschheim & Klein (1989) define it as a set of assumptions that professionals use to share similar insights and employ in shared practices. It encompasses assumptions about the world (physical and social) and others about how we accumulate knowledge about this world. The former type refers to ontological assumptions and the latter refers to epistemological assumptions.

In their seminal work, Burrel & Morgan (1979)"*ontology"* as the essence of the phenomenon and whether the reality imposes itself on individual consciousness (external), or emerges from individual consciousness (internal). "*Epistemology"* is the second assumption that

explains how we might understand the world and communicate our expertise of this knowledge to our successors. The third assumption is the "*human nature*" that draws the map of relationships among human beings involved in a problem situation and ranges between "*deterministic relations*" and "*creative role relationships*" (Burrel and Morgan, 1979: 2). "*Methodology"* is the final assumption which is dependent upon the other three. It presents not only different feasible tools for data collections and analysis, but also guides the investigators on how to acquire knowledge about the problem situation. As shown in Figure 4.2, each ontological assumption results in two extremes. Nominalism as a subjective ontology vs realism as an objective ontology. "*Anti-positivism*" as subjective epistemology Vs. "*Positivism*" as objective epistemology, "*Voluntarism*" as a subjective nature of humans Vs. "*Deteminisim*" as the objective nature of humans, and "*Ideographic*" as subjective methodology Vs. "*Nomothetic*" as objective methodology.

Figure 4.2: The Subjective-Objective Dimension

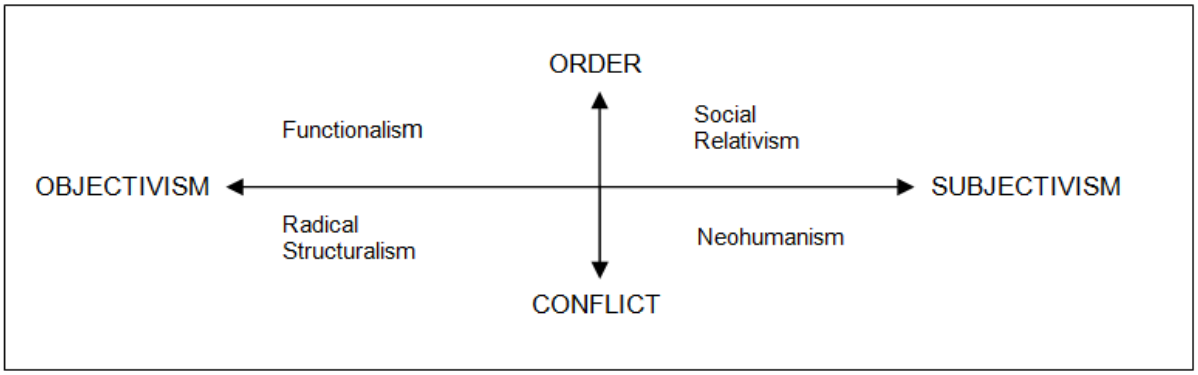


Adopted from Burrel & Morgan (1979: 3)

Using Burrel & Morgan's assumptions, Hirschheim & Klein (1989) developed another stereotype of ISD paradigm. They set two axes; "*Order-conflict*" axis for the ontological orbit and "*Objectivist-subjectivist*" axis for epistemological orbit (see Figure 4.3). Along the vertical axis, the order view presumes that the social world is ordered, stable, systematic, integrated, and built upon consensus and functional coordination. The conflict view emphasizes that the social world is full of changes, conflicts, disintegrations, and

intimidation. Along the horizontal axis, the objectivist extreme adopts the "hard tradition" of gaining knowledge that constructs cause and effect relationships into models and uses methods drawn from the natural sciences to the study of social phenomena. In contrast, the subjectivist extreme refers to the "soft tradition" of knowledge management in which researchers aim to understand the human experience without black boxes. It explains how to understand the way individuals create, modify, and interpret the world in which they live (Hirschheim & Klein, 1989: 1201). This aforementioned demarcation resulted into four intertwined paradigms: positivist, interpretivist, radical structuralist, and radical humanist). Hirschheim & Klein's typology contributed to develop ANT and Innovation Diffusion theories during the last two decades (Klecuń, 2004; Stahl, 2013).

Figure 4.3: Information System Development Paradigms

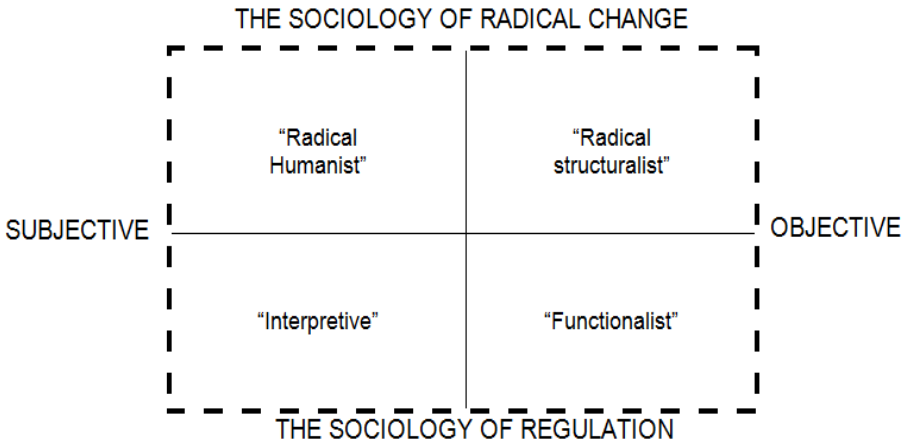


Adopted from Hirschheim & Klein (1989: 1202)

Wood-Harper & Wood (2005) also followed Burrell & Morgan's trail to map different IS methodologies and to develop Multiview model in particular. Wood-Harper & Wood's explanation showed more consistency (than Hirschheim & Klein's interpretation) with Burell & Morgan's original assumptions about the nature of social science, including *Ontology, epistemology, human nature, and methodology* (Burrel & Morgan, 1979: 3). However, the human nature assumption has been replaced with "*information situation*", which presents human beliefs about their own behavior in any information situation. This replacement reflected the authors' action research experience as ISD representing a set of turbulent information situations that embed different human behaviors to achieve radical change. Explaining Morgan's model, the authors stated two dimensions: "*the nature of the content of the information situation*" and "*how the problem solver perceives these contents"* (Wood-

Harper & Wood, 2005: 29). While the first (horizontal) dimension comprises assumptions about *the objective* versus *the subjective* nature of the available information, the second (vertical) relates to the hypotheses about the degree of change to the information situation as *regulation* vs. *radical* (see Figure 4.4). Their interpretation of Burrell & Morgan's typology resulted in four paradigms: *functionalist, interpretive, radical humanist, and radical structuralist* respectively. The *functionalist approach* represents the natural science extreme objective-regulation match, while the *radical humanist* exemplifies the sociology extreme subjective-radical match. In between, the interpretive approach represents subjective-regulation combination that has dominated the IS literature in Europe during the last two decades (Walsham, 1995). The radical humanist approach is an objective-radical mix. Wood-Harper & Wood (2005) paved the way for a wider set of social constructed assumptions in IS research and consider the information growth dynamics (Kallinikos, 2006).

Figure 4.4: Four Paradigms for the Analysis of Social Theory



Adopted from Burrel & Morgan (1979: 22) to explain the above view of Wood-Harper & Wood (2005)

All the aforementioned typologies lead to six types of ontology that identify *"what we know about the world"* (Cunliffe, 2010). They are positioned between two extremes; objective oriented versus subjective.

The first type is *reality as concrete structure* where facts can be defined independently of human consciousness through exact measures and variables. This objective ontology draws absolute definitions and laws of the world. In our research, issues of mobile finance and

technology infrastructure can be studied objectively from a technical perspective. The second is *reality as a concrete process* where the interrelations and the mobility of the materials and social objects change in a predictable manner. This ontological position can be used to study the going concern and foresights of IS.

The third is *reality as contextual field of information.* Advocates of this assumption see objects in relation to their surrounding environment. Humans usually exchange information about their learning experience and adapt to the environment. So, there is no distinction between what the humans see and their context. The effectiveness of IS cannot be identified in isolation of the surrounding environment. The perceived usability and benefits of MMS cannot be isolated from the context where the system is evolving. The system development best practices and how they identified are contingent to the context.

The fourth is *reality as symbolic discourse* where meanings, value, and norms gets created through the social interaction between humans. This human made reality reflects how different individual experiences have been exchanged to create a common sense about things, people, or events. The created symbols then lead individuals to behave according to the common sense and agreed meanings. Innovation is a value that results from developing IS in a participative fashion. However, the definition of innovation can reflect different meanings in different social groups who embed their own experience in this definition (Baskerville et al., 2014). Innovation in the BoP, for instance, emerges from the grassroots, based on low cost and creativity. The elite class believes in technological advances pushed by market leaders such as Apple and Samsung who create a human need for the new technology (Geels, 2010).

The fifth is *reality as individual construction* where humans evolve their learning about society's common sense. How individuals in a society accept, reject, or tailor the common sense and justify their own behaviour toward other individuals in society. Each individual has his/her own day-to-day reality. In ISD, the definition of the system effectiveness as defined by the industry average and benchmarks will be different the effectiveness as realized by the system operators and end-users (Hamilton & Chervany, 1981).

The last type is *reality as projection of human imagination*. It represents the extreme subjective ontological position. It uses human consciousness and feelings to draw future scenarios of the complex world without empirical research. It relies more on how th individual practitioner sees the future. Al Gore (2013), for instance, drew six drivers of the future. One was the technosourcing that shows how global IT outsourcing will decrease the economic power of western nations who trust eastern nations to maintain their data and control their life.

Apart from the first ontological assumption, the other five are usually called social construction ontology (Geels, 2010; Bijker et al., 2012). Because we study different process and social interactions between different stakeholders in the MMS development, we have chosen different ontological positions that are socially constructed. We believe the no one holds the full truth; rather, each individual has different experiences that lead to a different perception of the so called "reality" and different future scenarios.

4.1.2. Epistemology in Information System Development

Max Weber developed the concept of "ideal type of sense" in which one view overruns other views of an individual phenomenon. Despite the promise of reaching a unified analytical construct, it presumes a "methodological utopia" that does not exist in the real world (Weber, 1949: 90). Churchman pinpoints five types of inquiring systems (Mason & Mitroff, 1973 & 2015; Checkland, 1981, Mitroff, 1983; Linden et al., 2007). Each kind of "inquiring system" offers a distinct mode of thinking, including a set of elements (e.g. inputs, outputs, operator, and guarantor) which helped influence philosophers to solve problematic situations at the time (Richardson & Courtney, 2004; Mitroff, 2012).

The "*Leibnizian inquiring system*" is a deductive approach where preset rules and evidence get examined and falsified. It is based on closed systems which begins with a set of axioms and uses formal logic or a mathematical algorithm to create knowledge that solves problems. Such an approach best explains the minimum technical requirements for information systems

(e.g. software and hardware) (Avison & Wood-Harper, 1990). Its internal validity has not been exposed to debate and yet believed as the most scientific approach to building knowledge. It assumes that the world is simple and can be understood in terms of cause-effect relationships.

The "*Lockean inquiring system*" is a consensual based proposition that offers a moderate view of experts engaging with the problem interpretation and solving activities. It actively seeks input from the environment, and is communicative and social. Lockean inquirers use their five senses to observe the environment and engage in a discourse with others to develop interpretations and understanding of perceived phenomena. However, advocates of this inquiry system define social problems as bounded and well structured dilemmas that can be answered through numbers (Mitroff, 2012). This approach is much more in line with the current writing about the mechanisms of socio-technical change and organizational learning (Argyris & Schon, 1995).

The "*Kantian inquiring system*" is based on the interaction between human's perception and the realised thing itself (noumenon in Greek) (Monod & Boland, 2007). Each human has different life experiences that make him/her appreciate things differently. Emanuel Kant believed that the single-sided control of reality is not enough to understand a social problem, rather, a range of views needs to be considered to strengthen this understanding. Advocates of this approach believe that the world is complex, knowable and there is more than one way to describe it according to the observer, observed, time and place of observation. In doing so, they combine data from the ground with theories (models of ideas) to gain an unbiased view of the phenomenon (Avison & Malaurent, 2014). They routinely turn these models on or off as they see it relevant (Churchman, 1971). Each model has a measure of how well it is doing. It can be a quantitative measure such as a "r-square" in regression analysis or qualitative replication features that are drawn from the context. This approach can help explain information system development in a wicked environment (Harrop & Wood-Harper, 2013).

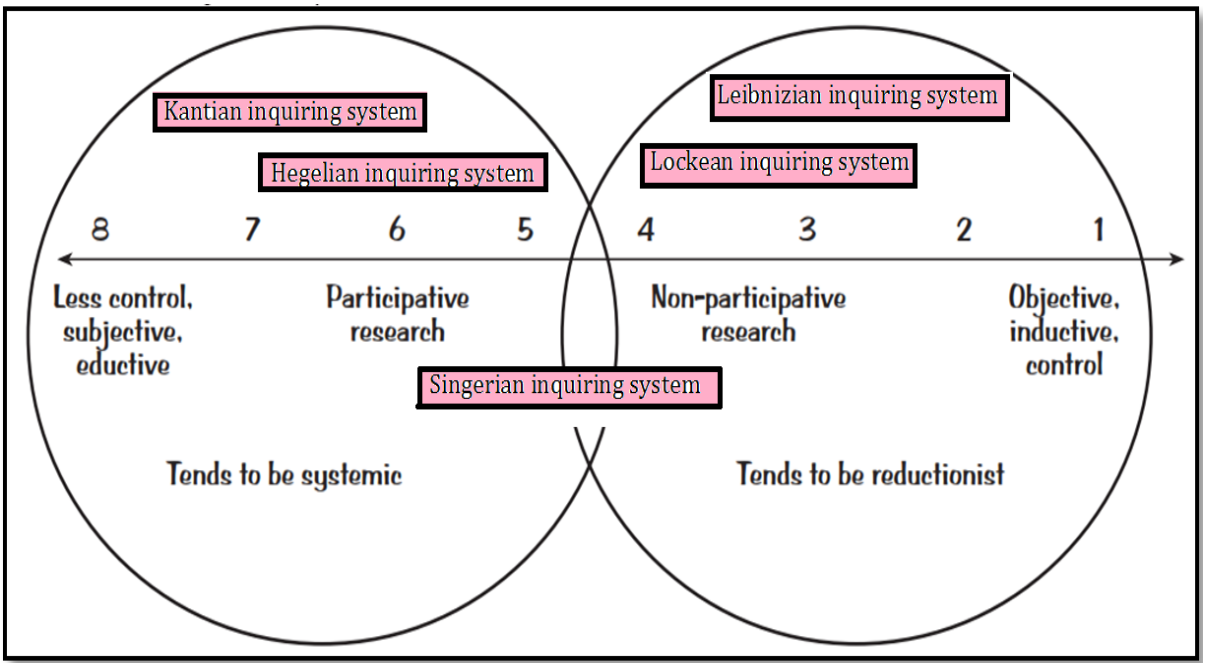
The "*Hegelian inquiring system*" is a dialectical approach that addresses the extreme views that creates a discursive situation. Advocates of this approach argue that social problems can

usually be accompanied by such events as disagreement. Once zero point (i.e. reconciliation) is reached, the conflict can be solved. In doing so, the researcher might highlight all counter theses and try to reach a rational midpoint. Theories reflect the experts' views and antithesis reflect experts' views that are far from the mean (Mitroff, 2012). Hegelians give a higher emphasis to theory over the posteriori facts. This approach can help reconcile the conflicting socioeconomic objectives of information system owners (Thought & Wisdom, 2012).

The "*Singerian inquiring system*" is a pragmatic approach where the researcher gives equal opportunities to all the above mentioned systems so s/he gets a complete insight that cannot be captured by a single inquiry system. Hegel's view is not based on "paradigm shift"; rather it swept into the boundaries between paradigms, while gets twisted to accommodate the progressive research process and its new elements. So while the Kantian approach employs diverse views, the Singerian approach employs diverse inquiry systems. The goal of the Singerian inquirer is the creation of common knowledge, suitable for the resolution of social and public problems, in contrast to the Liebnizian system, for example, which is very much directed at esoteric, scientific knowledge. But social problems, hunger, poverty, homelessness, crime, and financial exclusion reside in an environment that is exceedingly complex and highly interconnected. The same can be said for management problems, since business enterprises and any other organization, for that matter, exist within that same environment. This approach was found significant in the anthropological studies of Information and Communication Technologies for development purposes (Hayes & Westrup, 2012; Elyachar, 2012 a&b).

Bell & Wood-Harper (2003) emphasised that the subjective view of reality requires systematic epistemological tools, while the reductionist Leibnizian approach works better for objective abstract reality. The systematic tools of knowledge building offer less control and encompass inclusive research processes to educate those involved in such research.

Figure 4.5: Systematic and Reductionist Tendencies and the Continuum



Adopted from Bell & Wood-Harper (2003:20)

4.1.3. Positivist, Interpretivist & Critical Paradigms

Hirschheim (1985) pinpointed five classes of epistemology in IS history; positivism, anti-positivism, re-enter positivism, contemporary critics, and post-positivism. These five stages in time produced three epistemological paradigms, namely, positivism, interpretivism, and critical research.

4.1.3.1. Positivism

Advocates of positivism believe that they know how humans see reality, so that their view represents the wider population. In doing so, they set educated guesses drawn from previous studies and estimate cause-effect relationships to examine their assumptions. Positivists use empirical testing as the only valid scientific method to acquire knowledge. Positivism is based on unified scientific methods, causality, empiricism, and abstraction (Hirschheim & Klein, 1989). It can be used to study all ontological stands to build and accumulate

knowledge. Positivists reduce the complexity of the human phenomena into conceptual elements, constructs, and variables to draw laws and regulations of the world.

Only refutation of objective knowledge and documented experience can be accepted as a valid method. This process does not consider the surrounding environment, including culture, identities, beliefs, and behaviours. It employs mathematics to prove/refute the correlations and regressions between variables.

Knowledge built from positivistic research reflects logical consistency, explanatory power, falsifiability, and parsimony (Bhattacherjee, 2012). Positivists question the consistency between constructs and their ontological grounds. For instance, a construct that is built on rationality and concrete structure cannot be linked to another one that is socially constructed (Bhattacherjee, 2012).

Using structuration theory, Hirschheim & Heinz (2010 & 2012) presented the following schools of thought; technological advances, research themes, dissemination channels of the positivistic ear of ISD discipline. Scholars such as Daniel Techroew, Borje Langefors, and Sherman Bumenthal uncovered the distinction between the Infological and Datalogical of IS as explained in **Chapter 2**. They also founded system optimization design algorithm, and problem statement language. Gordon Davis - one of the fathers of IS- relied on empirical research to conceptualise data processing from organisational perspectives. He also developed the validity of data processing through business oriented testing and decision support system (Davis, 1974 & 2000).

In mobile money literature, positivism has been followed to draw the transaction cost models and the financial impact of this technology on small businesses' profit (see Vong, Fang & Insu, 2012).

4.1.3.2. Interpretative Approach

This approach aims to accumulate knowledge by exploring human extrasensory experience, perceptions, consciousness and beliefs in organizational and personal settings. The interpretivists use these subjective values to understand individuals' behaviour within their surrounding context (Hirschheim, 1985). Influential scholars of the neo-Kantian school such as Johann Droysen and George Simmel argued that natural science principles and physics regulations ignore the deep meaning associated with human phenomena. The 21st century is rich of complex phenomena that are not value free and culturally distinguished from each other (Burrell & Morgan, 1979).

The social meanings evolved with history. In information studies, Vico (1984) called for a new science that reflects the structures of developing social meanings and values. Later, such an approach has been heavily considered in technological advances and the social meanings associated with development and adoption of IS (Land, 2010).

Kant (1781) distinguished between pure reason that arises from experience and the understanding of varying human perceptions. His philosophy of transcendental idealism offers both physical and human sciences as two pillars of moral nature. This approach addresses the cultural issues embedded in developing the practical experience.

Hegel (1910) offered disputation as a valid tool to interpret the social meanings. Studying dialects improve inappropriate concepts to commonly agreed truth. Each dialectical thesis reflects different shapes of human consciousness that lead to absolute knowledge.

Karl Marx argued that the absolute spirit does not exist and all knowledge is human created. Society is an alienation of man through self-consciousness (Marx, 2012). His interpretative approach emphasises the duality between nature and society.

Manuel Castells, a fellow of Karl Marx, extended the interpretative approach to the trilogy of economy, society, and culture as key components of human life (Castells, 2011a). His theory of the networked society assumes that economics and cultural orientations shape the structure of our society. In the era of ICTs, nodes of economic power and dominating cultures led evolve the way our world is structured (Castells, 2011b). His trilogy creates social intuition that is intersubjective and progresses through historic discourse (Husserl, 2012).

Table 4.1: Comparison between positivism and interpretivism

Dimensions of comparison	Positivist	Interpretivist
Philosophical basis	Realism: the world exists and is knowledgeable as it is real	Idealism: the world exists but different people construct it in very different ways.
The role of social science	Discovering the universe laws of society and human conduct within it.	Discovering how different people interpret the world they live in.
Basic units of social reality	The collectively: society or organisations	Individuals acting singly or together.
Methods of understanding	Identifying conditions or relationships which permit the collectively to exist.	Interpretation of subjective meanings which individuals place upon their action.
Research	Experimental or quasi-experimental validation of theory.	The search for meaningful relationships and the discovery of their consequences for action.
Methodology	Abstraction of reality especially through mathematical models and quantitative analysis	The representation of reality for purposes of comparison. Analysis of language and meaning.
Society	Ordered. Governed by a uniform set of values and made possible only by these values.	Conflicted. Governed by values of people with access to power.

Adapted from Myers (2013)

The above discussion, confirms that the Kantian, Hegelian, and Singerian inquiry systems can be extended through interpretivism. In the mobile money literature, a few studies consider the social networks in the mobile money industry (Maurer, 2012). As shown in the

table above, positivism and interpretivism offer different epistemological assumptions to study different types of realities. In the next section, we explain critical research that offers a more pragmatic epistemological approach of building knowledge.

1.1.3.3. Rationale of the Kantian Interpretive Approach

In order to understand the dynamics of the process through which MMS have been developed by stakeholders to coordinate their participation and reflect transparency in transactions, the *qualitative* approach was chosen.

This understanding may provide an unrivalled capacity to constitute compelling arguments about how mobile devices work in the context of non-bank microfinance in Egypt. Yin (2003) emphasizes that case studies are *reporting interpretations of interpretations* and as such they *do not represent unproblematic 'facts' concerning absolute reality*, and hence lack external validity (Walsham, 1993, 1995a&b). However, this case study reports a descriptive state of affairs and does not represent an attempt to locate some 'universal truths' or generalisable theories, which explain the phenomena under investigation. Further, interpretive analysis of the research data will be followed to *narrow down unique factors in e-Masary case* and the MMS in Egypt.

This thesis adopts an inclusive interpretative systematic thinking approach incorporating the Kantian and Hegelian inquiry systems explained above (see the systems thinking section in C**hapter 2**). In doing so, we aim to address unbounded and wicked problem situations that face the stakeholders of MMS in Egypt. Their varying and sometimes conflicting view reflect their varying life experiences dealing with different life situations. It is challenging to reconcile all views and build a legitimate consensus and unified strands of actionable knowledge.

Both the Lockean and Leibnizian inquiring system are not useful to solve unbounded problems that encompass considerable social, political, and organisational dilemmas that cannot be reduced to causality. The argumentative stands of the regulators, developers, and users and their different actions defy the potential of reaching a consensus or a rational action plan.

The day-to-day problematic issues, which multistakeholders face during the development processes, are ill-defined and no solution can be easily agreed. Our Singerian approach helps offer solutions that are good enough and consistent with building a critical mass of advocates. Mitroff, Alpaslan & O'Connor (2014) argues that today's management studies require a multiperspective systematic inquiry system that extends the Singerian system to address the dialogue between the experts' rational/technical view, organisational/societal view, and the personal/political view to engage with problem situations in the 21st century.

4.2. Research Approaches

Certain research methods are associated with positivist thinking, such as quantitative methods, whereas qualitative methods are associated with interpretivism (Walliman, 2006). However, Crotty (2007) disagreed with this distinction and argued that it is not the quantitative methods that make positivist research, but the "*attribution of objectivity, validity and generalisability to quantitative findings*" that give the research the essence of objectivity. Along the same lines, Gephart (2004: 456) stated that "*large portion of the qualitative research, I have reviewed for AMJ can be characterised as representing positivism and postpositivism*".

This might indicate that it is the theoretical perspective rather than the research method that determines how study findings are interpreted. Unfortunately, this is unclear in many research articles, and the only possible way to infer the theoretical perspective of particular researchers is through their research methods.

It has been argued that the deductive research approach does not suit some social enquiries that relate to questions of "why". Others have argued that this approach results in less reflections and explanations compared with the inductive research approach (Bryman, 2008b), which, by contrast, starts with the data and tries to find out "*if any patterns emerge that suggest relationships between variables*" (Gray, 2009: 14).

Having said that, it is well documented that the deductive research approach is more appropriate for theory testing (Bryman, 2008a), whereas the inductive research approach can be used for theory development (Gummesson, 2001; Bryman, 2008a).

These studies have drawn on a variety of qualitative research methods such as the critical incident technique, participant observation, interviews and ethnography. They have followed an inductive research approach, which is justified on the grounds that emotions are a product of many personal, social and cultural factors, implying the need for rich descriptions of why they occur and under what conditions.

4.2.1.Quantitative Research

"Quantitative research methods were originally developed in the natural sciences to study natural phenomena" (Myers, 2009: 8). Quantitative research is used mainly to test a theory using individual hypotheses. These hypotheses are attempts to establish relationships between variables and concepts. The primary data collection methods include survey tools such as questionnaires and structured interviews, which can be quantifiable. Data analysis using these method types, is undertaken by using statistical tool packages and expressions of the hypotheses is given in tables and charts, by linking them together (Neumann, 2002; Creswell, 2003).

4.2.2.Qualitative Research

Qualitative research methods were developed in the social sciences to enable researchers to study social and cultural phenomena. Examples of qualitative methods are action research, case study research and ethnography. Qualitative data sources include observation and participant observation (fieldwork), interviews and questionnaires, documents and texts, and the researcher's impressions and reactions (Myers & Avison, 2002). Qualitative research is advantageous when little is known about a phenomenon. It can also be effective when the investigator suspects that present knowledge or theories may be biased, or when the research question pertains to understanding or describing a particular phenomenon or event about which little is known. This research approach is holistic. Understanding, explaining, and developing theory is inductive through documenting, describing and identifying relationships between concepts. This enables the creation of theoretical explanations that explain reality, and which lead to theory development using rich description, data synthesis, and abstraction (Morse, 1995; Morse & Field, 1995; Creswell, 2012). Qualitative research may be divided into the four methods discussed in **Section 4.3**.

Qualitative research is a field of inquiry to obtain in depth understanding of social behavior and the reasons that govern such behavior (Bell & Bryman, 2007). This understanding presents a whole picture about the motives that underlie the human decision making investigating who, what, why, when, and where (Easterby, 2008). These sources are dynamic and present a contextual field of information among actors, their symbolic discourse, and the social construction of the tools that they are using to interact. Due to these ontological dimensions, we chose exploratory case study to understand the nature of this contemporary phenomenon in relation[21] to its context (Yin, 2003). In doing so, we relied on multiple sources of evidence to prove the uniqueness of the case's situations. Accordingly a mix of triangulated data collection methods and grounded theory has used. All of the above reflect different ontological, epistemological, and methodological positions that should be interconnected; otherwise, critiques will arise about the ability to generalize the results of this case study. As a precaution we triangulated our data and cross-checked the collected data

[21] Lack of MNCs involvement in the Egyptian development that is presented in the growing market of mobile telecommunication without reaction on the Egyptian GNP

with both company records and descriptions of other individuals. We also asked the research participants to give their feedback on our interpretation of their views that have been reflected in the interviews and focus group meetings.

4.2.3. Rationale of the Qualitative Approach

In this thesis, we follow a systematic inquiry to study MMS stakeholders in natural settings of system development at the BoP context. We aim to obtain in-depth accounts of the how the TOP perspectives shape the participants' issues, situations, or events (Maxwell, 2012).

In our journey, we aim to see how the stakeholders perceive the infrastructure aspects, value propositions, market access, and financial aspects associated with the design of MMS. We also address how these stakeholders perceive the diffusion of the system through alliances with non-traditional partners such as the government, the NGOs, and MSPs. Such partnerships require regulatory frameworks to govern the impact of the whole MMS. Above all, we explore the impact of e-Masary wallet on those stakeholders in terms of realised challenges, benefits, and how to try to improve the system's sustainability.

We believe that the aforementioned issues cannot be understood in isolation from the social and organizational context on systems use at the BoP. Our study was conducted in Egypt, a developing country, where the digital divide is another issue associated with the context of the system development process.

In **Chapter 5**, we discuss the technical view of Masary Co, the system owner. Our aim is not to study the causality among the elements of the MMS development and the antecedent conditions. Rather, we shed light on how these causal processes work among at the Egyptian BoP.

In **Chapter 6**, we defined a problem in system development. Then we provided an action plan to improve the full integration between the mobile payment and microfinance subsystems in e-Masary platform. In addition, our results and the final framework of MMS development communicates to the individual perspectives of policy makers, systems designers, and practitioners.

4.3. Research Strategies

Bell & Wood-Harper (2003) discusses eight research strategies based on the degree of control over the research results and the demarcation between the researcher objectivity (i.e. setting equal distance with other views) and subjectivity (interpretation of purposefully selected views).

Strategies such as conceptual study, mathematical modelling, laboratory experiments, field experiments have more control over the data collection and analysis. In doing so, they facilitate measuring technical facts and setting objective unrefuted quantifiable meanings. Other strategies like survey design, case study, phenomenology, and action research offer less control over the final research outcomes. In doing so, they offer qualitative data that helps in drawing judgmental contingent results. Miles (2010) & Markus & Mentzer (2014) employed foresight analysis as a subjective research strategy for ICT/IT projects that serve society. The following section explains all the ***qualitative-based strategies*** and justifies "why" / "why not" they have been adopted in our research.

4.3.1.Foresight Analysis

One of the recent, but recognizable methods of system thinking is the scenario analysis or the so called foresight analysis (Markus & Mentzer, 2014). The Systematic Foresight Model (SFM) in particular helps explore alternative futures and develops a vision for these futures (Saritas, 2013). In doing so, it maps the potential impact on society and reflects the

implications for policy makers and different groups of stakeholders (Saritas & Nugroho, 2012).

The SFM is grounded in the main systems thinking principles, namely; causality, holism, hierarchy, and continuity. It acknowledges the institutional and behavioral properties of mobile telecoms (as MNCs) and the consequent behavior of the BoP community. Understanding the *causal interdependencies* is essential for the definition of the MMS and its boundaries. Adopting the *holistic viewpoint* sheds light on the social forces (e.g. demographic), economic, technological, ecological, and political factors the affects the sustainability of the project from the outside-in. The policy makers can then make their decision based on the wider context and issue feasible transformations to the role of the mobile telecoms in non-voice services such as branchless banking.

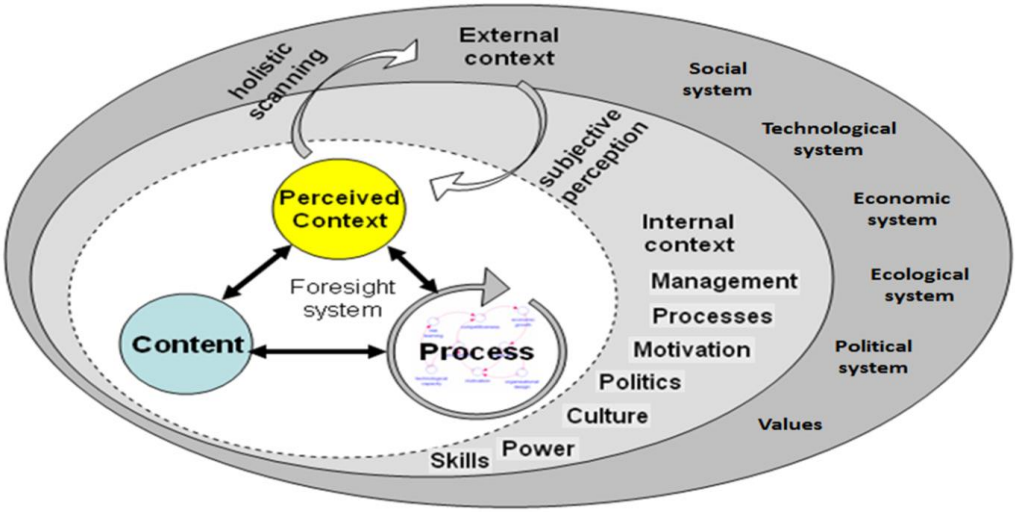
Understanding the hierarchy of the MMS helps the analysts prioritise the structural and functional boundaries for scenarios. Accordingly, we conducted a stakeholder analysis to reveal the macro, meso, and micro layers of e-Masary. Feed-back and feed-forward communications among those boundaries have been captured to improve the flexibility of our foresight analysis against the changes in the inner and outer environments (Saritas, 2013). Understanding the hierarchy would bridge between "*what* is expected" in our foresight and "*how it can be carried out*" by the policy makers and other actors "*who perform on the BoP context*" (Pettigrew, 1987).

Considering the *dynamic nature* and continuous self-transformation of the MMS, the SFM will help us draw different scenarios of development impact in response to different entry mode by the mobile telecoms. Then an action plan can be imposed to change the entry mode and its consequent impact. As shown in Figure 4.6, the SFM reflects how our scenarios (contents) for the entry modes and the development impact are affected by the antecedent economic, political, technological and historical (context) (Smith & Saritas, 2011). Corporate strategy, management style, marketing mix[22], employees' motivation, and power structure

[22] Marketing mix includes the 4Ps: Price, Place, Promotion, Product (American Marketing Association, 1995).

identify (the process) through which the entry modes take place and their interdependent impact.

Figure 4.6: Systematic Foresight Model



Adopted from Mohamed, Wood-Harper, Ramlogan (2015)

To develop a SFM for our case study, we started with an overview of the antecedent conditions to develop a systematic understanding of the shared views and mutual appreciations of the mobile financial services. Then we followed the systems synthesis and scenarios modelling to investigate alternative entry modes of the telecoms through which a new context of MMS arises at the Egyptian BoP.

This facilitated developing systematic templates (matrices) of alternative development paradigms for the BoP living in poverty and how the policy makers can transform them to better-off-poor[23] or middle classes. Both scenarios help develop alternative futures and decisions for policy makers. Such matrices also help the policy makers to maintain a sustainable relationship with the telecoms, NGOs, and the poor community to develop themselves and not for them. Accordingly, systematic actions can be put in place to structural

[23] This concept refers to a class of customers who earn enough money to cover their basic needs and create small business. Hermes, & Lensink (2007) argue that this class of customers requires less attention from the financial service providers.

and behavioural transformations for the stakeholders and their interaction at the BoP context. The next section shows our scenario analysis and provides a detailed discussion of the unequal power among stakeholders. Recently, Albert Al-Gore offered a systematic foresight analysis of world's future drivers based on two ontological assumptions:

First, the new law of nature is based on Ilya Prigogine's second law of thermodynamics. This law assumes that entropy breaks all closed systems over time and makes them irreversible. Then it can be recognised as an open system that exposes energy from the orbit and releases this energy again outside it (Jarzynski, 2011). The continuous flow of energy into earth (as a system) reshapes it into a more complex self-organised sub-system. The earth imports energy from the solar system and develop self-organised butlers of energy transfer that shape the oceans, the atmosphere, and the ecological and biological systems in our life. Then, this energy outflows into the universe and takes a shape of circular infrared radiation.

Following Al-Gore's first assumption leads to a new definition of the information society. The future definition of the MMS will be "a flow of information and communication technologies that breaks the tradition (hard) and turn it into irreversible revolutionary butlers of information that lead to self-organisation of unlimited innovative business systems".

The second law by Ilya Prigogine is about irreversibility. This led Al-Gore to think differently about the time arrow that we use to move from the past, present, to the future. Applying this to e-Masary system, we can highlight a systematic view of capitalism that offers a reformed structure of decision making in relation to human enterprises and both of the ecological and biological systems in the BoP market. Isolating humans from the technical (hard system) situation (e.g. Profitability and climate change) would give the wrong picture. Our foresight analysis at the end of **Chapter 6** highlights the future view of e-Masary and embed the time irreversibility and learning mechanism that stop the system providers repeating their previous mistakes in the ISD process. The above discussion emphasises that Gore's epistemological assumptions are more interpretative and soft rather than positivistic.

Al-Gore based his foresight on six ontological assumptions of the future work;

> *"a more globalised economy, planet-wide electronic communications and developments in robotics, a new political economy in which influence and initiative is shifting from west to east, unsustainable population growth and resource depletion, advances in biological, biochemical and materials science that enable human beings to reshape the fabric of life as never before, and a radically unstable relationship between human civilisation and the earth's ecological systems, particularly its atmosphere and climate"[John Gray, 31th Jan 2011].*

4.3.2. Case Study Research

Case study research is the most common qualitative method used in information systems (Orlikowski & Baroudi, 1991). Case study research can be positivist, interpretive, or critical, dependent on the philosophical assumption of the researcher. For example, the positivist view assumes that theories can be measurably tested, whereas from an interpretive viewpoint, the emphasis is on social constructs and the understanding of phenomena. The critical position tends to reflect social critique, focusing on opposition, conflicts and contradictions in society. Consequently, this research methodology embraces qualitative and quantitative approaches using a case study, as advocated by Walsham (1993). Oates (2006) states that the case study is designed to investigate or study all aspects of a single chosen phenomenon by applying various tools of data collection. The case study approach mainly relies on interviews and documents to collect data.

Analysing data from case studies, needs to be positioned in the middle between two extremes. The first is to rely on the descriptive accounts of the case study in hand, which may result in weak theorization. The second is to remove particularities of the case study and abstract relevant models. In doing so, the researcher might draw boundaries (e.g. Societal, Institutional & Individual) to define his/her case and to find the link between these levels (Benbasat, Goldstein & Mead, 1987; Munro, 2005). Each level includes different stakeholders who provide evidence of a multiplicity of agencies to draw a partial context (Avgerou & Madon, 2004).

We wondered how case study design helps answer the questions of "*what was problematic in developing e-Masary mobile system*? ", "*how is the social life of e-Masary's context taking place*?", and "*how can we transform the system into a more sustainable MMS?*".

Vidgen & Braa (1997 & 1999) distinguished between two types of case study; hard versus soft case study. A hard case study offers deep investigation where no boundaries exist between a phenomenon and its surrounding context (Baskerville & Pries-Heje, 2014). Advocates of this type of case study might follow explanatory exploratory, or descriptive narratives (Yin, 2013). However, such an approach does enable control over the event, behaviours, or actions in the phenomenon. Accordingly, it has been rejected as a strategy for our research.

The soft case studies, however, offer plausible and cogent, logical reasoning to describe the result of interpreting a social phenomenon (Walsham, 2014). Advocates of this strategy emphasise the social whole to draw generalizable replication features (Wynn & Williams, 2012). However, such a strategy requires ethnography or grounded theory methods rather than action taking or problem solving research that is required to answer our research question about e-Masary MMS.

4.3.3. Grounded Theory

Grounded Theory Methodology (GTM) is another qualitative research strategy that tends to build theory from grounded data. It mainly relies on a systematic process of data collection to point out key emerging themes (Charmaz, 2011). It is a research quest in which the system analyst abstracts general assumptions of event, actions, and interaction based on the participants' perceptions and daily experiences (Strauss & Corbin, 1990; Charmaz, 2014).

GTM helps develop a theory inductively using extensive interviews and document analysis through consecutive iterations of research. Out of the four grounded theory approaches: classic, evolved, analytical, and mixed methods (Matavire and Brown, 2013), the evolved

approach, sometimes called the "Straussian" approach, is used in the previous mobile money literature. Our research, however, does not aim to build a "sensitizing device" (Matavire & Brown, 2013), rather, we compare and contrast between the theory and the theory-in-use to learn how to make sustainable change in MMS. The GTM usually starts with a certain research question and aims to reach to the social totality that surrounds this question (Charmaz, 2006). Such a strategy offers an iterative process of comparing between data collection, data analysis, and theories (Myers, 2009: Mohamad, Wood-Harper, Ramlogan, 2013).

This research is initiated to answer the research question "*How does Multiview**4** help to understand the process of MMS development at the BoP?*". In doing so, we believe that reality is different from one organization to another (Walsham, 2014; Stahl, 2014). Likewise, Heeks (2002) raised concern about the "design-actuality gap" and how IS is usually tailored to the developed context that does not fit with the ground reality when it is implemented in the developing context. Similarly, innovation of IS use differs in these contexts (Avgerou, 2008). However, we found that through selection of organizations from different stakeholder groups that we cannot contrast and compare the TOP perspectives following the GSM. This will easily lead to losing focus and we will not be able to reveal templates of perceived benefits, challenge, and sustainability features of the MMS (Myers and Klein, 2011). Analysing the data drawn from GTM requires four stages as shown in Table 4.2

Table 4.2: Steps of Analysing Grounded Theory Data

Grounded Theory Method (GTM)	Manual	CAQDAS
Open coding	Creation of codes based by paragraph – description / summary of paragraph	Creation of codes as free nodes by sentence or paragraph – description / summary of sentences or paragraph
Axial coding	Re-reading of codes generated and re-arrangement according to theme / category – cutting and pasting	Re-reading of codes / free nodes and re-arrangement according to theme / categories / tree nodes – Creation of hierarchies by "drag" and "drop"
Selective coding	Re-reading of codes and categories and selection of category that most represent the cumulated categories.	Re-reading of codes and categories and selection of category that most represent the cumulated categories. Higher hierarchies of the tree nodes are established to show the selected codes.

Adopted from Ahmad & Newman (2010: 4)

4.3.4.Action Research

In this section, we explain different action research approaches and justify why the participatory action research best fits our research[24]. Then we propose our own PAR approach following action case study (Braa & Vidgen, 1997) that highlights the problems in the MMS development process, the required transformation, and the foresight status.

Action research is a refined cycle of identifying community problems, diagnosing, planning, intervening and evaluating the results of action to create learning and to plan consequent interventions (Checkland, 1991). Some scholars stigmatized action research as an unscientific and invalid research conduct. Others, however, found it useful to link researchers to the community, obtain empirical knowledge, and systematically link theory to practice (Baskerville & Wood-Harper, 1996: Kock, Gallivan & DeLuca, 2008). There is an unstoppable call for IS researchers make their studies more relevant to practice (Baskerville & Myers, 2004). This makes action research the rational methodology to study these fields (McNiff, 2013).

Kurt Lewin developed this methodology through his experimental logic to study social psychology within the framework of field theory. His approach relies on a linear process that flows as a water drop from engaging the human situation, diagnosing the problem, unfreezing the situation, re-engineering, re-freezing, and disengaging (Baskerville & Wood-Harper, 1998).

Lewin's experimental approach has been replicated in the field of operations research by the Tavistock Institute and led to the psychological equivalent of this field (Mumford, 2006). They mainly used it to study psychological and social disorders caused by battlefields and prisoner-of war camps. In this approach researchers intervene in each experimental case through transforming some problematic elements surrounding the object of the study. The impacts of all actions need to be recorded and studied to develop a body of knowledge about fruitful solutions. Lewin elaborated his approach in six stages to facilitate social change:

[24] Section 4.3.4 is presented in Mohamed et.al (forthcoming, 2015) in the action research journal.

situation analysis, fact finding, model conceptualizing, solution planning, action implementation, and evaluation (Baskerville & Wood-Harper, 1998).

McNiff (2013) argues that Lewin's approach has an ethical misfit because it aims to solve a practical problem and answers a research inquiry at the same time. While the former goal requires a subjective involvement to recognize the problem-at-hand, the latter goal necessitates an objective treatment of all factors and actions. To solve a practical problem the researcher acts more as a consultant who gets paid and his/her research report passes to the client's control. Another unfit, is the traditional conflict between the client and the researcher's culture (Rapoport, 1970). The researcher might, for instance, require a lengthy multilayered process of actions to assure a higher level of effectiveness on one hand; on the other hand, the client concern is to perform actions quickly and efficiently. In addition to the ethical concern, Lewin's school relied more on statistical methods to give assertive data to attract public funding (Clark, 2012). Our team rejected this approach because it does not help in explore the personal and organisational perspectives of system development problems, rather it helps examine theoretical assumptions drawn from the literature review. Following Lewin's approach, other approaches of action research have been also developed. Each approach has different meaning, philosophical assumption, source of inspiration, practice, and underpinning theory (Reason & Bradbury, 2001). Cassell & Johnson (2006) recap these varying approaches into four emerging approaches for action research.

The first is "*inductive action research practices*", where understanding and the deployment of qualitative data collection methods is usually used to produce a grounded theory (Glaser & Strauss, 1967). This process of generating theory comes through dense descriptions of the themes of subjective meanings that actors attach to their behaviour, then via testing causal hypotheses deduced from a pre-set theory. In this approach, researchers follow a reflective process model that contrasts between "what we know from theory" and "what we found in the action experiment" (Baskerville & Wood-Harper, 1998). Our research does not aim to build theoretical themes, however, some replication features will be revealed for how best a crowd control strategy can be applied.

The second is "*deconstructive action research practices*", where we understand reality and truth through linguistic entities that are subject to repetitive revisions. In this case, reality is rhetorically produced and holds varying descriptions and explanations. Researchers who follow this approach usually aim to record how different actors play particular language games based on their own rules, structures, and cultures. In doing so, researchers can map these linguistic constructs and show "*how plural localized understandings and practices have emerged*" (Coghlan & Brannick, 2009). However, this approach does not offer an epistemological assumption on what is the preferable way to understand the phenomenon, nor a mechanism of how to prioritize potential research approaches (Cassell & Johnson, 2006). Further, this approach follows a water drop linear process starting from engaging the situation, diagnosing the problem through linguistic evidence, unfreezing the situation by deconstructing language games, re-engineering the situation verbally, refreezing into plural practice, and disengage (Baskerville & Wood-Harper, 1998).

The third is "*participatory research practices*", where actors participate in a democratic research process with a particular set of assumptions. In doing so, they make sense of reality subjectively, through their negotiation of inter-subjective meanings (Cassell and Johnson, 2006: 798). This approach is usually used by critical theorists who aim to study how organizational change engender democratic social relations and shift the balance of power to currently marginalized people (Kemmis et al., 2014). It arises from the human needs and aims to alleviate miserable living conditions in the community. It over emphasises the practical contribution that the theory lacks (Park, 1999). Despite that fact that our research tends to solve crowding problem during Hajj and save lives through better visual communication, we also aim to contribute to the area of action research and technology use. Accordingly, the participatory research practices do not help fulfilling our quest.

The latest is "*Participatory Action Research*" (PAR), research in action that involves varying stakeholders of the phenomenon in defining their critical problem and proposing sets of solutions (Greenwood & Levin, 1998; Checkland & Holwell, 1998). In this approach, organizational actors or the community under investigation get involved actively throughout research design, problem diagnosis, to solutions formulation and evaluation (Whyte, 1991; Stringer, 2013). In PAR, the researcher becomes a participant and the participant also

becomes a researcher and both have a joint obligation to engage in the problematic situation (McIntyre, 2008).

PAR aims to alter the stakeholders' problematic situation in a more self-managing, liberated, and viable state. The so called liberation can be achieved either through greater self-realization or through a political discourse of liberation. The latter, vary among stakeholders who advocate different levels of political liberation. Politicizing the research process renovates the power relations and empowers community partners to shape the research process, including planning, data collection, and analysis (Mountez et al., 2008). Accordingly, we believed that the PAR is more appropriate to involve regulators, MNOs, MSPs, intermediaries, and customers into an inclusive democratic process to prototype a fully operating MMS. This facilitates iteration and repetition of problem diagnosing and performing solutions as a way to build learning and achieve our research objectives (Baskerville & Wood-Harper, 1998).

David Kolb is a pioneer of PAR who developed a model of experiential learning. His model relies on four key stages; "*concrete experiences"*, "*observation and reflection*", "*formation of abstract action strategy*", "*testing the implications of concepts for future action*" (Kolb, 1984). The first stage reflects an active learning style about the problem from relevant actors (Honey & Mumford, 1982). In this stage, the researcher explores the actors' individual interests to define areas of conflict. During the second stage, the researcher collaborates with the community's actors to observe and reflect potential corrective actions (solutions). In doing so, the researcher plays an equal co-worker with those actors. This task is shared and the participant's perspective is supposed to be equally valuable. The third stage is based on the recorded reflection of stage two to produce a conceptual framework of actions that can be generalized to study and solve similar problems. During the last stage both the researcher and participants evaluate the delivered action plan and its consequences. Eventually, a pragmatic learning style will evolve and leads to novel experience (Mehmood & Moulaert, 2013).

Recently, the action case research strategy has been proposed as a PAR. In doing so, it mixed the characteristics of the soft case study discussed in **section 4.3.2** and the characteristics of

action research that are discussed above. It offers less risk in terms of theory building and rich learning process (Vilbergsdottir, Hvannberg & Law, 2014).

4.3.5.Rationale of Action Case Study:

Our object of interest is a complex social situation, for which reductive methods based on engineering and natural sciences are highly inappropriate, if they are possible at all (Checkland, 1998). This consideration points us towards the goals of interpretation and sense making in order to help ourselves and others navigate the conceptual domain.

Organisational and societal problems do not exist in isolation from their roots in past events and current imperatives or from the human audience. They are best considered as problem situations in which there is a recursive relationship between the problematic situation, the would-be problem solvers and the problem solving approach (Jayaratna, 1994).

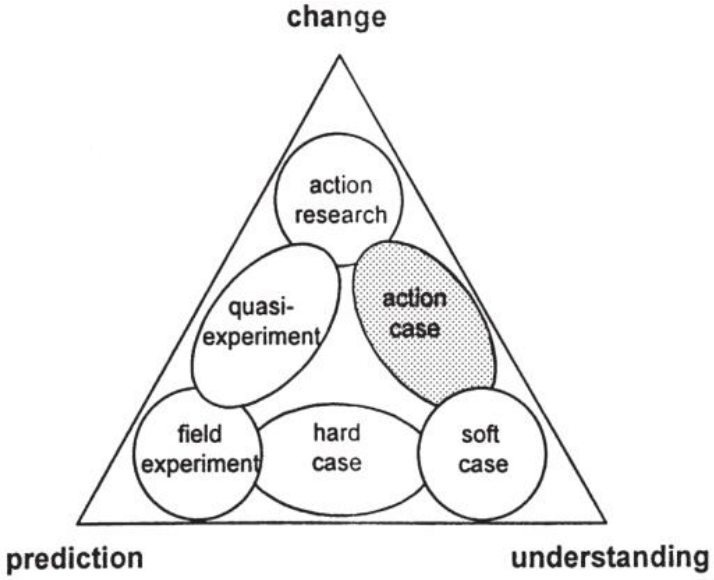
Financial inclusion and the perceptions it produces have no concrete reality, but the effects they produce are real in the sense that they have a detectable impact. These considerations lead to the epistemologies of interpretivism and 'soft', approaches to problem structuring and analysis; as well as to the ambition of addressing relevant and salient problems in ways that deliver results consistent with observable 'realities'. In turn, they lead us to the methodological approach aimed towards a deep understanding of problems in situ so that they can be navigated successfully.

Our ultimate goal is to pursue a programme of research that can deploy deep participative understanding of a problematic situation so that it can be alleviated somewhat. An approach with this intention closely associates with the genre of action research and is aligned with the category of professional/consultancy research when, as in this case, at least one of the researchers is an inhabitant of the problem situation instead of a visitor. Having the characteristics of "a participative form of research for gaining the advice and perspectives of key stakeholders (researchers, users, clients, sponsors and practitioners), to understand a complex social problem" (Van der Ven, 2007), it is a form of 'engaged scholarship'. A study aimed at a deep understanding of the problem situation with a view to ultimate improvement

through shared learning can be termed a soft action case (Braa & Vidgen, 1999) as described in Figure 4.7.

The author of this thesis has been mandated by Masary.Co to help develop and implement the multifaceted MMS. Accordingly, he conducted an initial study drawing a rich picture of the mobile money value chain to pinpoint the problem situation from the stakeholders' perspectives. He then diagnosed the necessary transformation to remove the major implementation challenges and maximize the perceived benefits. The last stage of this research reflected how the change has been conducted and refers to the sustainability warranties to maintain wider outreach and longer project life cycle (see Figure 4.8).

Figure 4.7: Action Case

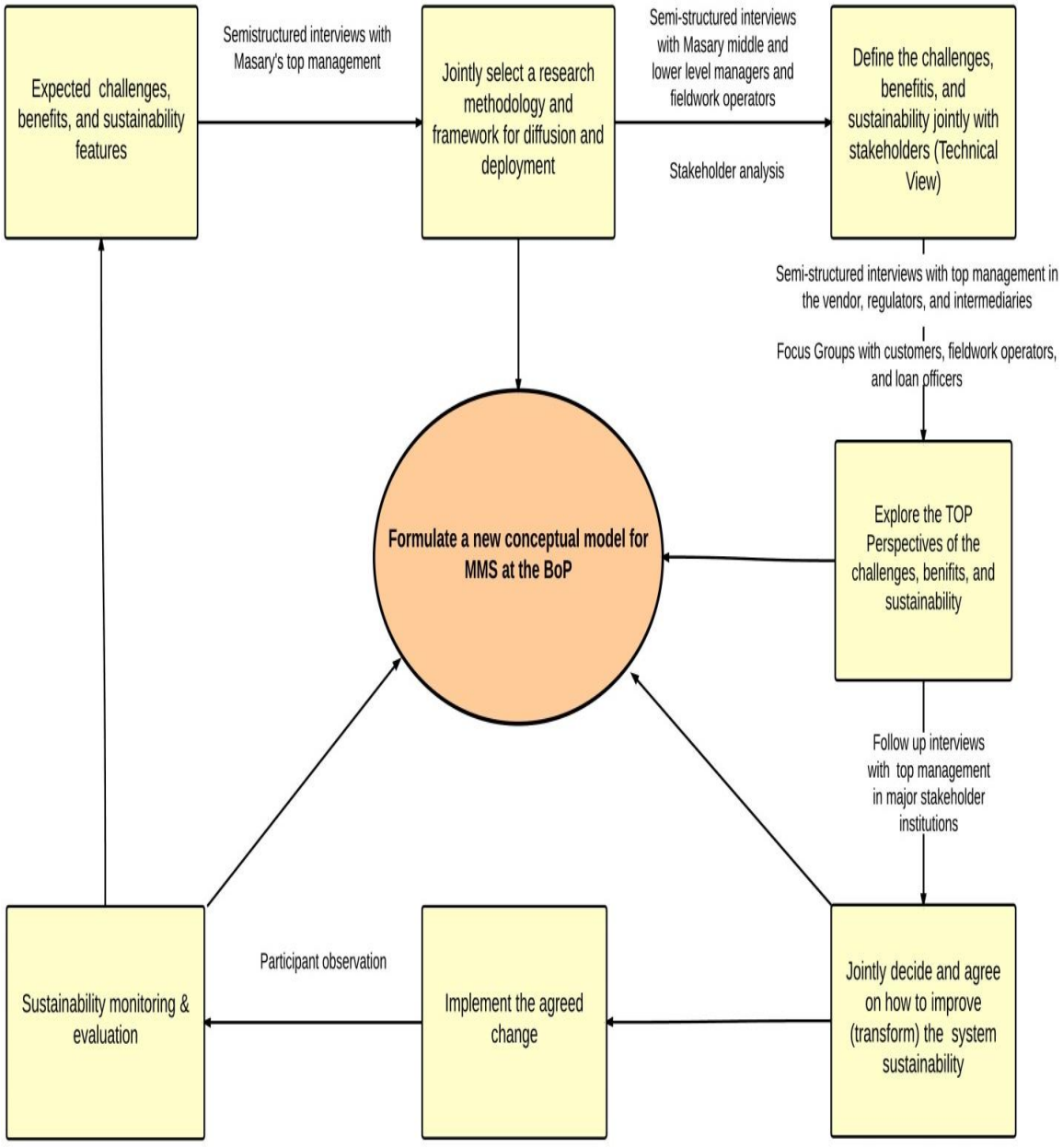


Adopted from Braa & Vidgen (1999:32)

Following Susman & Evered (1978) the cycle of action research starts with diagnosing the situation, then action planning, action taking, evaluating, and specifying learning. At this point the process starts again with diagnosing. In the case of Multiview, the cycle above can be adapted to start with theory formation where a contingent approach from emerging themes (called Multiview) is prepared; testing Multiview framework in an organization; reflecting on Multiview framework in an organization and modifying Multiview framework as appropriate.

At this point the theory was redefined, tested and Multiview framework changed again as appropriate, and so the cycle was used to test the framework again in a number of different organizational circumstances.

Figure 4.8: Action Case Model for e-Masary



Developed based on based on Warmington (1980) & Bell (1996)

4.4. Data Collection Methods and Procedures

The interpretative qualitative approach requires flexible data collection methods such as interviews, focus groups, participant observation, and archival analysis (Myers, 2013). In the following section, we discuss how these methods have been employed and the rationale for our choice (see Tables 4.3 & 4.4).

4.4.1. Interviews

Interviewing people brings unclear variables to the surface. It is a tool to know what a set of people think, or how they interpret an event in relation to others' behavior (Aberdach & Rockman, 2002). In the case of selecting interview method to do action case study research, respondents should be selected based on what they may know to help the investigator fill in pieces of a puzzle (Bryman & Bell, 2006). If the puzzle's gap needs inferences about a larger population, then one must conduct a systematic sample (Aberdach & Rockman, 2002). Such a sample should help the researchers need to explore the area of concern from multiprespectives and consider the view of different managerial layers (Pettigrew, 2013).

In our research *elite executives* are key parts of the sample. Interviewing elites (e.g. board of directors or senior managers) should be via open ended inquires, to avoid *"being put in the straightjacket of close-ended questions*" (Aberdach & Rockman, 2002: 2). This way of conducting interviews allows the respondents' engagement in wide ranging discussions and to consider the contextual issues and to offer deep explanations of their implicit reasoning (Rubin & Rubin, 2011).

While interviewing elites is challenging and deserve a long preparation period, interviewing those at the *bottom of the social structure* poses formidable problems for the researcher as well (Hertz, 1993). Those in rural areas are more visible and easier to find. However, gaining their confidence is difficult (Baguma, 2013). Accordingly, the language and the type of

questions used in interviewing people at the BoP should be simple, inclusive, and native to build a bridge of trust and encourage participants to participate in the change process.

Table 4.3: Data Collection Methods

Collection Methods	Data Sources	Number and Period
Desk Research	Two databases have been used to reach to the peer reviewed journal papers covering the core research issues **1- Business Source Premier (BSP):** Financial Inclusion was of real importance, I launched a search with the following criteria: • *Find all my search terms: Topic "Financial Inclusion*".* • ***Limiters**: Full text, References available and Scholarly (Peer Reviewed) Journals.* • ***Source Types**: Academic Journals.*	Total of 73 articles 4 out of which were deleted because they were either book reviews or editorials. **Period:** 2001 to 2015
	2- Web of Science (WoS): • Search for "Financial Inclusion" and "Cross-sector Collaboration" in ALL Fields. • **Limit To**: Topics - Limit To Humanities & Social Science	Total of 34 articles 2 out of which do not address the developing context **Period:** 2001 to 2015
Interviews	• Semi-structured individual interviews (Donner & Tellez, 2008; Morawczynski & Miscione, 2008) conducted with top and middle level managers in the three mobile network operators (Vodafone, Mobinil, and Etisalat), Masary Corporation, the Social Fund for Development, and the Financial Supervisory Authority. • The interviews length ranges between 45-90 minutes fully recorded with a signed consent of the respondents.	37 Interviewees **Period:** March-May 2011
Focus Groups	• Focus groups conducted with various stakeholders involving a total of 348 individuals (Bloor et.al, 2001; Wilkinson, 2004). The discussions were taped and fully transcribed. • Focus groups' length ranges between 45-90 minutes fully recorded with a signed consent of the respondents.	39 (48 MFIs top management and officers & 300 mobile money users) **Period:** August-Oct 2011
Archival Analysis & Electronic samples	• Electronic samples (provided by the CCO) from e-Masary mobile and internet based systems reflecting issues of available services, data flow, performance indicators and online loan tracking system.	45 snapshots **Period:** Sep 2010- Sep 2014

Source: Mohamad, Wood-Harper & Ramlogan (2014a)

The interviewers must know that the objectivity of the research subject comes from their capabilities to construct and analyze the collected data. "*It is not the obligation of a subject to be objective and to tell us the truth"* (Berry, 2002: 680). Accordingly, a customised and pre-examined[25] interview guide should be developed for each class of interviewees to assure high quality responses and deep reflection of the participants' perceptions.

Our literature review of the methods used in mobile money (see appendix 2c) shows that using semi-structured interviews is recommended to understand case studies the includes issues of customer satisfaction, issues of the service diffusion and market access in the mobile financial services see Kalba (2008), Kleijnen et al. (2009), Nafukho & Muyia (2010) & Baguma & Eilu, 2015). See Table 4.4 that explains the rationale for conducting 37 interviews following snowball and quota sampling.

4.4.2. Focus Groups

Conducting focus group is another collection method that we used in our research. After receiving the appropriate training from the University of Manchester, we conducted 39 focus group meetings[26], including 8-12 respondents for each. The key aim was to understand the opinions of different stakeholders who possess conflicted views (e.g. technical versus personal). Such a method has been employed in systems development studies such as Stephanidis & Savidis (2001), Bell & Wood-Harper (2007), Stephanidis (2014), Cecez-Kecmanovic (2014), Cecez-Kecmanovic, Kautz & Abrahall (2014). In financial inclusion studies, Hulme (2000) argues that focus groups are more appropriate for problem solving research where wicked problems need stakeholders' pedagogic conversations.

[25] Pilot electronic interviews have been conducted with five respondents from the regulating parties, MNOs, and the provider (Masary.Co) to improve the plausibility of the interview guide and avoid misleading questions. Interviewing the low income users and illiterate microentrepreneurs, however, evolved different types of questions that are more flexible and reflects the cultural context in three different cities in north, middle, and Upper Egypt.

[26] These groups have been formally organised with the relevant participants and have been conducted during 29 days of the fieldwork.

As we followed a participatory approach of selecting the research methodology, the system owner and the top managers of the three MFIs expressed the implicit disagreement they had with the fieldworker and the loan officers who serve the end users (i.e. customers). Another conflict was uncovered between Masary and some of the CBE officers regarding the customer privacy and other organizational and personal issues.

As shown in Tables 4.3 & 4.4, two types of focus groups based on convenient and quota samples respectively. The first type aimed to explore conflicts between the system owner and the regulators of the MMS in Egypt. In addition, it included Masary's microfinance manager and three top MFIs' managers as well as Masary and their own retail agents. The second type aimed to explore discourses in the micro-level where loan officers and retail agents have daily contact with e-Masary's customers. The average time for our focus groups was 70 minutes, which included group discussions guided by the lead researcher to learn more about opinions on the design and diffusion issues of the e-Masary system and guide future transformation plan to relieve conflicts of interest.

4.4.3. Participant Observations

The author of this thesis has been employed as a team leader for retail agents in Minia city and be authorised to attend internal meetings at Masary headquarters. This observation has taken place between Feb-March 2012 and the role of the author was introduced to the participants and accepted (Lyon, 2013). Such a chance enabled him to observe the retail agents, customers, Masary executives in their natural setting after proposing the system transformation (Myers, 2013).

Written notes have been taken to document the participants' activities and controversial issues in the participants daily interactions. The aim was to get first-hand knowledge of processes. The author of this thesis also conducted two bank reconciliations and had to manage the liquidity for a team of eight agents. He wanted to evaluate how the new system facilitates effective and efficient mobile money services. The observation records have been

shared with the participants to improve the reliability of the information recorded and avoid any misunderstanding. The final agreed conclusions and future strategies have been shared with Masary's top management for comments and corrective actions.

4.4.4. Archival Analysis & Electronic Documentation

Our research explores the development of MMS as an information society at the BoP. Every day we wake up to find a new technology either software/hardware. These changes may be complicated or deserve spending a long time to be understood. It also creates pressures on how mobile telecoms and other providers of MMS should behave. Accordingly, the qualitative researchers need to find more about the narratives of mobile financial services and alternative sources of finance at the BoP. "*How did mobile phones as technical artifact transform the finance industry?"* The result of this analysis was incorporated in **Chapter 5 & 6**.

Berg, Lune & Lune (2004) & Froud et al. (2006) recommend conducting archival analysis for complicated industries where both private and public sectors are involved. The archives usually reflect the institutional narratives, including objectives and strategies.

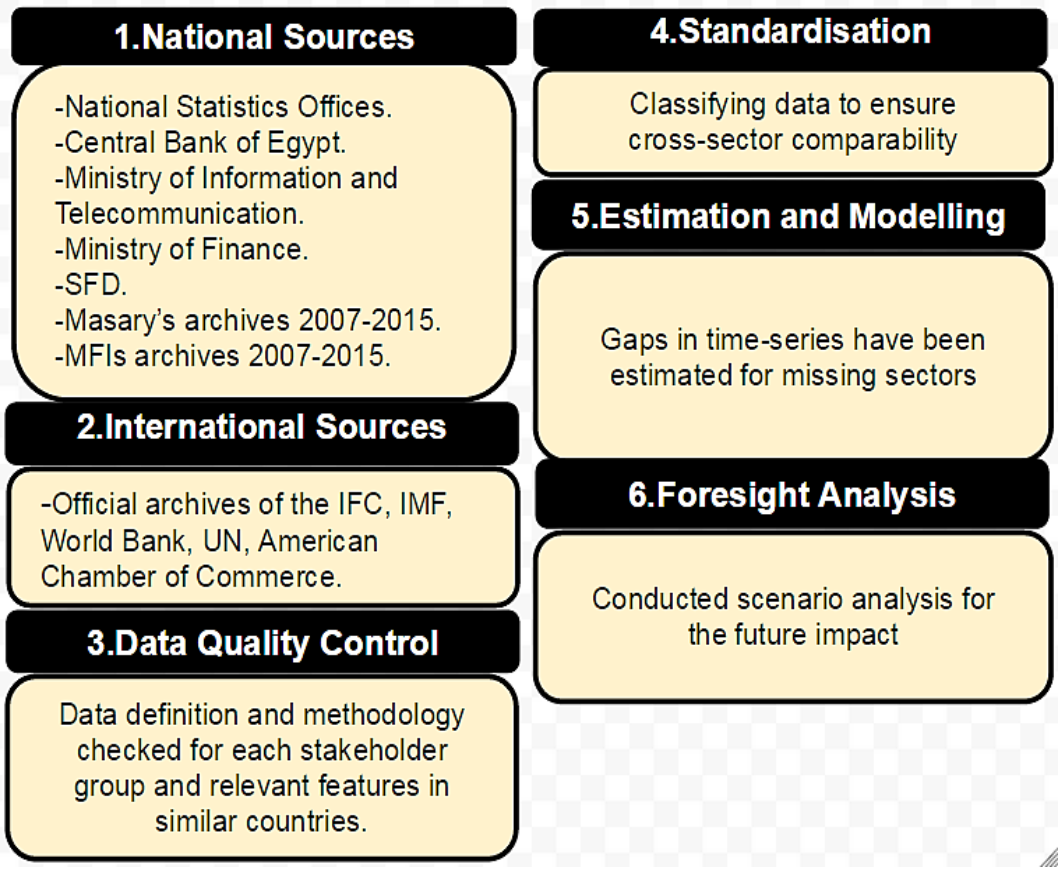
4.4.5.Selected Data Collection Methods

This research follows an interpretative approach and a case study design of the e-Masary mobile money initiative in which cross-sector collaboration is an organizational goal to improve financial inclusion as a societal goal. Understanding these objectives requires perceiving human sense and action in context (Avison & Malaurent, 2014). We realize both issues as two pillars of a socially constructed phenomenon and accordingly we based our evidence on the shared meanings, language, documents and reality of its stakeholders (Klein & Myers, 1999), and we applied grounded theory (Glaser, 1978; Urquhart et al., 2010) to construct key concepts from this reality.

Our understanding of "social construction" reflects "Socially mediated Idealism" where the social world is recreated by the actors with every event, and reality is the accomplishment of individual sense-making (Ryan et al., 2002). We are concerned with the procedures through which the individual actors make sense of "what is going on".

E-Masary is one of the biggest such projects ever attempted – 26 cities and more than 18 million potential users (1.5 million already reached) – the issues related to such a networked project are likely to be relevant to the donors and private enterprise networks at macro, micro, and meso-levels. Given its size, scope, complexity and diversity, the e-Masary initiative is a symbolic exhibition of the issues related to both cross-sector collaboration and embedded models of financial inclusion and it helps interpret the evolution of their meanings as has been negotiated by the relevant stakeholders. The data collection methods were archival research, semi-structured interviews, focus groups, and electronic samples of Masary's electronic wallet.

Figure 4.9: Strategies of the Archival Analysis



As shown in Table 4.4, we explain the key sources of data, sampling, and the period during which, data have been collected.

At the end, three key themes have been found significant "mobile-based balance metrics and align incentives", "investment agility", and "innovation and competitive advantage". The following section discusses the case of e-Masary and draws examples in relation to the aforementioned themes.

Our ***archival analysis*** revealed conflicts between what was released in a published reports and the actual strategies followed by institutions involved in the development of MMS in Egypt. For instance, the BoP as a business model reflects a social orientation of business value creation that leads to a financial return to providers. Allocating high rates of dividend shareholders, is another example of an economic orientation rather than stakeholders orientation (see **Chapter 5**). Announcing different privacy and security rules than those placed on the system design is also another example of how the company's narratives differ from the actual policies.

We collected different sources of archives from national and international databases to draw relevant interpretations that complement our analysis of other data sources (Bryman & Bell, 2011). Our samples include different sets of participants' autobiographies, public documents, organizational documents, and newspapers. We also collected electronic samples of the MMS, including Masary Web, mobile, android tablets, and desktop interfaces (Newman & Lyytinen, 2014). 41 snapshots of e-Masary interfaces reflect issues of all available services, data flow, performance indicators and an online loan tracking system.

Participants' autobiographies includes personal diaries, letters and to-do-lists documented by fieldworkers and front office staff (Saunderset al., 2011; Silverman, 2013). The detailed procedures of our archival analysis are described in Figure 4.9.

Table 4.4: Sampling for our Data Collection

Data Collection Method	Sampling Technique	Sampling Rationale
Interviews	• Snowball sampling, including Masary's CEO, CCO, and ten executives at Masary Co.	• To explore the natural/technical view of the system owner.
	• Quota Sample of 22 participants, including regulators, MNOs, MSPs, IT vendors, retail agents.	• To explore the perceived TOP perspectives of categorized stakeholders as listed in our stakeholders' analysis (See section 5.1.4.
	• Quota sample of 3 to managers in three MFIs located in the north, middle, and south Egypt.	• To explore the organisational and personal perspectives of those managers and agree on the research methods and how to approach the borrowers and loan officers.
Focus Groups	• 5 focus groups based on convenient sampling as follows: - *Masary's microfinance officer and the top managers of three MFIs.* - *Masary's Marketing Manager and three retail agents.* - *Masary's CEO, SFD, and CBE.*	• These focus groups aimed to reveal the conflicts among Masary and their partners in the macro and meso levels. Such conflicts will be highlighted on the rich pictures discussed in chapter 6.
	• 34 focus groups based on quota Sample of 3 MFIs, including, Assuit Business Women Association, REDIC, MAWADA microfinance. Each focus group involved MFIs managers, loan officers, borrowers.	• Out of 8 partner MFIs, 3 were selected based on the following criteria discussed in the literature review: - **Highest number of transactions** –REDIC located in Beni-Suef City. - **Gender and nature of loan guarantee** –ASBWA that serves loan groups of women. - **Religion and Islamic Finance** – MOWADA microfinance.
Observation	Spent 45 days as a retail agent in Minia's biggest Masary retail that conducts up to 60 mobile money transactions per day.	Observing the challenges, benefits, and sustainability from technical, organisational, and personal perspectives.

4.5. Data Analysis Techniques

Following the SSM steps discussed in **Chapter 2 & 3**, we developed our TOP perspective analysis of e-Masary system development process. Three data analysis techniques have been employed; RP, CATWOE analysis, and template analysis (see **Figure 4.10**). These techniques aimed to offer an inductive approach of data analysis that could be fed into NVivo templates afterward. Later, the templates emerged from the data analysis have been compared with the template from the literature review and a new inclusive template has been developed (see **Appendix 7).**

4.5.1. Rich pictures

The rationale of the RP is that the complexity of human affairs arises from the complexity of the varying interacting relationships. As we discussed in **Chapter 2**, the MMS includes macro, meso, and micro level stakeholders that interact across different relevant systems. Two types of rich pictures have been developed; inclusive pictural RP (Vidgen, Avison & Wood-Harper, 2002) and hand drawing RP (Bell & Morse, 2013). The RP resulted from our focus groups and follow up interviews (Bryant, 1989).

4.5.2. CATWOE analysis

Sensing and modelling each picture has been developed using the so called CATWOE analysis. Checkland (1981: 224–225), explained six components (*Customer, Actors, Transformation Process, World view, Ownership, and Environment*) based on which the researcher constructed root definitions of proposed MMS. In doing so, critics and challenges of CATWOE analysis have been reviewed to avoid recreating the wheel (Basden & Wood-Harper, 2006). Three RPs have been introduced in **Chapter 6** to reflect the TOP perspectives.

4.5.3. Template analysis

The challenge of qualitative research is how to make sense of the data collected. Analysis of 37 interview transcriptions and 39 focus group meetings, field notes and annual reports were used to find emerging themes or patterns (Saunders et al., 2011). Templates were then applied to thematically organise textual data for analysis and interpretation.

The researcher used template analysis as a qualitative method for organising textual data by producing codes, or 'templates' that represent a particular theme (King, 2004b: 256). A priori of existing themes was identified and established from the systematic literature (**Appendix 1**) applied during the analysis. A final theme emerged by adapting previous themes found in the interviews and focus groups. In the analysis, a 'template' was produced from 'coding' which represented themes emerging from textual data (King, 2005). Following King, this study designed an initial template from research questions; a research model and relevant literature (see detail in **Appendix 1**). A second template was then built on the first to reflect the emerging issues (see detail in **Appendix 7**).

Template analysis is a form of thematic analysis that balances between a relatively high degree of data structure and flexibility to adapt the textual data to the needs of a particular study (King, 2012). Templates are lists of codes representing significant themes drawn from the textual data. Some of them will be initial "priori templates", while others will be modified and added to until a satisfactory level of analysis is reached and data interpretations make sense. Templates represent relationships between themes through a "*hierarchical structure*", which clusters similar codes together to initiate broader higher-order codes (King, 2004). Some templates follow a "*parallel structured*", which facilitates allocating the same elements or study segment to two or more different codes.

The template analysis is best used to demonstrate a reliable coding to studies uncovering the underlying motives of human behaviour in an objective manner (Miles, Huberman & Saldaña, 2013; Silverman, 2010). It can be also used within the "Kanatian approach" or the

"*contextual constructivism mode*" where the researcher considers different interpretations of the phenomenon and the problem situation (Cobern & William, 1993; Madill, Jordan & Shirley, 2000).

On the other hand, template analysis can be used within what Madill et al. (2000) call a 'contextual constructivist' position. Here, the researcher assumes that there are always multiple interpretations to be made of any phenomenon, which depend on the position of the researcher and the context of the research. These techniques have been extensively used in qualitative studies to analyse data from interviews (Alvesson & Shcraft, 2013)

4.5.3.1. Why template analysis?

Template analysis helps to examine the TOP perspectives of providers, regulators, software vendors, intermediaries, and end users involved in the MMS. Despite the complexity of such a massive project, the discipline of initiating templates leads the researcher to follow a well-structured approach for data management and analysis, which can be a great value for the final reflective account of this study.

King (2004) found that junior researchers are eager to include all data analysis at an equal degree of depth. This trap of unselecting will lead the researcher to very general findings. However, you need to identify the key themes which are of most central significance to the goal of building a thorough understanding of the phenomena under investigation.

While we were developing our templates, some themes were found to be of great importance to participants, but that they lay outside the scope of our study. Examples of these issues are the Islamic microfinance and *Sharia compliant money transfer and mobile devices empower needs of women* in the financial inclusion industry. Accordingly, we carefully reconsidered these issues in the interpretation of the HAA and the STA as key central themes in our Multiview**4** framework.

To simplify our templates we used matrices and diagrams to explore our template analysis findings (Crabtree & Miller, 1999). An account structured around the TOP perspectives drew illustrative examples from each transcript or data resource. In doing so, we aimed to produce a clear and succinct thematic discussion of the benefits, challenges, sustainability factors for the MMS. The final template does not offer a generalized framework for every MMS rather than a tailored model reflecting the stakeholders experience drawn from the Egyptian context. Following each template we use a mix of short and long passages of quotations from the participants to aid reader understanding of the substantial points of discussion and get the flavour of the original texts.

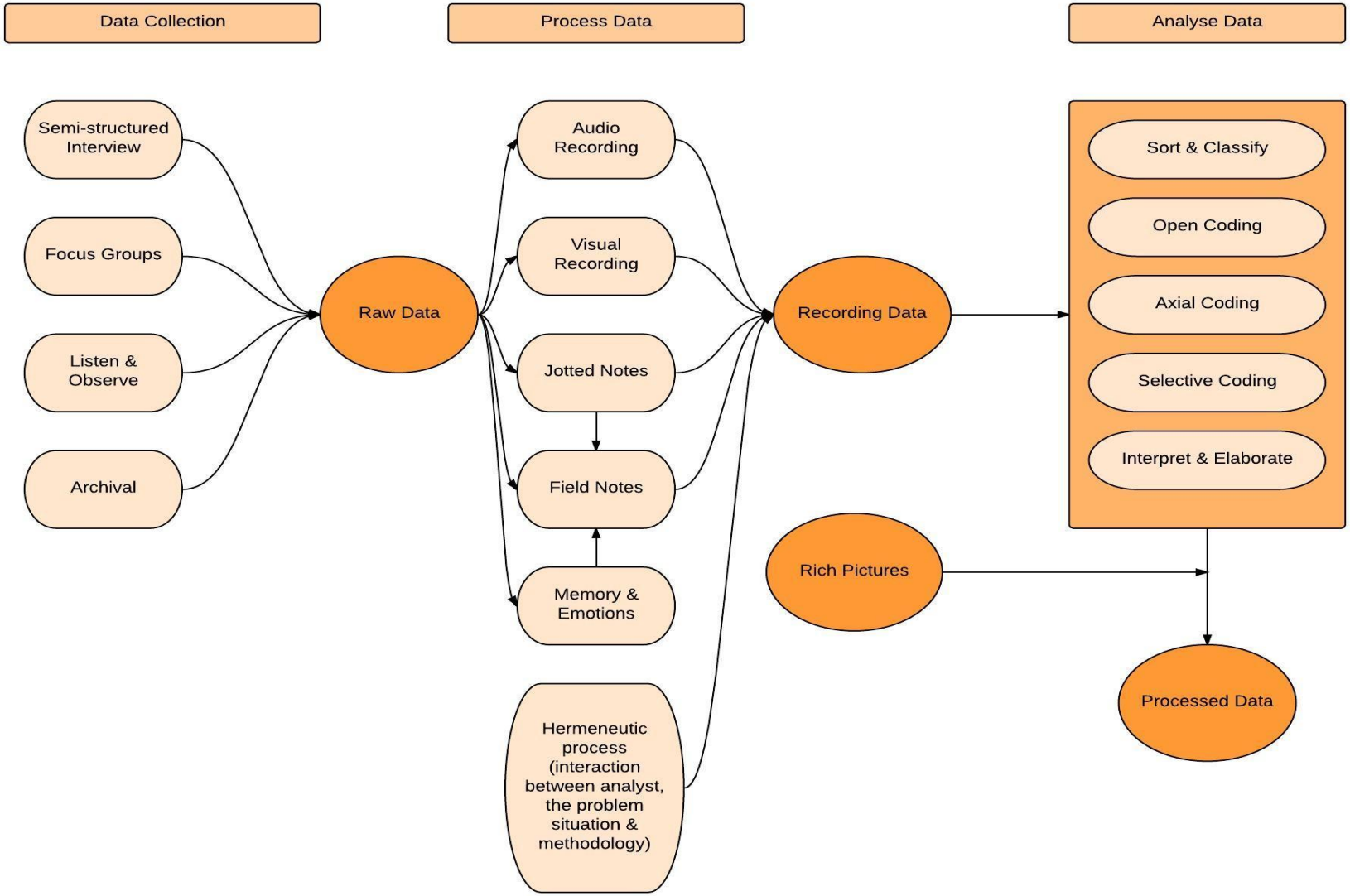
4.5.4. Computer Assisted Data Analysis Software (CADAS)

The total textual materials count to 61,478 words inserted in NVivo 10[27] (Gibbs, 2002). The final data used for the open coding process consisted of a total of 1654 paragraphs of text. The grounded theory approach has been followed to analyse the transcribed data (Glaser, 1978; Charmaz, 2003; Urquhart et al., 2010). The iterative coding was the basic tool to link the key themes and categories and to pinpoint the key institutions, individuals, and technologies that construct the cross-sector collaboration and financial inclusion.

In this thesis, we used NVivo 10 as CADAS to develop our template analysis. Our thematic transcript of the interviews and focus groups were organised into paragraphs that start with different unique colours. Each colour reflects a different stage of system development and proposes a distinct concept (e.g. women empowerment as a personal view for female microentrepreneurs takes the green colour). Later, we cut the codes (i.e. Classes of data) into stripes and pasted them under the themes found in our systematic literature review shown in **Section 2.7** (Miles, Huberman & Saldaña, 2013). The rationale behind this classification was to keep the research focus on the agreement and disagreement with the literature and allow the debating themes to emerge in a gradual fashion. Grbich (2012) argues that emerging themes announce labelled data properties that reflect events and actions taken by the change agent.

[27] NVivo is an electronic tool designed to analyze qualitative data.

Figure 4.10: Data Collection & Analysis



Source: Authors interpretation of Strauss (1987) & Flick (2008) in lights of the Multiview hermeneutic assumption

Lessons & Conclusions

This chapter adopts a qualitative case study using an interpretist research paradigm. It begins with a discussion of the ongoing debate of various philosophical schools, followed by the choice and exploration of the research context. Next, the research methodology is outlined, with a special emphasis on the theoretical framework, the preparation of the interviews, archival studies, and sampling issues. Then, the chapter moves to discuss the decisions taken during the process of data collection and ends with the choice of data analysis technique.

1) The choice of the research methods and sampling needs to be participative and engage the maximum possible number of stakeholders.
2) The rationale behind our qualitative approach includes five reasons as follows (Kaplan & Maxwell, 2005):
    - *Understanding stakeholders' perceptions and meanings associated with the MMS development.*
    - *Exploring the social and organisational context at the BoP.*
    - *Investigating causality between the antecedent conditions in the Egyptian market and the issue of MMS development.*
    - *Transforming the system to improve the integration between the mobile payment and microfinance subsystems.*
    - *Communicating empirical findings to the individual perspectives of policy makers, developers, intermediaries, and practitioners to increase the research usefulness and credibility.*

3) Conducting primary research at the BoP requires an inclusive role of the analyst to understand the attached meanings of multilayer stakeholders. Egyptians speak more than 20 Arabic dialects due to their different origins and geographical location. Engaging with top managers in this context reflects Franco-Arab culture of those who received American education and work with the low income people. Engaging with field workers, operators, and customers, however, reflect the native slum culture and how the system is perceived. In doing so, the system analyst learns new dialects and ways of life.
4) Different forms of rich pictures might be used to reflect the problem situation from TOP perspectives.

CHAPTER FIVE
CASE PROFILE: TECHNICAL VIEW OF E-MASARY

Introduction:

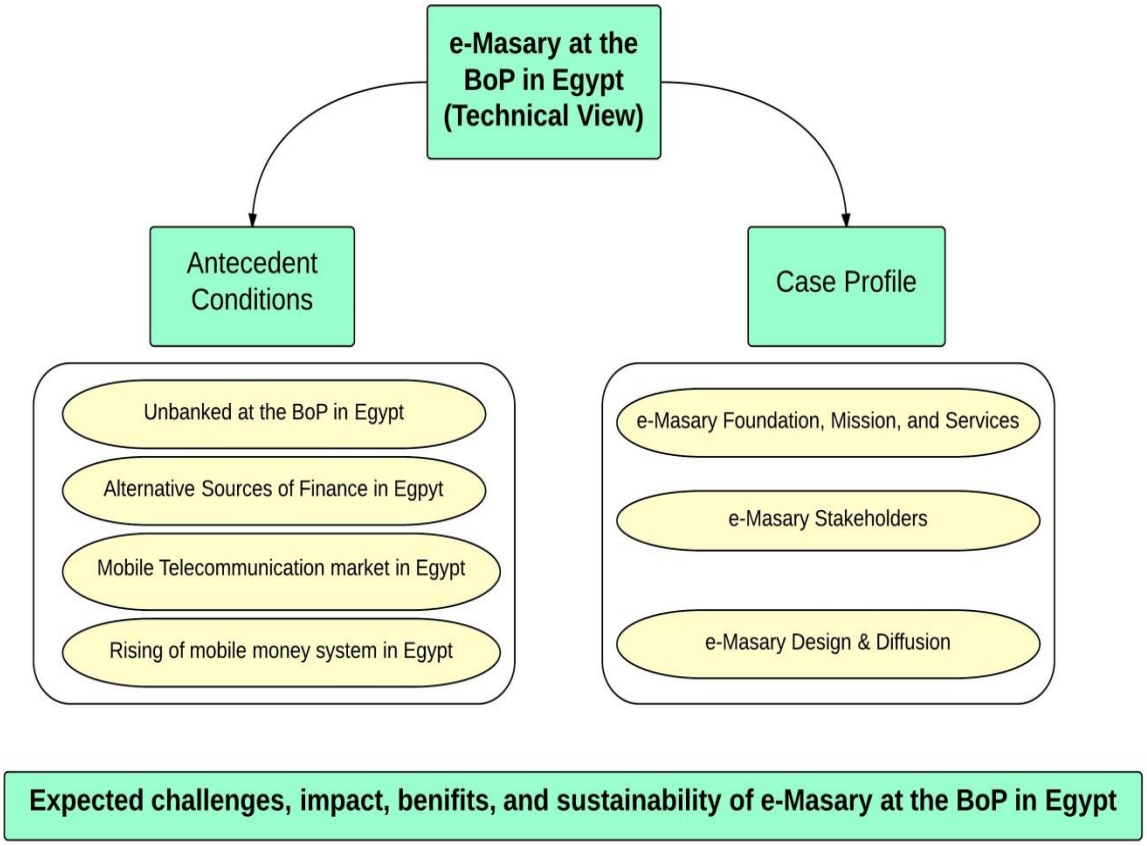
This chapter presents our neutral voice and the system owner's point of view. It shows the result of taking a technical/rational standpoint of how the MMS development process was supposed to take place. It presents the first step of our exploration on how e-Masary mobile money system was developed. **Chapter 2** discussed the Multipleperspective (i.e. TOP) analysis to define the problem of why e-Masary MMS did not work as expected when the actual deployment proceeded. Both chapters reflect our action research guided by Multiview**4** framework developed in **Chapter 2 & 3**.

Masary.Co, the system owner, is the major stakeholder in the system. Without their support and engagement in the systems development, the technology would seem intimidating. However, we argue that Masary's view is a rational view (i.e. technical view) through which Masary see the Egyptian unbanked market and opens a window to a fully mobilized money system. This chapter aims to improve our understanding of *the antecedent conditions* of developing e-Masary at the BoP in Egypt. Then it highlights the *complexity of e-Masary design & diffusion plan* before its ground implementation. Reaching both objectives facilitates identifying the *expected challenges, benefits, and sustainability features* of e-Masary at the Egyptian BoP. This will help identify how the providers' view helps us answer the following sub-questions:

> **Sub-RQ2:** *How can Multiview model improve our understanding of e-Masary design & diffusion?*
>
> **Sub-RQ4:** *How can Multiview model improve our understanding of the expected challenges, impacts, benefits, and sustainability of implementing e-Masary MMS?*

The literature from the Egyptian context, archival analysis and semi-structured interviews are the key sources of data to draw this technical view of e-Masary design & diffusion. As shown in Figure 5.1, this chapter starts with a thorough analysis of the system's antecedent conditions. This encompasses insights on the *unbanked BoP market, mobile telecommunication market, alternative sources of finance and money remittance services, and mobile money strategies* in Egypt. The second section of this chapter, present *e-Masary case profile* and analyses the key stakeholders in that MSS. This analysis enabled us to draw a *rich picture* of the system, identify the problem situation and set the optimum view of the system design and diffusion strategy before the e-Masary system gets implemented. The last section offers a template analysis of the expected challenges, benefits, and sustainability features of the e-Masary system.

Figure 5.1: Structure of Chapter 5



5.1. Antecedent conditions of MMS in Egypt

In this section, we considered the problematic situation in developing a networked MMS. In doing so, we explore the perceived problems/opportunities to diagnose the needed intervention to employ the full MMS. Therefore, we explore the BoP market in Egypt, alternative sources of finance in the country, the characteristics of the mobile telecommunications market, and the history of MMS between 2007 and 2014. These antecedent conditions help draw the expected challenges, benefits, and sustainability features throughout the development stages of e-Masary system.

5.1.1. The Base of the pyramid in Egypt

Social and economic indicators in Egypt have improved during the last 3 years. However, poverty is still growing. According to World Bank indicators in 2013, 55% of the Egyptian population live in poverty. The Egyptian Organization for Human Rights (EOHR) declared that the poverty level is expected to increase, and varies between governorates (administrative regions). For example, poverty in Upper Egyptian governorates encompasses 63% of the population, falling to 40% in governorates which are close to the main cities and so feature more commercial activities (EOHR, 2009). The World Bank report referred to political conditions in Egypt and some bad practices from Egyptian governments as the main reasons for income inequality, social stratification, and high illiteracy. Examples of these practices are price inflation, privatization, a floating exchange rate, and a large deficit in the fiscal budget, and the increase of the national debt to high levels (EOHR, 2009).

The Central Agency for Public Mobilization and Statistics in Egypt (CAPMAS) reported the following indicators for year 2013: (1) decrease of GDP by 2.3 %; (2) increase of the national debt by 3.4%; (3) price inflation of 2.4% (4) deficit in the fiscal budget of L.E. 56.4 million, (an increase of 2.4% on the year 2009). In March 2014, Egypt cabinet ministries (ECM) reported that 47.5% of the poor are farmers, and lack access to finance. The same report found strong relationships between income poverty,

mortality rate, and illiteracy (ECM, 2010). Another issue which affects poverty is the average consumption of consumer goods, estimated at L.E.17, 000 per year (ECM, 2010).

All of the above problems increase as population increases (Bolbol and Fatheldin, et al., 2005). 4.24% of Egyptian children leave school to join the work force as a way to raise funds to cover family expenses. According to Bolbol & Fatheldin, et al. (2005), the Egyptian government succeeded in economic reform through three steps: (1) removing trade customs (2) introducing tax exemptions for small businesses and foreign direct investment companies (3) expanding the infrastructure in new cities on the right bank of the river Nile. The early stages of the reform programmes started in the early 1990s.

The Egyptian government has adopted new macroeconomic reforms and stabilization policies. The World Bank and United States Agency for International Development (USAID) promoted such policies (Osama, 2004). In the year 2000, the United Nations reported that the late 1990s was an era of liberalised commodity prices, a liberalised financial sector through the reduction of barriers to capital movement and control of the interest rate, reform of public enterprises, and the boosting of privatisation. Al-Mashat & Grigorian (1998) divided Egypt's economic reform and structural adjustment program into two phases. The first phase occurred between 1990 and 1993 and sought to decentralise the Egyptian economy through minimizing the role of the public sector and giving the private sector a larger role in a market based economy. These policies resulted in the following positive results: (1) reducing the budget deficit of the government; (2) liberalising the financial sector by decontrolling the interest rates and exchange rate unification; (3) establishing the Treasury bill market in 1991; and (4) liberalising prices, in particular energy prices, resulting in lower price distortions.

The second phase was mainly concerned with partnerships with MNCs in order to improve the performance of the financial sector, high technology industries, and microenterprises (e.g. the partnership with Shell to train micro-entrepreneurs and financially support their projects) (Shell Egypt, 2008). Concluding the above discussion, despite the Egyptian government introducing many steps to enhance economic reform,

these efforts need more partnerships with MNCs, NGOs, and poor communities to enhance economic development from the bottom-up (Silmi, 2010).

5.1.2. Financial Inclusion in Egypt

One decade ago, the evaluations of Financial Inclusion (FI) initiatives throughout Africa suggested that they were less successful than initiatives in Asia and Latin America (Aryeetey, 1998, Basu et al., 2004). However, in 2010, Arab FI recorded the second highest median among the world regions (CGAP, 2010). In 2009, the average number of borrowers to Arab MFIs became 11,785, exceeding an average of 9,768 borrowers reached by the more mature FI market of Latin America and the Caribbean (PlaNet-Finance, 2010). In the Arab region Egypt continued to dominate the FI sector in 2009. This market leader represented 45 percent of all borrowers and 37 percent of the total loan portfolio of the MENA region (CGAP, 2010). This high percent represents 21 million borrowers who live under the poverty level of $2/day (EFSA, 2010).

Mohieldin & Wright (2000) classified the Financial Inclusion market in Egypt into "Formal and Informal" sectors. Also, they provided statistical evidence that 67.5% of the Egyptian population prefer to deal with informal FI than the formal one (Mohieldin & Wright, 2000). The authors testified that this was due to the effect of variables such as *religion, gender, and level of income* of the Egyptians' preferences dealing with micro-credit providers. In the same context Elyachar (2010) emphasised that gender has a significant role behind the success of MFIs in Egypt. The social infrastructures of communicative channels are important to the economy and so need for finance to be more visible (Elyachar, 2010).

Their social infrastructures of communicative channels are important to the economy and so need for finance to be more visible (Elyachar, 2010).

Other academics such as Drolet (2010) analysed women's experiences in a micro-credit project using triple roles, *practical* and *strategic* gender needs and notions of women's *empowerment*. Moussa (2008) classifies formal FI institutions into banks, NGO MFIs, Non-Bank Finance Institutions (NBFIs), and Community-managed loan funds. Additionally, Kaleem & Ahmed (2011) discussed the relationship between religion and FI prospective in what is called Islamic FI. All of the aforementioned sources of FI are discussed in the next section.

5. 1.2.1. Formal Financial Inclusion

Moussa (2008) declared that among different types[28] of microcredit services only two types are significant in the Egyptian market. The first type is individual lending that provides working capital for existing micro-enterprises operating for more than one year. 75% of these micro-enterprises are retailers for commercial products (EFSA, 2010). This type feeds into different purposes such as financial lease, car repairs, breeding, education, agriculture, medical projects, house restoration, repairs and consumer loans (Moussa, 2008).

The second type is group lending[29] for income-generating activities of women, especially female household in the lowest income categories. EFSA (2010) sees that group lending has huge promise in Egypt due to the mutual guarantee among group members and their personal relations that help collecting more accurate data about each borrower and increases the repayment rate. Usually the group members receive one big loan and divide it equally or as they agree (EFSA 2010: 8). Table 5.1 shows the dominant mechanisms of individual and group lending in Egypt.

[28] These types include Individual, group, uncollateralized agricultural credit, asset-based lending and micro-leasing products (FRA, 2010).

[29] The idea of group lending started by a project called " basher el-kher" in 2006, in which a group five female households apply for a group loan and guarantee each other against unpaid loans (see The national strategy of microfinance, a report issued by Social fund for development in 2008).

Table 5.1: Dominant Mechanisms of Individual and Group Lending in Egypt

Methodology		Individual lending	Group lending
Loan Size[30]		100-1500 L.E/ member	50-5000 L.E / member
Repayment period		4-24 weeks	10-40 weeks
Nominal interest rate		13.5-16%	24-28%
Instalments		Monthly	Weekly / every 15 days
Collateral		Not required	Not required
Guarantor		Family members	Group members[31]
No members		1	3-9[32]
Required documents		National ID & Project 's ownership contract	National ID & Birth certificate
Eligibility	Sex	All	All [33]
	Age	18-60 years	18-60 years
	Type of projects/ life period	Informal/ Established one (or more) years ago.	Informal / New & existing
Institutions		Banks & NGOs & other financial institutions	NGO-MFIs (Religious-based & Commercial)

Source: The author's archival analysis

These two types of loans can be provided by banks, Non-Governmental FI Institutions (NGO MFIs), Non-Bank Finance Institutions (NBFIs), and community-managed loan funds (Moussa 2008).

5.1.2.1.1. Banking

There are different bank categories in Egypt based on the degree of ownership and licensing structures.

Commercial banks demonstrate increasing interest in the FI as well as small and medium enterprise markets. This interest was uncertain after several unsuccessful initial attempts to downscale in the 1980s.

[30] The loan size has been changed in light of the recent amendments for the microfinance framework issued in April 2011. However, the EFSA report shows old numbers such as 100-500 L.E/ member for individual loans and 50-1500/member for group loans.
[31] Husbands and wives are not allowed to join the same group (EFSA 2010: 9).
[32] According to the EFSA report, the maximum number of group members is five. However, CGAP (Nov 2010), a more recent report emphasised that the number of group member ranges between 3 to 9 which reflects how the social networks among Egyptian female householders are constituted.
[33] According to the EFSA (2010), 93% of the loan groups are female householders.

Since then, banks in Egypt have gone down-market the Arab African bank has opened offices in 22 countries in West and Central Africa and offers retail FI services and wholesale finance in a number of them. A recent study undertaken by the Dutch banking group found 20 large global financial institutions involved in FI (Riria, 2008).

Following this initiative, in 1987, the US Agency for International Development (USAID) founded both the National Banks of Egypt (NBE) and the Alexandria Businessmen Association (ABA) to offer microfinance services (Baydas & Graham, et al., 1997). This project aimed to offer microloans to poor Egyptians who have microenterprises. The amounts of these microloans ranged from $300 to $1500, with maturity periods ranging from 3 to 11 months. Simple interest was at 16% (Osama, 2004: 210). By the end of 1988, the program achieved 1million L.E profit and reached to 22,600 borrowers (Iqbal & Riad 2004). In 2001, the Banque du Caire received financial and technical support from the USAID to commence in the FI services[34]. The success of the Banque du Caire encouraged Banque Misr to offer FI services in the year 2004 (EFSA 2010). In doing so, Banque Misr asked for the technical and financial support of the International Fundraising Congress (IFC).

Since this time the commercial banks reconsidered a closer link between their FI-oriented products and their "Traditional" business because the sector to date has demonstrated that this market segment is bankable and profitable (Baydas & Graham, et al., 1997). An interesting evolution is that global banks have recently become major suppliers of FI in Egypt, a significant contribution that was rarely seen before (Business Monitor, Second Quarter, 2010).

"Egypt is going from unbanked to banked," says Khalid El-Gibaly, Barclays Egypt's Managing Director. El-Gibaly who added, "*The bank had served what is called the top of the pyramid; now spurred by competition from local African banks and by its experience in Asia, Barclays is targeting the middle and lower end*" (The Economist, 2007).

[34] Banque du Caire had a workforce surplus equal to 350 employees that have been relocated new rural branches instead of layoff.

Microfinance banks represent another bank category that is currently mushrooming in North Africa. These banks are fully regulated, for profit, commercial banks that offer a broad range of products and services. But from their inception, they lend to micro- and small enterprises as their primary business purpose (Foster et al., 2006). Aga Khan Development Network (AKDN) is a typical example of this category in Egypt (AKDN, 2001).

Agricultural and development banks typically enter the FI sector through wholesale lending to NGO MFIs or non-banking financial institutions (NBFIs) (Riria, 2008). The Agricultural Credit Bank of Egypt is one of the oldest banks founded in 1930. This bank was the first specialized bank that aimed to grant loans to Egyptian farmers.

Postal Office Savings Banks are another bank category, often with low minimum required balance(s), which make them accessible to the poor (WSBI, 2008). Egypt Post was introduced to Egypt by former colonial powers as early as the end of the 19th and the beginning of the 20th centuries. This institution provides all types of financial remittances and FI services. In 2010, the Egyptian Ministry of Communications and Information (EMCI) has estimated that 14 percent of Egypt Post's customers, roughly 1 million, are low-income people that use financial services and microcredit.

The Social Fund for development (SFD) is a branch of the Egyptian cabinet that is completely under the control of the Egyptian government. This financial institution targets poor Egyptians via microfinance and capacity building projects. Those poor may be women, new graduates, micro-entrepreneurs and unemployed youth. The financial budget of this institution is currently 14.7 billion Egyptian pounds that provide a wide range of investment portfolios. A 10% interest rate for loans less than 5000 L.E and 13% for loans more than this is normal.

5.1.2.1.2. NGO MFIs

These associations take different forms of sponsorship such as international network affiliates or standalone local NGOs. In Egypt, there are 390 stand alone NGO MFIs and are largely credit-only institutions (EFSA, 2010). Most of them are technically and

financially supported by the Social Fund for Development. This category of NGO MFIs serves 23% of the active borrowers and holds 24% of the active loan portfolio in Egypt. However, the majority of them does not exceed 9,000 clients (EFSA, 2010).

On the other side, there are 10 big NGO MFIs that receives grants from international Aid organizations such as the French Aid organization, the USAID, the Swiss Aid organization and the African International Bank (Mousa, 2008). *Assuit Business Women's Association* is one of those big NGO MFIs. It serves 17,931 active borrowers and holds 42 million L.E outstanding loans (MIX, 2010). This category serves 56% of the active borrowers in Egypt and 43.6% of the active loan portfolio of all microfinance borrowers in the country (EFSA, 2010).

5.1.2.1.3. Non-Bank Finance Institutions (NBFIs)

NBFIs are for-profit financial institutions that are not commercial banks, and require a small amount of capital (Riria, 2008). These institutions are seeking a different legal status to offer a greater range of services than NGO MFIs.

In Egypt, NBFIs are counted among parastatals—institutions owned or controlled wholly or in part by the government — such as *Naser Social Bank* (Loewe, 2004). Consumer finance companies that provide short-term loans at high rates for consumption purposes can be NBFIs and are widespread in countries with larger middle classes.

5.1.2.1.4. Community-Managed loan Funds

The fourth category of microfinance service provider, Community-Managed Loan Funds (CMLFs), are also referred to as revolving funds, self-managed village banks, Village Savings and Loans Groups (VS&LGs), Accumulating Savings and Credit Associations (ASCAs) and community based finance (Riria, 2008: 29). CMLFs tend to have between 5 and 40 members and are not managed by professional staff; instead members, who are sometimes illiterate, both own and manage their funds. One of the

most famous is the Small Businesses Association in Alexandria (SBAA) in Egypt, which managed to reach 47,139 clients by June 2010 in the hamlets and remote areas. This outreach resulted in 59,580 jobs by the end of 2010 (SBAA, 2013).

5.1.2.1.5. Islamic Finance

Islamic finance refers to a system of finance based on Islamic law (CGAP, 2008). This law is formed from three sources: First is the Quran, considered by Muslims to be divine scripture and life constitution (Von, 1985: 25). The second source of Sharia is Hadith—the practice, conduct, and sayings of the Prophet Muhammad (Juynboll, 1996). In case further clarity is needed, jurists look for group consensus on rulings among Islamic scholars (Layish, 2004). The main aim of this type of financial institutions is to improve the welfare of the population by prohibiting practices considered unfair and exploitative (Karim et al., 2008). The dominant characteristic of the Islamic financial system is the prohibition of setting a fixed rate of return on financial transactions.

Alashanek Ya Balady for Sustainable Development (AYB-SD) is one of the Egypt's most prominent youth based organizations, which follows the Islamic principles in microfinance. This NGO works in developing poor areas and in empowering the poor in cooperation with multinational corporations such as Vodafone. AYB focuses mainly on women in most of its programs and one of these is the lending program.

5. 1.2.2. Informal Financial Inclusion (Money Sharks)

This category includes consumer lenders, referred to as informal money lenders. Money lenders can in particular be found in developed and higher income markets, but the relatively new entrant group Blue Financial Services is aggressively entering other markets as well (Wahba, 2009).

In Egypt, 52% of the poor depend on self-financing or costly informal financing (e.g. rotating savings, credit schemes, supplier credits, and local moneylenders) with a very limited role for the state, NGOs, and international donor-subsidized programmes

(Osama, 2004). In the era of the 1990s, Egyptian farmers used these loans to bridge seasonal food gaps and meet deficiencies in seed and draught power (Brandsmaet al., 2001). This depresses a number of long-standing informal institutions that regulate seasonal lending and land rental between households with differential access to resources. Due to microcredit clients' immediate large cash needs to pay off their debts, short-term informal money lending and one-year land "sale" has gained importance (Brandsmaet al., 2001). An informal social security institution has been adapted to take care of unlucky microcredit borrowers (Segers et al., 2010: 1).

Mahmoud Mohieldin, the former minister of investment and current managing director of the World Bank conducted an empirical study on formal and informal credit in Egypt, using a dataset which was specifically collected for the purpose (Mohieldin & Wright, 2000). His analysis supported the view that the informal financial sector was more active than the formal sector, though the loans obtained were generally smaller. Moreover, he examined what factors determine whether or not a person borrows from the formal and the informal financial sectors (Mohieldin & Wright, 2000). These equations were well researched and indicated that financial considerations were of primary importance in the determination of loans in both sectors. The interaction between the two markets is far from simple, however, and no simple correlation exists between having a formal sector loan and having an informal sector loan (Mohieldin & Wright, 2000).

According to the Egyptian Ministry of Social Solidarity (MSS), the average interest rate required by money lenders is 16%/y, which exceeds the bank interest rate of 10%/y (MSS, 2010). The choice of informal money lender depends on many factors: ease of repayments; trust - money lender being from the same community in the same hamlet; and the amount of money to be borrowed; how quickly they need the money, (i.e. criticality of the situation in relation to financial crises, and medical emergency) (Moussa, 2008). Women face yet another challenge – from a gender perspective. If they are borrowing money for the first time, they usually have to be accompanied by men to the money lender's place, even if they are the ones who will repay the money (Chavan & Arora, et al., 2009).

The twentieth century witnessed a wide diffusion of mobile telecommunications and their integration in nearly all aspects of everyday life and is altering economic activity and the social environment (Kamel et al., 2009). In terms of impacts, mobile telecoms have the potential to create job opportunities, improve delivery and access to health and education, facilitate information sharing and knowledge creation, and increase the transparency, accountability and effectiveness of government, business and non-profit organizations; all of which contribute to an enabling environment for socioeconomic development (Morawczynski & Ngwenyama, 2007).

The importance of financial inclusion in Egypt has been remarked by the United Nations as the second millennium development goal (UNDP, 2011; IFC, 2013). Highly cited anthropological studies such as Elyachar (2005, 2006 & 2012) and Fritz & Lang (2012) explored the social capital and best practices of financial inclusion in Egypt. The money sharks and other Informal sources of finance have been discussed in the seminal work of the previous minister of investment in (see Mohieldin & Wright, 2000; Nasr, 2010). A few other studies covered the socio-economic impact of the financial inclusion in Egypt (Dhumale, et al., 2000; Levine, 2002; Moussa, 2008; EFSA, 2010). Studies such as Goodman & Walia (2007), Elbeltagi (2007), Abdel-Wahab & El-Masry (2010), and Firpo et al. (2011) emphasized the potential for the fast spread of mobile communication technologies in the fields of electronic commerce and payment services.

All together, they justify the potential for MMS as a highly diffusing technology that provides more efficient and effective financial inclusion services (than the traditional microfinance tools) for the Egyptian unbanked people. Reviewing these studies also enabled the researcher to systematically map the technical, institutional, and cultural factors in the financial inclusion industry in the Egyptian context and to highlight the boundaries of this multi-stakeholders environment.

Concluding this section, I argue that mobile telephony presents a platform for more effective and transparent microfinance and mixes the advantages of informal and formal microfinance sources. Additionally, it combines the advantages of Islamic financing and the non-Islamic one.

Table 5.2: Alternative Sources of finance in Egypt

Formal Finance
Banking • Commercial banks. • Microfinance banks. • Agricultural and development banks. • Postal Office Savings Banks. • The Social Fund for development. ***NGO MFIs*** ***Non-Bank Finance Institutions*** ***Community-Managed loan Funds*** ***Islamic Finance***
Informal Finance
• Money Sharks

5.1.3. Mobile Telecommunications in Egypt

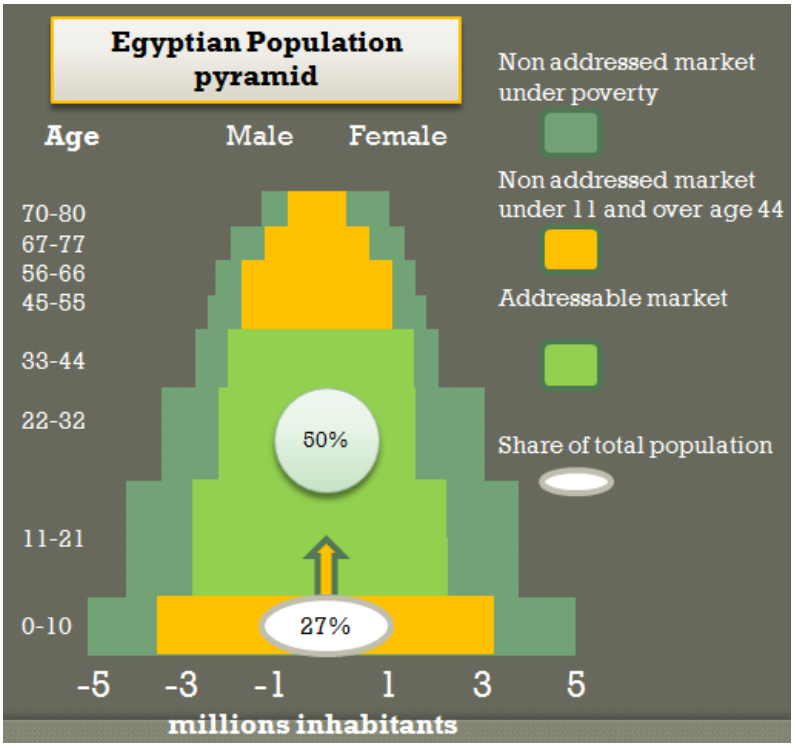
Based on our archival research, this section discusses the Egyptian mobile telecommunications market in terms of key stakeholders involved and the strategies applied. After discussing the *demographic characteristics* of the targeted mobile market, we analyse *how telecoms compete* to hold a bigger share of this market. Then we discuss the *other actors* such as the national telecommunications regulatory authority, the non-governmental organizations, and the retail agents who shape the strategies followed by those telecoms to serve the poor. Overall, we reveal some of the *challenges* that face mobile telecoms accessing the BoP in Egypt. This section is linked to our scenario analysis of the potential entry modes for any candidate telecoms aim to access the Egyptian market[35] (see secion 6.7.1 & 6.7.2).

The number of low-income subscribers (including better-off-poor users) jumped from a million to approximately 30 million between the years 2006-2014 (Egypt state

[35] This chapter complements with the other chapters' published by the author that offer a strategy for the three dominating mobile telecoms to diversify into mobile financial services such as mobile money, mobile banking, and mobile payment services.

information service, 2014). Such a promising market tempted the mobile telecoms to grasp profit and differentiate a wide variety of telecommunication services including (e.g. call, data, and payment services) (Mohamad, et al., 2014). According to a Vodafone report in 2007, North Africa and particularly Egypt and Algeria are demanding markets that allow them to utilize their massive capacity, infrastructure, and worldwide experience far further than the traditional telecommunication services offered in saturated markets (e.g. the United Kingdom). The recent estimation of Egypt's population is 80.72 million, which is the largest in the Middle East and North Africa (World Bank, 2014).

Figure 5.2: The Targeted Market of Mobile Telecoms



By the end of the second quarter of 2014, the number of mobile subscribers reached 101,930,000 million subscribers (i.e. 126% penetration rate) (National statistical offices, June 2014). Euro monitor International reported that 50% of the Egyptian population ages between 11 and 44 years old are represented in the second through to the fourth layer in Figure 5.2.

The area highlighted in light green refers to 70.2% of that age group who earn less than US$2 per day (Euro monitor International, Jan 2014). This socio-economic class counts of 59% female, 41% male (i.e. Females should be considered as potential mobile users) (Euro monitor International, 2014). This class is expected to grow due to two factors: (1) the population increases by 7% annually and the mobile market is also expected to grow by 3% annually (Ministry of communication and information technology, 2014$_a$). (2) 27% of the population are under the age of 11, enlarging the base of subscribers (Kamel, 2009).

Vodafone Egypt[36], Mobinil, and Etisalat are the only licensed mobile telecoms operators in Egypt. All are private for-profit corporations that operate in more than one country. Mobinil is an Egyptian mobile telecom founded in 1998. Since that time the company has strived to maintain its percentage of market share (see Figure 5.3a&b). Despite the competition among the other telecoms, Mobinil still holds 35% of the market share in terms of number of subscribers and 40% in terms of revenues. Mobinil provides the highest quality mobile telecommunication services to the upper and middle classes (NTRA, 2013).

The second telecom corporation is Vodafone Egypt, founded as a subsidiary Vodafone group in Egypt in 1998. Vodafone Egypt covers different voice and data exchange services in addition to 3&4G and ADSL internet services for all classes of the Egyptian population pyramid. The company followed distinctive marketing strategies to cover the rural areas in Egypt (ITU, 2011). Vodafone's worldwide presence allowed them to use their knowledge and innovative services portfolio to serve poor customers. Vodafone has the largest services revenue market share of 42 % subscription rate and 44% of revenues (Ministry of communication and information technology, 2014$_b$).

In March 2014 the American chamber of Commerce in Egypt reported a 60.9% increase in the number of mobile subscribers against only 39.7% in the telecoms' revenues. This effect is typical of markets where growth is achieved through low-income customers and changing the subscribers base mix (American Chamber in Egypt, 2014).

[36] 75% of Vodafone Egypt is owned by Vodafone UK and 25% is owned by Orange telecoms.

In January 2007, a third mobile telecom company, Etisalat, entered the Egyptian market to target adults and children in rural areas and in Upper Egypt. Etisalat is an Emirati multinational telecom that experienced some technical problems at its early beginning in the Egyptian market that affected the quality of its services (NTRA, 2010). However, within one year of operations, the company succeeded to position its brand among the other two giants. Both Vodafone and Mobinil suffered a loss of market share, due to the orientation of the two companies towards the upper and middle classes rather than the poor (Aly, 2010).

After Etisalat's entry, Vodafone has maintained its customer base and its leadership in revenues, while Mobinil has continued to acquire customers at a high pace, but has sacrificed revenues (Lynch, 2011). This is because of the wide range of services that Vodafone offers and its exclusive right to provide mobile 2.0 services such as mobile banking, mobile microfinance, Skype calls, and social networking services (Aly, 2010).

To sum up this discussion, Vodafone has the exclusive rights to provide financial services to the Egyptian people. As Vodafone's upper and middle class market became saturated, the company began to target low income users aged between 11 and 44. An important issue that needs to be considered is the oligopolistic power of these three companies over mobile users. According to Karnani (2009), this power may result in unethical marketing and exploitation of the poor. In response, the National Telecommunication Regulatory Authority (NTRA) started to control the malpractices of the mobile telecoms. Furthermore, they built a partnership with NGOs and the telecoms to extend the benefits of mobile services to the poor in Egypt. The Ministry of Social Solidarity reports 83 registered NGOs in the country, 36 of which operate in the drugs and crime domain (UNODC, 2014), others work in microfinance, women empowerment, education enhancement, health care, human rights, childcare, and political awareness. Examples of wide impact initiatives where NGOs collaborates with MNCs to deliver a development project are; "***Protecting the future***" and "***for the sake of my country***"[37]. The former is a profitable initiative that operates in five Egyptian cities to fight canapés and cigarette smoking. This initiative is led by "life makers"

[37] The original Arabic name is Alashanek Ya Balady Association for Sustainable Development (AYB-SD) which is a synonym of the English expression "for the sake of my country".

institutions and “hyper one” (see: http://lifemakers.org/7omat/). The latter, is a not-for-profit institution that operates in education enhancement, women empowerment, and poverty alleviation. This initiative has been founded by the Vodafone Egypt foundation for corporate social responsibility and has the full technical and administrative support of the American University in Egypt (See http://www.ayb-sd.org/).

Mobile retailers play a key role In the telecoms market. These agents operate either in a franchise right (exclusive agents) or in sole proprietorships that work independently and add a mark-up to the services provided by the exclusive agents (Aly, 2010). They receive a mega quota of call minutes and data usage at a discounted price and then sell them on at the market price set by Vodafone. Successful mobile agents require IT, entrepreneurship, and management skills to serve the middle and lower classes (Ling & Donner, 2013).

Recently, Vodafone are expanding their network of retail agents by recruiting middle level educated individuals who have low income or are unemployed. As said by the CEO of Vodafone Egypt “For us involving community representatives closes the gap with our customers and helps us see the ground of the BoP” (Vodafone, 2013).

Donner (2008) refers to some environmental and user challenges in the market. Environmental challenges include long travel times, variable population density, and lack of secure storage. Examples of the user challenges are 40% illiteracy and a 35% underemployment rate (CAPMAS, 2011).

However, Aly (2010) argues that Egyptians need mobile telecommunications in their day-to-day life and this why they spend 11.2% of their disposable income on it. Further analysis of technical, organizational, and personal challenges are covered in Mohamad & Wood-Harper (2013). In the next section we discuss our Human Activity analysis, including stakeholder analysis and business processes of e-Masary system during the pilot (i.e. design stage).

Figure 5.3a: Telecoms' market share in terms of number of subscribers

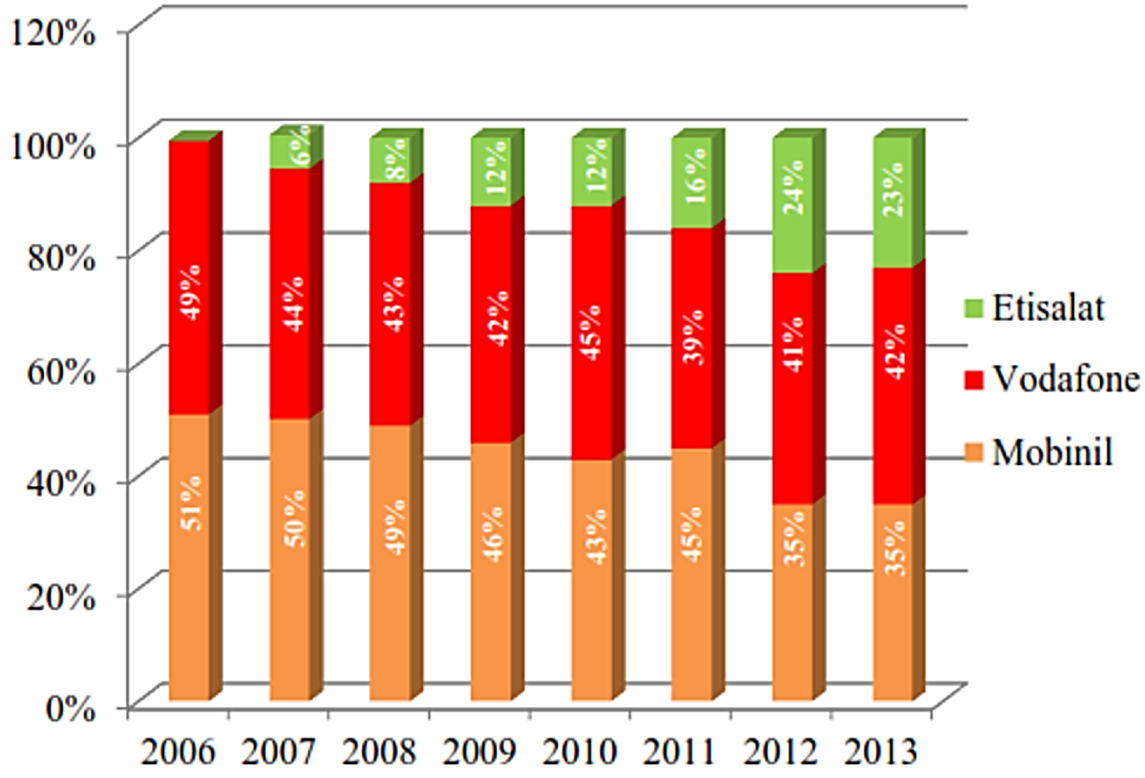
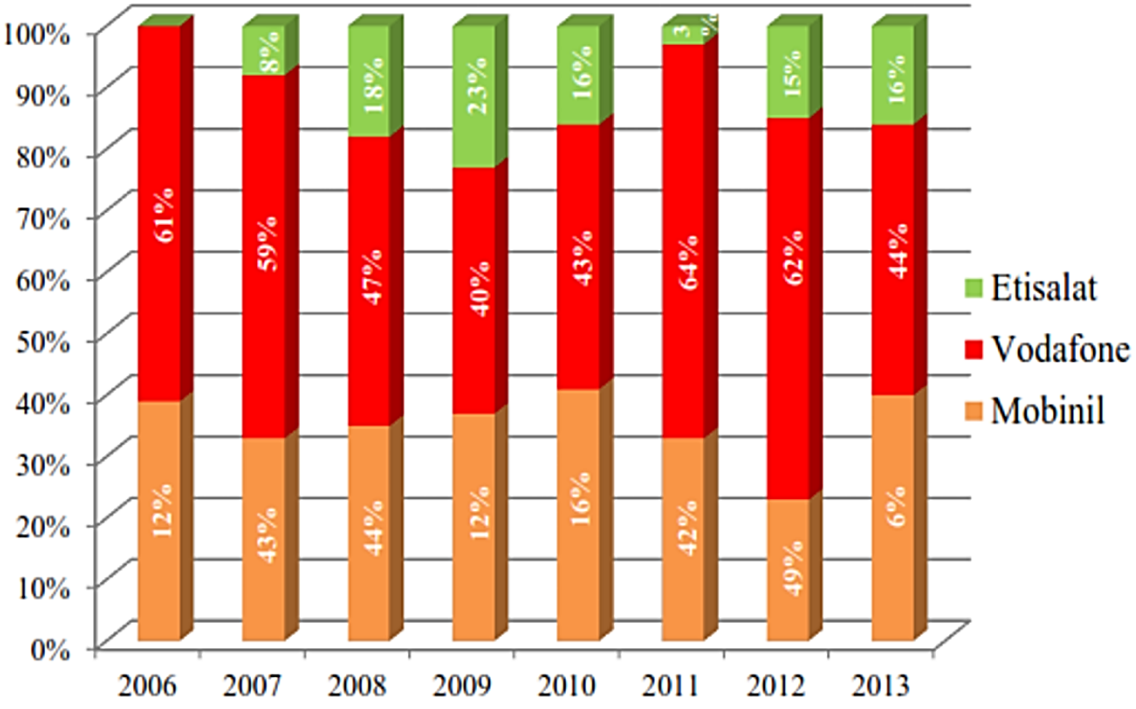


Figure 5.3b: Telecoms' market share in terms of revenues



Source: Mohamed, Wood-Harper & Ramlogan (2015a)

5.1.4. Mobile Money in Egypt

The first initiative to develop MMS in Egypt was in 2001, when the Arab Bank-Egypt[38] formed a partnership with Euronet Worldwide. According to the annual report of the Arab Bank in Egypt, this service would be provided through Vodafone Egypt to provide mobile real-time access to traditional banking services (Arab Bank, 2001). However, such a system does not match our definition of a fully operated MMS (see **Chapter 2**). The access to personal information and bank accounts was intended to be via a SIM toolkit (STK-based[39] account access) and a sophisticated event messaging solution that provides the customer with real-time alerts (Gatekeepers, 2010). Services provided by this initiative are; access to bank information, balance summary, money transfer, intra-bank transfer, money overseas transfer in different currencies, and microloans (Arab Bank, 2010). Once a transaction is conducted, the system sends an account activity alert with a notification and a transaction number to the user. According to the American Chamber in Egypt, these new services allow commercial banks to not only offer financial services and microloans, but also advertise new services (American Chamber of Commerce in Egypt, 2001). Our interviews reveal six challenges that delayed the development of an appropriate MMS as follows:

1) *There was no legislation controlling the relationship between mobile telecoms companies, the Arab Bank, and borrowers.*
2) *The profit model of the Arab Bank was not efficient enough to overcome the operating cost.*
3) *The bank's shareholders were looking for higher dividends, rather than achieving social benefits and attracting more borrowers via lower interest rates.*
4) *The capacity of the Arab Bank was not sufficient to serve 15 million people, the expected number of borrowers.*
5) *The Arab Bank could not copy the successful experience of NBD or the NGOs offering microfinance services.*
6) *The Arab Bank could not maintain a reliable database about borrowers due to a lack of governmental support (Arab Bank, 2008).*

After the establishment of the Egyptian Financial Supervisory Authority (EFSA) and the creation of microfinance legislation, many banks started to offer mobile banking

[38] Arab Bank is the largest bank in the Middle East, with 123 branches in more than 27 countries. This program was the first trial of Arab Bank to provide M-MIF services and mobile banking in general.
[39] STK-based account access is comprehensive mobile banking software the built in a Java based and an operating system (OS) based module.

services. In September 2009, Henri Guillemin, the managing director of Credit Agricole Egypt (CAE), launched a mobile banking initiative that utilizes the spread of mobile telecoms amongst the Egyptian people (Dannies, 2009). On February 2010, Philippe Garner, the managing director of BNP Paribas, announced the start of M-Wallet services that extend the reach of banks into rural areas by offering deposit, credit, money transfer services, and bill payments (Petkova, 2010). Sharp (2010) reported that, by July 2010, 15 suppliers of Fast Moving Consumer Goods (FMCG) will be served with mobile banking and payment platforms.

To launch an appropriate license of MMS, the Central Bank of Egypt (CBE) issued mobile money framework in the year 2009. This legislation maintains the transparency and accountability of mobile money transactions (Ahmed, 2009). A fellow institution to the CBE, the Egyptian Financial Supervisory Authority (EFSA), was founded in July 2009 to control several regulatory bodies involved in the issuance of that legislation. The main role of the EFSA was to monitor market performance and transparency (EFSA, 2009). In performing this role the EFSA developed more complicated instruments to manage the capital market, insurance industry, mortgage finance, and other non-banking financial activities. The second step toward the desired framework was in September 2009 when the Central Bank of Egypt gave the EFSA the legal authority to license, supervise and regulate these markets (EFSA, 2009). Through this authority the EFSA could solve an emerging dispute between Orascom Telecom and France Telecom over the ownership of Mobinil stocks.

The third step started in October 2009, when the EFSA called for greater involvement of the MNCs in non-banking financial services. In response, an increasing number of financial institutions participated in the under-served market of poor people, who mainly have access to finance via informal markets (moneylenders), non-profit organizations, and state-owned banks (Ahmed, 2009). After one month, the Ministry of Investment (MI) issued a law establishing private microfinance companies (MI, 2009). Under this law, the minimum capital to establish a microfinance company is L.E. 5 million. The potential microloan client market is estimated at 21 million people (MI, 2009).

The fourth step was the amendment of the mortgage law in January 2010. Investment Minister Mahmoud Mohieldin changed the rules of mortgage calculation, from a percentage of the principle amount of the mortgage to a percentage of the borrower's total income (MI, 2010). This amendment facilitated greater access to funding, particularly amongst the young.

In the fifth step, the National Telecommunication Regulatory Authority (NTRA) issued special legislation that regulates security and privacy in the new emerging mobile-based payment and transfer platform.

Finally, in February 2010, the Egyptian parliament passed the mobile money law to enable private companies to provide microloans, and regulate the provision of microfinance services nationwide (Sheline, 2010). This law regulates periodical reporting procedures and financial instruments to keep equilibrium in the microfinance market and eliminate monopolistic practices (Central Bank of Egypt, 2010). It also covers different applications of mobile financial services such as mobile money transfer, mobile banking, and mobile microfinance provided by telecoms.

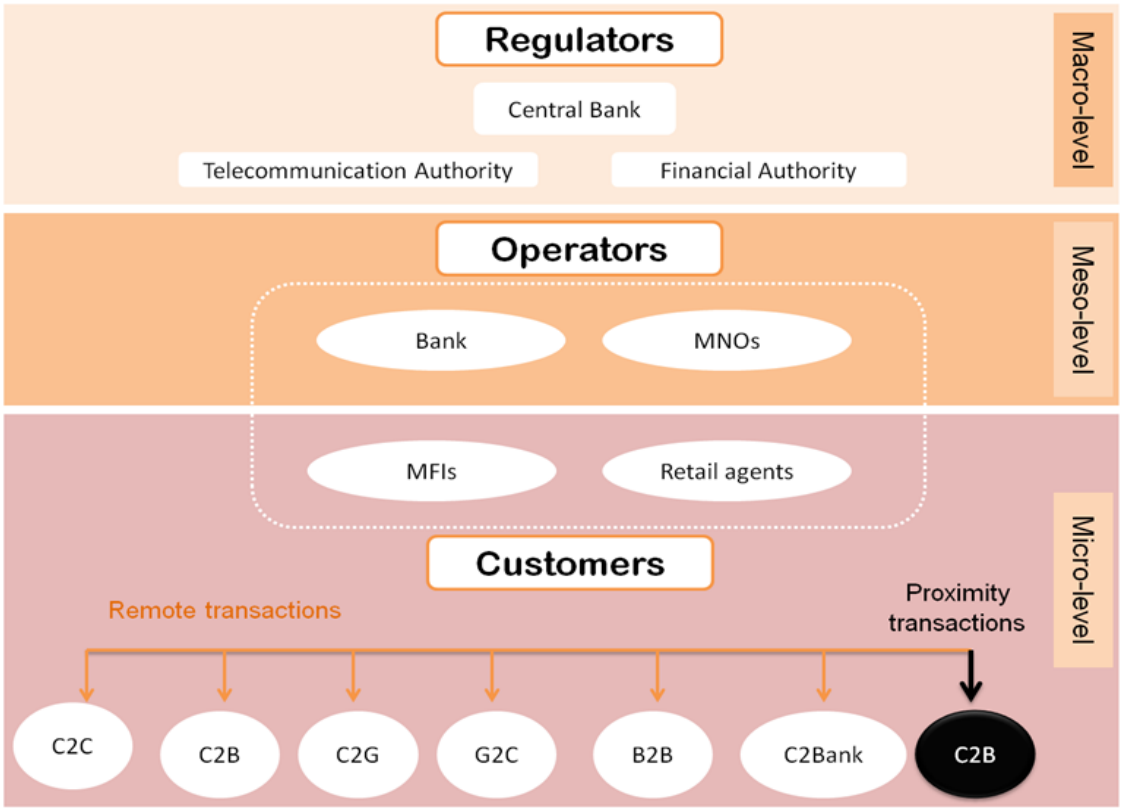
Following Ondrus, Lyytinen & Pigneur (2009) and Donaldson & Preston (1995), we classified the stakeholders of MMS in Egypt into Macro, Meso, and Micro-levels. At the ***macro-level***, regulators such as the NTRA, CBE, and EFSA, SFD control the system design and deployment based on ***technical*** and ***personal/political*** perspectives. Those regulators also control e-Masary – the only fully operating MMS in Egypt.

At the ***meso-level***, telecoms, MFIs (including loan officers), and retail agents manage the service provision within the boundaries drawn from the regulators. In e-Masary System, for instance, Masary Corporation (***Masary.Co***)[40] is the main provider who collaborates with the three mobile network operators in the country. In the next section we will explain how Masary.Co built the technical infrastructure in partnership with the

[40] The next section explains what e-Masary is in detail.

telecoms and then ally with intermediaries such as MFIs and retail agents to distribute the services. Third party IT vendors are also important to develop the system infrastructure with providers and develop the system functionality. Service providers invest their ***technical***, ***organisational***, and ***personal*** capabilities to improve the system sustainability. The intermediaries reflect their ***personal*** and ***organisational*** interest as preconditions for the partnership in MMS.

Figure 5.4: The Stakeholders of Mobile Money Services in Egypt



At the ***micro-level***, users of the MMS conduct a variety of remote and proximity[41] financial transactions. The remote transactions include all types of mobile payment, credit and transfer on Customer 2 Customer (C2C), Customer 2 Business (e.g. buying groceries from FMCGs), Customer 2 Government (e.g. paying for tuition fees and utilities), Business 2 Business (B2B) (e.g. supply of raw materials), or paying back bank loans.

[41] Proximity refers to money payment transaction on the shop than from a remote distance.

The second type of transactions is immediate payment such as direct shopping in the local supermarket, taxi fares or purchasing a hot drink. These transactions leave us with three types of customer; individual mobile payment customers, individual microfinance customers, and business payment customers. All these services are available for e-Masary customers as will be discussed in the next section. Those classes of customer are usually concerned with the ***personal issues*** and some ***technical issues that might raise personal discomfort*** and difficulty in using services.

5.2. E-Masary Action Case

This section discussed the process of MMS development as expected by Masary's top management in their project pilot in 2007-2011 (see Figure 5.11). The e-Masary system offers connectivity and a universal reach through retail agents (e.g. Airtime resellers and grocery retailers) and MFIs. This system is not a fully regulated banking system or a commercial bank that follows the central bank compliance and legal reserve rules. As mentioned in the mobile telecommunications market analysis, the airtime services in Egypt were also not organized and a ***black market of money remittance*** has arisen through exchanging the normal airtime with cash at the exclusive agents for telecoms and airtime retailers in the slum areas. This untapped ***over-the-counter financial market at the BoP*** encourages business development companies to access the telecommunication market and bridge the gap between mobile telecoms and the unbanked people at the BoP market.

Our analysis pinpoints the role of Masary's top manager as boundary spanners who extended the idea of mobile payment and money systems from Vodafone to a network of public-private partners that serve more than 15 million people by the year 2013. The starting point was to create a new market opportunity and identify the so called "below the ocean strategy" (Kim & Mauborgne, 2004). The strategy suggests delivering an innovative service(s) that is not provided by others in the market. The Egyptian market includes two promising profitable markets; namely, the telecommunications and banking services. By 2012, Egypt reached over 100% penetration for telecoms (see Mohamad. Wood-Harper & Ramlogan, 2014a). Masary's vision was to fill the gap

between the telecoms and the banks. While there are 35 commercial banks in Egypt, the banked population is only 7 million out of 82 million. Serving customers' whom the bankers see as not creditworthy, is the long-term plan.

To reach this vision Masary.Co decided to develop an efficient real-time data processing system to improve their back-office operation and link the system to the web and mobile clouds to facilitate distant data entry and reporting.

5.2.1. What is e-Masary?

"*E*" stands for electronic and the word "*Masary*" stands for money in Arabic language. It is a payment service launched by the Applications and Payment Systems Development Corporation (APSD) in 2007[42]. Later the name APSD has been changed to Masary.Co in 2009. Its key product is the mobile wallet, which allows clients to buy credit from general stores and use those to transfer money, buy products and services, or pay bills.

In the cash-based economy of Egypt, only 10 percent of 84 million Egyptians have a bank account (EFSA, 2011). Masary's main objective is to improve the financial inclusion of those unbanked Egyptians investing on the 118% penetration of mobile technology (Ministry of Information Communication and Technology, 2014). In the following section we explain the different services and products provided for e-Masary clients who hold Masary's SIM card.

The first service is *"mobile airtime top-up"* in which Masary's customers can visit one of Masary's 2965 outlets to charge their e-wallets and top-up their mobile credit for any of the mobile networks (Vodafone, Mobinil, and Etisalat) operating in Egypt. The second service is *"real-time payment service"* in which Masary's customers can top-up

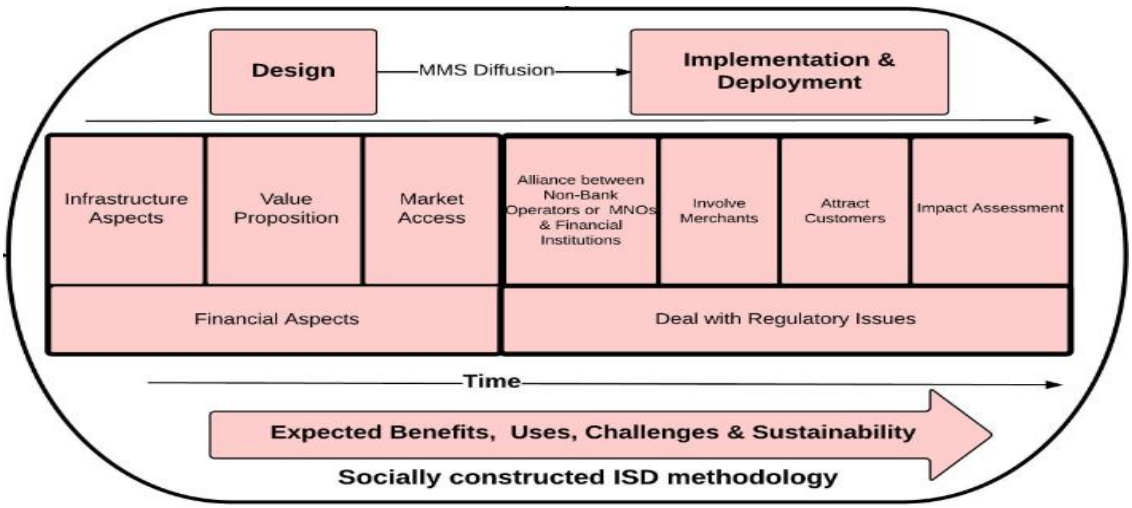
[42] This section explains our involvement in e-Masary action case during the early stages of e-Masary development. We then use the past tense to offer our interpretation of the expected system design and defussion plans. In Chapter 6, we explain how the system development plan was perceived by the stakeholders.

their e-Wallet to pay their bills (e.g. travel tickets, groceries and utilities) and online Games. Moreover, it enables customers to charge other electronic payment mediums such as "One Card" and "Cash U"[43]. In addition, customers can use their e-wallet to pay for entertainment websites like www.Shofha.com and www.Mazika.com. The third service is "*mobile microfinance services*" that enables MFIs to mobilize their data entry and reporting at low operating cost. It also enables active borrowers to upload their loans into e-Masary wallet for three uses:

1) *Resell airtime and electronic payment services to the rural communities with mark-up in order to achieve a profit margin and secure a stable source of income.*
2) *Direct purchase of production inputs or payment for bills.*
3) *Transfer credit to other family members or business partners to do (1) or (2).*
4) *I-Score service in which e-Masary enables their partner MFIs to trace the credit history of existing and potential borrowers.*

The fourth service is the money transfer service that Masary.Co offers to subscribers of Vodafone, Mobinil, and Etisalat. Through Vodafone the service is called "*Vodafone Cash*", through Mobinil it is called "*mobicash*", and through Etisalat it is called "*Etisalat Floos*". The word "Floos" is another synonym of Masary or money in Arabic. This service operates the same as the mobile microfinance loan tracking services, but open for all mobile users than just microfinance customers.

Figure 5.5: The rational/technical view of e-Masary before the actual deployment



[43] "*One card*" is a magnetic striped card for e-shopping and internet payment (www.onecard.net). "*Cash U*" is also a prepaid internet payment card (http://www.cashu-egypt.com).

In the following section, we follow the part of the framework that has been developed in **Chapter 2** and finalised in **Chapter 3** (see the Figure above).

5.2.2. e-Masary as a design

5.2.2.1. Infrastructure aspects

E-Masary wallet enables users to upload, download, pay, transfer money, and use SIM cards with a ***SIM Application Tool Kit (STK)***. To register for the wallet, users have to visit an authorised Point-of-Sale (e.g. retail agent, MFIs, or Masary headquarters in Cairo). It is a free registration that requires a valid national ID and mobile number. The second step in the registration is to install Masary SIM card, which enable the saving of electronic monetary value. Once the registration is complete, the agent installs the e-Masary application on the user's handset. For smart phone users, they receive a web link for automatic installation or e-Masary wallet. This link is automatically sent by the Customer Relationship Management (CRM) system on to e-Masary along with registration confirmation.

By the end of 2010, Masary produced an independent SIM card that includes e-Masary wallet as a built-in application. The Masary SIM card enables users to transfer their number and their credit from all network operators to e-Masary wallet. Customers' data, including authentication information, individual subscriber authentication key, and transactions' data are usually checked through the ***GSM subscription database*** or the so called "Home Location Register". After each transaction an SMS gets automatically generated and sent to customers. It usually includes the customer ID, time and amount of the transaction and the recipient ID. For proximity transactions, users and well as retail agents can print the transaction confirmation using a contactless Smart Card reader or mobile-based PoS. The CBE limited the maximum transfer to 1000 E.L a day and 250 E.L per transaction. Figure 5.6 explains the detailed steps in conducting an e-Masary transaction.

When the user chooses one service from e-Masary's menu and inserts all essential transaction data, an encrypted session of ***Unstructured Supplementary Service Data (USSD)*** launches a connection between the Masary SIM card and the GSM network. This network is controlled by Masary.Co and their partner telecoms. This GSM network includes a mobile intelligent network that processes the customer request and sends all data to the server.

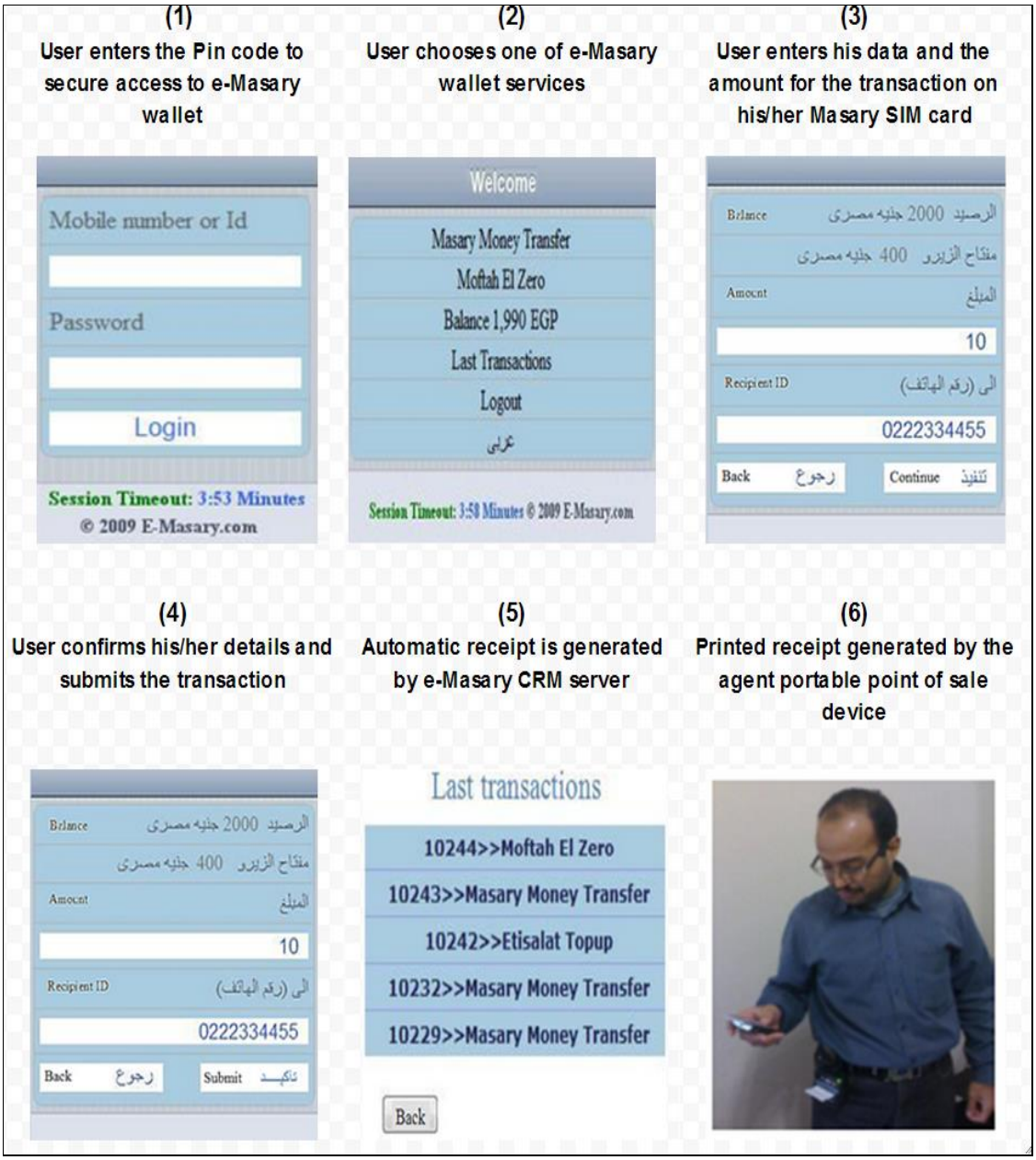
To operate e-Masary system, specific software needs to be arranged. An external GSM modem has to be set up and connected with PC in Masary headquarter via serial cable. It requires a SIM card from a mobile operator to facilitate the data processing. This modem offers a standard interface for Masary employees and regulators.

> "*It is simply more efficient than the GSM mobile-based modem in terms of cost and easy connectivity to USB 2.0 port as a replacement for standard power input. We can use a standard ATtention (AT) command to reset the modem, send or delete an SMS to users, monitor the signal, searching customers' data, or even fix any system function"* [Masary IT officer in March 2011].

Masary IT executives had to have high speed PCs (minimum Intel Pentium IV) to login the GSM modem through USB 2.0 port and process the user's data in Masary's Database Management System (DBMS).

They have two DBMS located in Masary headquarters (located in Giza) and in Nasr City (East Cairo). Masary.Co also planned to develop open source database systems such as MySQL to easily extend access to retail agents and Masary fieldwork operators. "*It can be used by agents who have a basic level of education with no programming background*" [Masary agents' team leader in March 2011].

Figure 5.6: Steps of conducting e-Masary transaction



"Gnokii Application programming interface" is another piece of open source software, which enables users to save data on their GSM mobile and enable the user to connect to this data through the GSM modems. It issues automatic C source codes and ATcommands to connect mobiles to the modem.

5.2.2.2. Value Proposition and creation

In this section, we summarise Masary's strategic business plan and the key services to be offered through e-Masary wallet since year 2013. This includes the pricing, customer selection, and repayment scheduling. Then we draw a DM analysis (including data entity modelling and flow charts) that underpin the provision of such services.

Masary.Co is led by a team of telecommunication experts with 5-20 years working experience in Vodafone, Mobinil, and National telecom of Egypt. As shown in **Appendix 5**, this level of experience and the mix of 36% R&D professionals and 36% supporting team increases the company's ability to innovate new financial services for people at the BoP.

Such a team developed e-Masary mobile money services with a 0.5% transaction cost for real-time payment/transfers, and a competitive interest rate of 3.5% to microfinance customers. All types of customers are permitted to register for e-Masary. However, to apply for microfinance services, customers have to go through credit appraisal procedures and receive their loans. "*Our policy is to offer prepaid services rather than to offer microcredit. We cannot guarantee the repayment from the client's side, we need to recruit fieldworkers to visit the clients and evaluate their credibility. We leave this all to our partner MFIs.* " [Masary's Microfinance officer in March 2011].

The original plan for microfinance services was to offer *three packages*, namely; Long term (Platinum), Intermediate (Golden), Short-term (Silver), and Very short (Bronze). See **Appendix 7** that shows these offers in more details. It shows an *escalating pricing model* developed by Masary's CFO, where loyal customers who repay on time can receive a bigger loan with less interest and longer repayment and grace periods. Loyal customers can then apply for microfinance services (e.g. microcredit & microsaving)

through Masary without approval from the MFIs[44]. Masary.Co aimed to extend cashless banking, all types of cash collection services, as well as money remittance services by the end of year 2013.

Above all, Masary's top management decided to monitor their customers and offer coaching and consultancy services to assure customers' success and sustainability, while using e-Masary wallet. As said by Masary's CEO "*We cannot tap the BoP without playing a social role in the community. We believe that microenterprises with better financial capacity building skills are able to improve the marginal productivity of other inputs, for instance, physical accumulation of assets*". More focus has been given to startups and their owners who can be upgraded from customers to Masary's agents. The ***monitoring services*** work through a feedback loop including automatic phone calls to customers after they conduct each transaction to facilitate a systematic assessment of the service's impact on the customer's capacity building skills.

To manage all these types of services Masary.Co developed a database that includes organised files for data access. As shown in Figure 5.7, we highlighted three types of files: heap files, sorted files, hashed files. The first type facilitates access and retrieval of all records. The second includes users' individual accounts that require special authentication. This class of files is grouped according to types of user, services, access tool, and type of payment. The third includes overflow pages that link the authorised access to users and transactions. They are organised into buckets that shows related entities (e.g. Tables & files) of data structures.

Multiview***4*** offers technical tools such as entity relationship diagrams and data flow charts that can be used to analyze how Masary designed e-Masary MMS. It shows the relationship between the key data tables required for different types of mobile money transactions and also the Structured Query Language used to build it.

[44] The top management of Masary's partner MFIs saw this as a threat that negatively affect their business and pushes their clients to switch to Masary for all microfinance services.

Figure 5.7: A Sample of File Organisation in e-Masary

Source: e-Masary database

When we accessed e-Masary as a case, the system has been already in place ready for deployment. So conducting detailed analysis of the entity relationship modeling was not possible. However, detailed data flow diagrams could be drawn and agreed with the Masary's IT officer.

Figure 5.8a&b, shows three abstract entities based on which the data flow reflects the cash in/out transaction; the customer (mobile-user), Masary's agent (including, retail agent, loan officers in the MFIs), and the network (Masary's GSM modem).

After a customer visit e-Masary PoS to upload cash, s/he submits his/her ID and cash. In return, the agent located in the retail branch or in the partner MFIs then issues a transaction code (credential) that specifies the amount of cash-in. The customer then confirms the transaction and an automatic credential is sent back to the agent.

Figure 5.8a: Data Flow Analysis of e-Masary Cash-In model

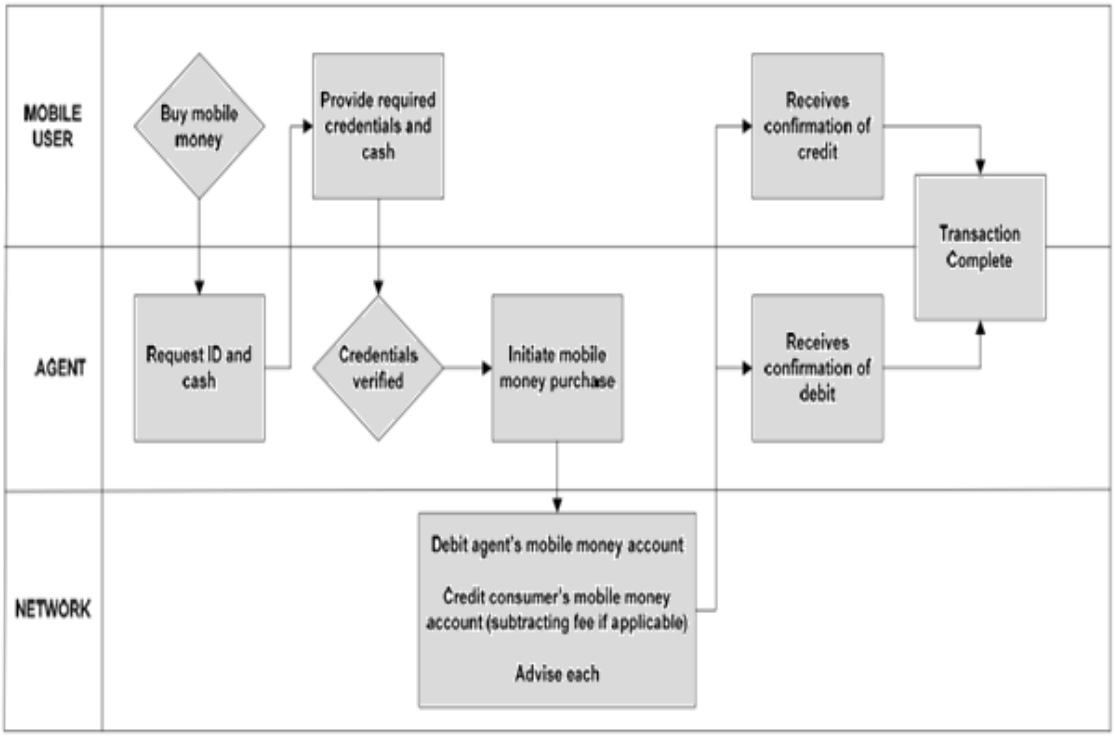
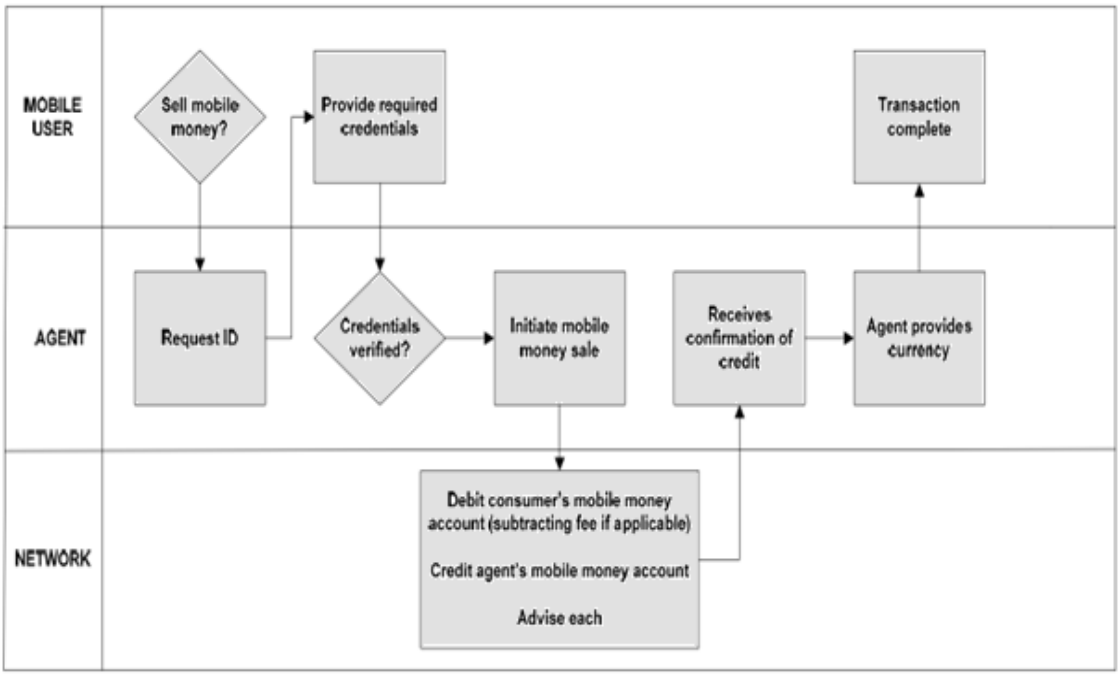


Figure 5.8b: Data Flow Analysis of e-Masary Cash-Out model



Afterward, the PoS initiates credit purchases for the customer and debts the agent's account in e-Masary wallet. Then the GSM modem credits the customer's wallet and subtracts the amount from the agent's account. The GSM modem then sends two

confirmations for the PoS agent and the customer respectively. The transaction ends when both parties confirm receiving the message sent by the modem (see Figure 5.8a).

The cash-out transaction is different in two elements of data flow (see Figure 5.8b). The first is that the GSM credit the agent's wallet and deducts the amount of withdrawal from the customer's wallet. The second is that the GSM modem sends one confirmation message to the PoS agent who then hands over the currency to the customer as a sort of transaction confirmation and completion.

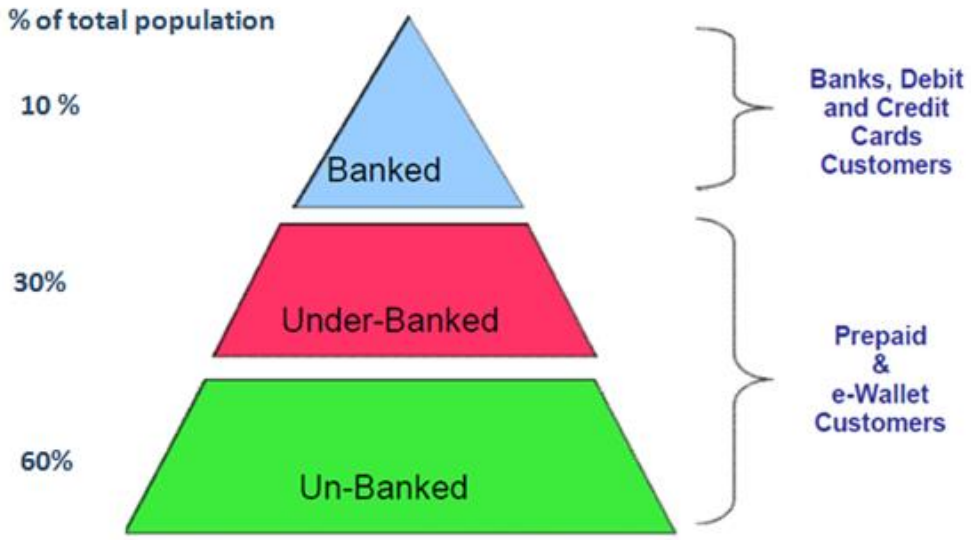
> *"We aim to offer a competitive and flexible value to the unbanked Egyptians that other alternative formal banking and money sharks who do not help the microentrepreneurs grow. The value of services provided to the unbanked, the market access, however, was a challenge*"
>
> [Masary's operation manager]

5.2.2.3. Market & Financial Aspects

Masary's main focus is the middle and lower tier segments of Egyptian society (i.e., the un-banked and under-banked at the BoP), while simultaneously focusing on the development of propositions for the higher tier that stimulates interactions with the lower tiers.

Both classes represent 90% of the Egyptian population who either have no banking facilities in their living areas (i.e. unbanked) or have limited access to the basic banking service and rely on cheque cashers, loan sharks and pawnbrokers (under-banked) (Avery and Bostic, et al., 1999). The World Bank (2010) reported that 10% of the Egyptian population have bank accounts, while 60% are unbanked and 30% under-banked.

Figure 5.9: e-Masary targeted market



Adopted from Mohamad, Wood-Harper & Ramlogan (2014)

In 2010, The Egyptian Financial Supervisory Authority (EFSA) reported that 274 NGOs and 5 Banks are offering micro-credits. The MFIs current market penetration is only 3% or 1,067,107 active borrowers with an outstanding portfolio of EGP 1 Billion and 30% annual industry growth (MIX, 2010). This current number of borrowers represents a small proportion of 21 million qualified[45] borrowers in the year 2010. "*Our opportunity lies in the cooperation with other economic actors in the field of mobile payment architecture and the microfinance industry, to achieve higher market penetration*" [Masary's marketing manager in March 2011].

Through different levels of partnership, (see the deployment stage), Masary.Co planned to extend their fruitful history in the prepaid and micropayment services to all financial services. As said by Masary's CEO in Dec 2010; *"My previous experience as ex-CFO in Vodafone Egypt confirms that low income Egyptians rely heavily on small amount top-up (e.g. 10, 20, or 30 LE) to exchange financial values. Customers trusted these prepaid services offered by telecoms as a high quality service. Why do we try more*

[45] Qualified borrowers are poor and near poor people in Egypt in the age bracket of 15 to 59 years old and have skills to create microenterprise.

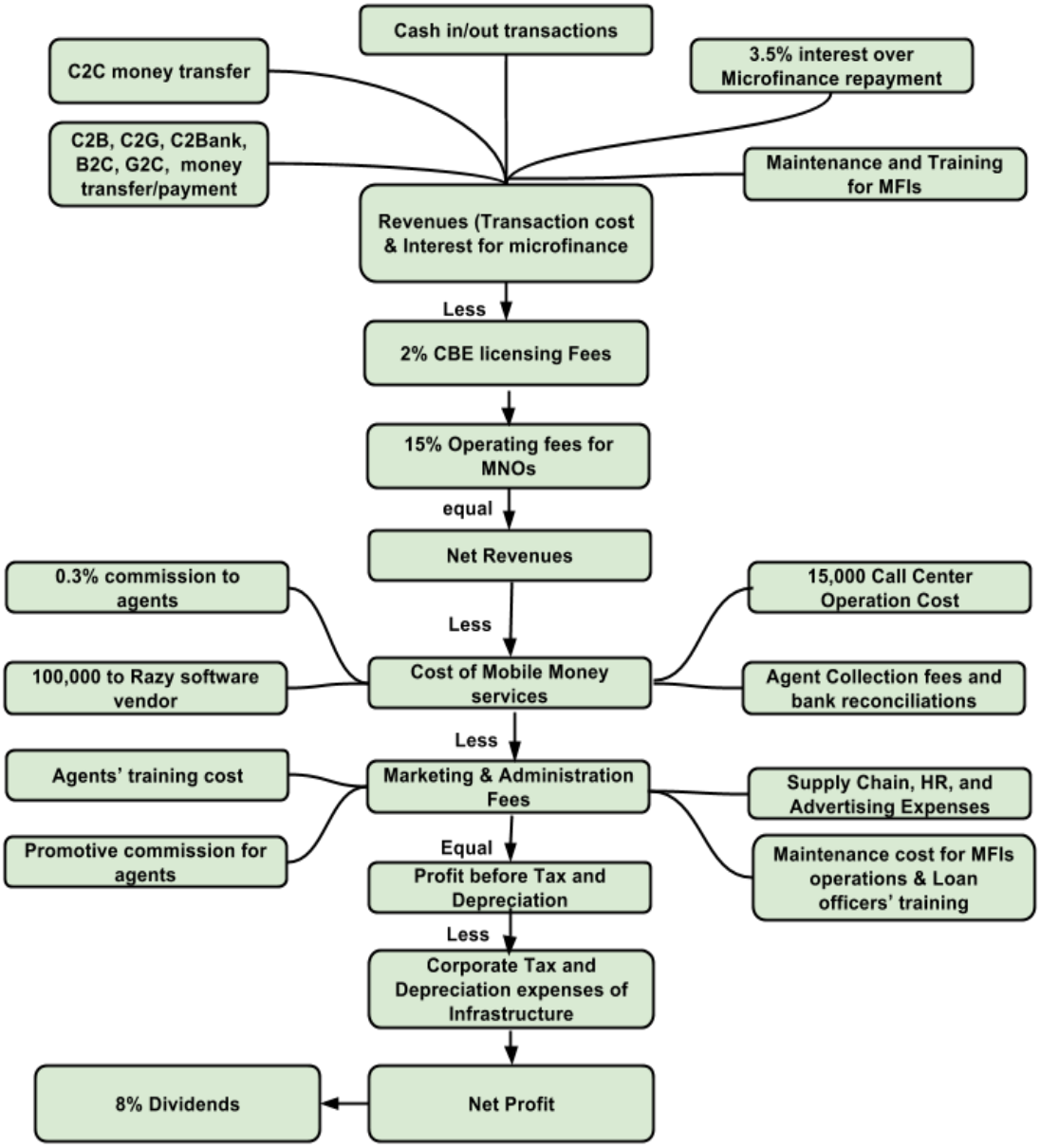
advanced services to offer them mobile money services? They are ready to accept more".

Our analysis shows that the company target three classes of customers into three categories; the first is low income households who either get small salaries or own small business enterprises (SMEs). The second is day workers who earn a small amount of a daily wage and keep working for a living. This category of people spends their daily income on their daily living expenses, including drinking tea, food, shelter and other essential needs. The third category is the farmers who have seasonal income and save their money in the post office or at home (under-bed saving). The statistics for these categories are 0.5m, 15m, and 10m respectively.

The financial risk associated with the new e-Masary system is managed by Masary.Co, while the partner telecoms stay free of any financial risk. Masary's top management faced huge pressure from the shareholders to escalate the company's business in bankless banking where they have a low level of experience. A special quota and pricing had to be agreed with the telecoms to offer lower transaction cost than other services that might be offered by the telecoms when the initiative succeeds in the future. Accordingly, Masary decided to sign an exclusive contract with the three telecoms to manage all mobile money services in the country.

As shown in Figure 5.10, we developed a model for e-Masary financial aspects. Two main challenges have been pinpointed; the first is setting equal amounts of commission for all classes of e-Masary agents. The second is the high rate of dividends promised to the shareholders at the expense of company growth. Such elements usually conflict with the S-T fit of the new system and the stakeholder satisfaction.

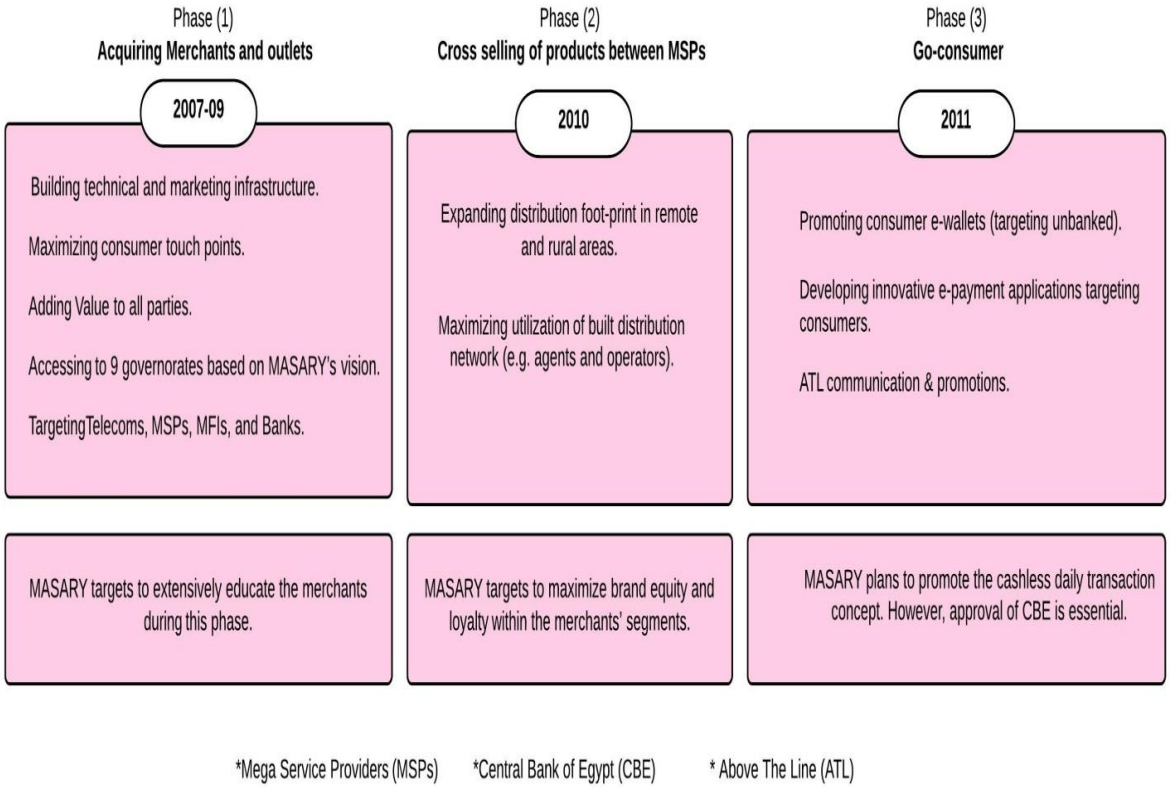
Figure 5.10: The Financial Model of e-Masary Mobile Money Services



5.2.3. e-Masary Deployment plan

Masary.Co conducted a three phase strategic plan to deploy the system between March 2007 and Sep 2011. Following a series of periodical meetings (including the board of directors, business analysts, IT and software developers, and lawyers) we have drawn the company's deployment plan as shown in Figure 5.11.

Figure 5.11: e-Masary Deployment Plan



Source: Authors initial interviews

5.2.3.1. Phase (1): Acquiring Merchants and Outlets

During the first two years the company founded a strong alliance with the three mobile telecoms to assure reliable mobile infrastructure, extensive retail outlet/agent networks, and to make good margins on low Average Revenue Per User (ARPU). This is parallel to another alliance with two big IT solution companies “One Card” and “Razy”. These companies helped Masary build two information platforms. The first is a Web-based system (www.e-masary.com), and the second is a mobile-based system (SIM application toolkit). Both of these systems facilitated Masary’s electronic payment services (i.e. via both the internet and mobile handsets).

To maximise the utility of Masary's technical infrastructure, they recruited a massive network of experienced agents who work for telecoms (e.g. Vodafone and Etisalat). This policy was supposed to offer less rigid and convenient banking services and scale-wide Masary's outreach to the existing mobile users (see **Section 5.1.3**). Later, the company recruited untrained youths to get more experience and work in Masary's outlets to maximize the customers' touch point in the slum area where there were no telecom agents. By the end of the year 2009, Masary built 3250 PoS to assure physical presence in the slum areas of 26 cities. The company received funding from the SFD to provide the retail agents with PoS and offer them the necessary training on how to serve mobile payment and remittance through e-Masary web and mobile interfaces. The agents are compensated by 0.3% of the transaction cost counted on top of each transaction. Such a service was expected to offer more job opportunities for young entrepreneurs and improve the foot traffic for purchasing groceries.

5.2.3.2. Phase (2): Cross-Selling of Products over FMCGs and MSPs

During the year 2010, Masary's operation and marketing teams conducted field visits to Mega Service Providers (MSPs) and FMCGs dominating the BoP market in Egypt. Examples of these companies are Coca-Cola, P&G, Egyptair, and Egypt's utilities. In doing so, Masary partnered with BNP PARIBAS and a third party for mobile payment services called One Card. This facilitated different value propositions such as B2B, C2B, C2B, C2G, G2C services.

However, the company found it difficult to penetrate in the rural areas without sufficient experience in that market, which resulted in high default risk (Masary, 2010). Consequently, the company collaborated with MFIs to expand service providers' foot print and grow focusing on rural areas (Masary's CCO, 2011).

25 MFIs have been listed and field visits have been arranged by Masary's IT and microfinance officers. These visits, however, aimed to promote e-Masary mobile

money services rather than to analyse the needs for MFIs and their clients for mobile-based financial services. In January 2011, Masary' signed exclusive contracts with eight MFIs located in eight cities. All of these MFIs are supervised/controlled by the SFD who decide the maximum/minimum loan portfolio and all relevant regulations (Ahmed, 2009; MSS, 2010).

5.2.3.3. Phase (3): Go-consumer

This stage focused on the marketing and awareness companies to involve the maximum number of customers to e-Masary wallet. TV commercials and presentations at local conferences have been planned to go-consumer. In addition, the e-Masary website has been listed as a related link in the most visited e-commerce website and on Egypt's Stock Exchange.

The above mentioned plan had potential benefits & challenges for all nominated stakeholders. When the benefits are more that the challenges, the system will sustain longer as we discuss in the next section.

5.2.4. Explored Impact: Expected Challenges, Benefits, and Sustainability features of e-Masary System

This section presents the researchers' interpretations of the benefits, challenges, uses, and sustainability factors expected from the e-Masary's initial development plan. In doing so, the researcher follows the cause and effect (or technical view) of what these issues and their impact on the service sustainability. Despite the accelerating increase of e-Masary's sales and the fast spread of the service[46], the company expected benefits and challenges for the stakeholders. E-Masary's CEO - Omar El-Sanhoury & CCO -

[46] Masary reached to 31 million L.E and 15 million customers within the first two years of operations.

Moatasem Osam emphasises the agreed lists shown in Table 5.3 with their internal team and the analyst(s).

Table 5.3. Expected Challenges & Benefits of e-Masary:

Stakeholders	Description of Challenges
Regulators	• Issuing appropriate legal framework for future mobile money services. • Managing the Security of the new MMS. • Setting agreed performance standards. • Accurate estimation of the corporate tax and reporting procedures.
MNOs	• Secure the mobile network by building a double firewall to protect hacking from mobile money users and staff who work for Masary and other partners. • Gain access to complementary resources from Masary and the MSPs to assure a higher level of revenues and increase the share price for the shareholders. • Offer attractive salaries and compensation packages to their exclusive agents to assure they do not switch to Masary as mobile money agents. • Offer only repaid services rather than credit.
Masary	• The project size is bigger than Masary's previous projects for mobile payment solutions in the middle east and north Africa. • Keep decentralized structure for the system management and maintenance. • Improve the agent's expertise with mobile technologies. • Build a long-term relationship with the SFD that controls 80% of the MFIs in Egypt. • Developing CRM system and recruit customer support staff for 24/7 services. • Launching commercial campaigns to increase the customer awareness • The operating cost is expected to overrun (CfH became £12.7m/ annually). • Reducing the time slippage on the service during the peak hours. • Improve the synchronization between the key module of e-Masary system in the Masary GSM modem and other modules and outlets operated by stakeholders. • Work with the IT vendors to improve the security of accessing e-Masary wallet through the web, Desktop, and mobile phones. • Offer affordable services to the price conscious customers. • Design a more satisfactory pricing plan through the value chain to reduce conflicts and save the time required for negotiations with partners. • Keep small margins from commercial (B2B) distribution to facilitate a wider customer base in the next 5 years.

Software Vendors	• Performing the IT activities outsources by Masary. • Build and maintain e-Masary firewall. • Assure building a backup disk space for the customer master files. • Add new functionalities to e-Masary system to cope with the new services provided. • Managing all lines of program code for the new function. • Help Masary in reducing the GSM modem processing time. • Identifying the most efficient way of storing data.
MFIs	• Local infrastructure factors such as intermittent or fluctuating mobile coverage in the slum areas. • Lack of constant internet access to access conglomerated printable reports in relation to the loan portfolio, financial statements, and collection reports. • Expensive installation & maintenance costs for e-Masary corporate wallet and PoS. • Overtime work required by loan officers to get the appropriate training from Masary's IT and fieldwork operators. • Approval of the SFD to use the funding in purchasing e-Masary credit. • Low level of security in e-Masary system in the early stages. • Lack of customer's trust on the new services. • The loan officers had to train the loan individuals and groups.
Retail Agents	• Low level of education. • Limited experience in using the internet and mobile technologies for financial transactions. • Lack of genuine software and low level of security at the PoS. • Reputation risk associated with defaulted transactions. • Investment risk associated with PoS and building e-Masary retail.
Customers	• The level of mobile use does not reflect the actual rate of ownership. • Low level of education. • Lack of trust in the new system. • Limited access to the internet to track the detailed transactions in comparison to the red book they used to have with the traditional microfinance services. • An unfriendly user interface that requires training. • The privacy invasion risk arises when the retail agent or one of the customer's relatives help conducting the mobile money transactions.

Key Stakeholders	Expected Benefits from the MMS design
Regulators	• More control over the informal economy at the BoP. • Control the operation, reputation, and money laundering risks associated with mobile money services. • Higher employment rate for microentrepreneurs and youths living at the BoP. • Access to national level financial information system saves all data about people who live at the BoP.
MNOs	• A 25% increase in the company's revenues from the diversified telecommunication services (i.e. Mobile Money services). • 45% penetration in the underserved rural areas of Egypt. • A 34% increase in utilising the technical infrastructure. • Alliance with third party IT vendors and Masary Co as a key player in the bankless banking services in Egypt.
Masary	**Benefits from Mobile Payment and remittance services:** • 45% increase in the company's revenues from C2C, C2B, B2C money transfers and payment. • Scale-wide in the BoP market through innovative bankless financial services. • Strengthens the company's government strategic alliance. • Exclusive control over (monopoly) the mobile money industry in Egypt. • Business Development & Marketing and awareness campaigns • Proposition and product development • Increase usage and add new merchants • Gets a share from the Mega Service Provider
Retail Agents	**Benefits from Microfinance Services:** • Masary's MFI cooperation programs will expand Service Provider foot print and grow as they grow focusing on rural areas. • Masary is working with 8 MFIs that serve 8 cities. • Offering new business opportunities for all participating MFIs/Active Borrowers through cross-selling of electronic services, for example e-Top Up, Bundles. • Up to 3000 job opportunities. • A 110 % increase in the retail profits by providing e-Masary related payment services. • Easy access to mobile or Internet facilities. • Professional training from Masary Co on enterprise and financial service provisions.
Customers	**Borrowers:** • Convenient bankless banking services. • Peace of mind paying for products and services. • Save travel and queuing time required to repay the loan instalments and the interests.

Lessons & Conclusions:

In this chapter, we discuss the expected challenges, benefits, and sustainability features that Masary Corporation expected before the actual diffusion of the system. In doing so, we reflect on our own interpretation of the executives understanding and perception of these issues. The key source of data for this section is the semi-structured interviews with Masary's CEO, CCO, and senior managers.

We found that Masary.Co devised the new system that is quite different from what other stakeholders (including partners and customers) require. It was more based on the previous experience of Masary's board in successful projects such as M-Pesa in Kenya and eko money transfer in India[47]. Adopting this point of view in the design and deployment stages would lead the researcher (the analyst) to stay at odds with the preference of the stakeholders and ends up creating conflict and ultimate failure (Bell & Wood-Harper, 2003). Even if this autistic view is proven to be successful in the short-term, it can lead to long-term failure unless real long-term inclusive sustainability is built into the system.

To avoid creating a system that is theoretically sound (in terms of the personal interest of Masary.Co) rather than contextually appropriate (what stakeholders want), we decided to draw from the multiperspectives theory to conceptualize all major stakeholders on the system diffusion and deployment stage. Consequently, we expect to uncover more challenges and benefits of the e-Masary MMS and find more inclusive measures of system sustainability. Such a journey helped us to learn the following lessons:

1) MMS is the best alternative source of financial services for users who live at the BoP in Egypt. It is the cheapest and most flexible source of finance to bank the unbanked Egyptians and in turn enhance their contribution to the GDP and tax payments.

[47] Detailed explanation of Masary management team and their experience has been discussed in Masary's section in the stakeholder analysis.

2) Developing MMS at the BoP requires building multilayer partnerships with unconventional stakeholders. Due to the varying interests, performance measures, and technical specifications, the market access and financial aspects need to be analysed at the same time, not in isolation (as found in the literature review).

3) Developing DM analysis for multidimensional systems is a complicated process that requires involving relevant stakeholders and change actors in a prototyping process from day one. Against that found in the literature, multinational corporations (e.g. Masary Co and telecoms) who invest at the BoP prefer a rational/technical plan of a system that was successfully developed elsewhere (e.g. M-Pesa) without considering the nature of the new context and the interests of the stakeholders in such a new market.

4) Drawing the ERD and the DFC for multidimensional system cannot be completed in one figure. Due to the high degree of complexity, the analysts need to develop ERD for each group of stakeholders and then show the connection between the individual ERDs and DFCs.

5) The HAA (including stakeholder analysis and system strategic plan) usually takes a technical form when system owners (in this case Masary Co) recruit an international consultancy company to conduct it. Rather, they need to recruit a local business consulting company or send their own team to conduct a socially oriented HAA analysis that reflects the real "Multiview" of the situation.

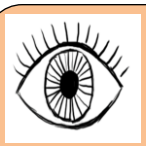
6) Multiview4 has been employed as an exploration to analyse Masary's view of systems development. Some stages such as the S-T analysis were not found useful, because of the retroactive involvement of the researcher/analyst after the system was developed in the first place.

7) Some elements of Multiview**4** as a methodological toolkit could be employed within the elements of MMS development, but other elements had to be kept in isolation and added to the framework as an additional entity. For instance, the DM analysis would be clearer if kept as one core element that is to be part of the

infrastructure and value proposition elements. Adopting the DM analysis as a part of the value proposition evaluation serves the S-T analysis more than the DM analysis.

8) The single technical view of the system developer does not help build a plan for sustainability. It excludes the stakeholders of the system development process and shows more benefits than challenges, which decreases the necessity of a sustainability plan.

In the next chapter we see varying stakeholders as central to the system development rather than the technical (expected) view of Masary.Co. We also involve Masary.Co in our wider TOP analysis to see how their existence in this networked society creates a new sense of the system's sustainability.



CHAPTER SIX:
DISCUSSION & ANALYSIS
(Multiperspectives of MMS Development)

Introduction:

In the previous chapter, we discussed the expected plan for e-Masary system design and deployment. This is what we called the "e-Masary" pilot. The involvement of the system stakeholders at the pilot stage is limited and reflects only the rational (technical view) of Masary.Co, before the actual implementation of the system.

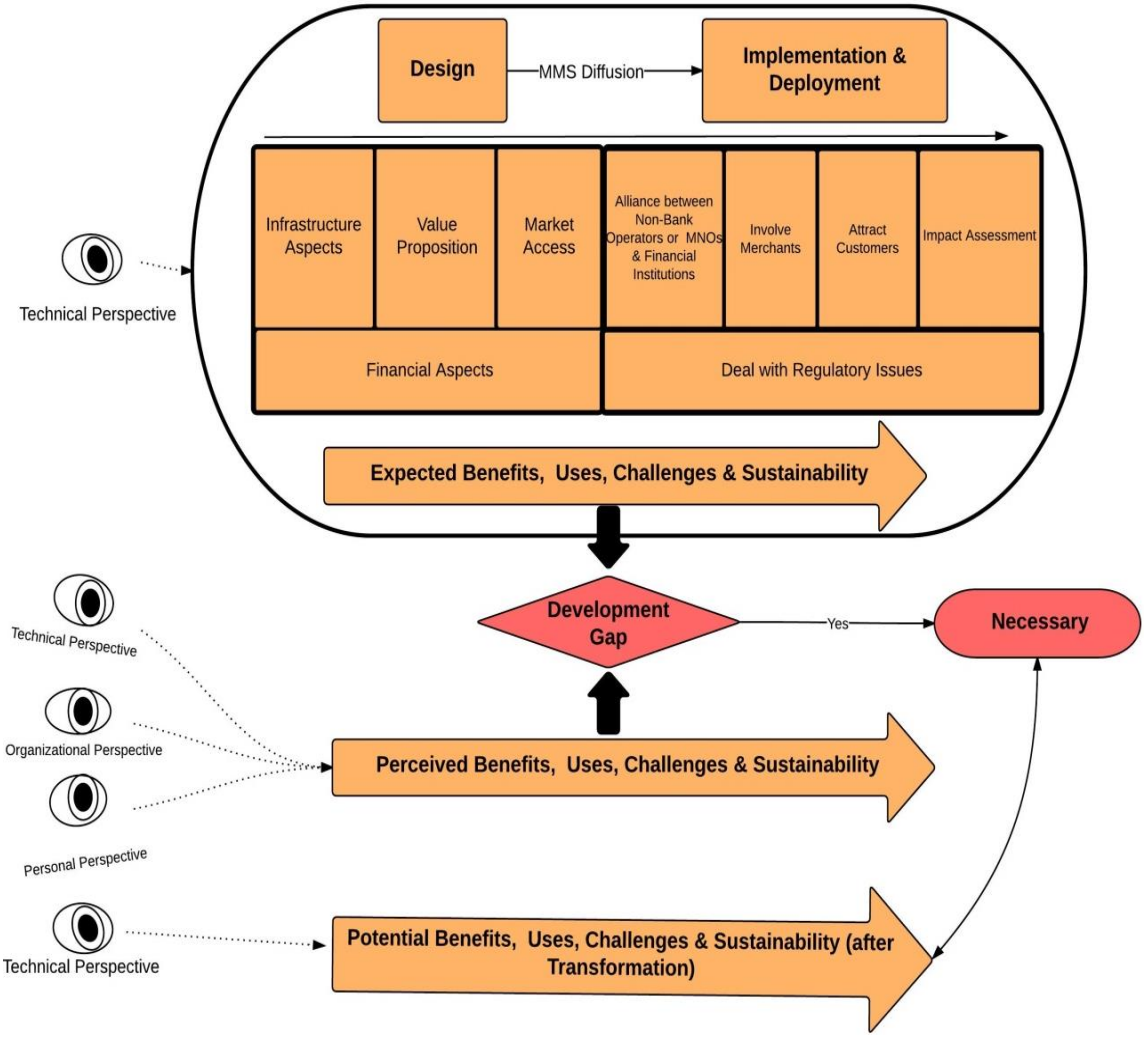
The first section of this Chapter presents our interpretation of the stakeholders' TOP perspectives and discusses them. Our discussion then explores different elements of e-Masary's development process to highlight the perceived impact, including challenges, benefits, and sustainability features within each stage of development. The structures of **Chapter 5 & 6** have been drawn based on the cornerstone highlighted in our theoretical framework developed in **Chapter 2 & 3.** The key aim of the first section of the chapter is to answer:

> "*How can Multiview4 improve our understanding of the perceived impact (including challenges, impacts, benefits, and sustainability) of implementing e-Masary system?"*

The second section then discusses a transformative action plan that was offered by the researcher (as a consultant) to the top management of Masary.Co (the system owner) to manage the perceived impact (i.e. reduce that challenges, maximise the benefits, and enhance the sustainability) of e-Masary MMS. As advocates of the SSM, we use the 3Es (efficiency, effectiveness, and efficacy) criteria to evaluate our proposed transformation.

The third section of this chapter, presents a strategic foresight for e-Masary's impact after the deployed transformation. Such scenarios offer a limited (i.e. rational/technical) view of e-Masary's future, but works as a good basis for academic research in the forthcoming years.

Figure 6.1: Structure of Chapter 6



6.1. e-Masary as perceived by stakeholders

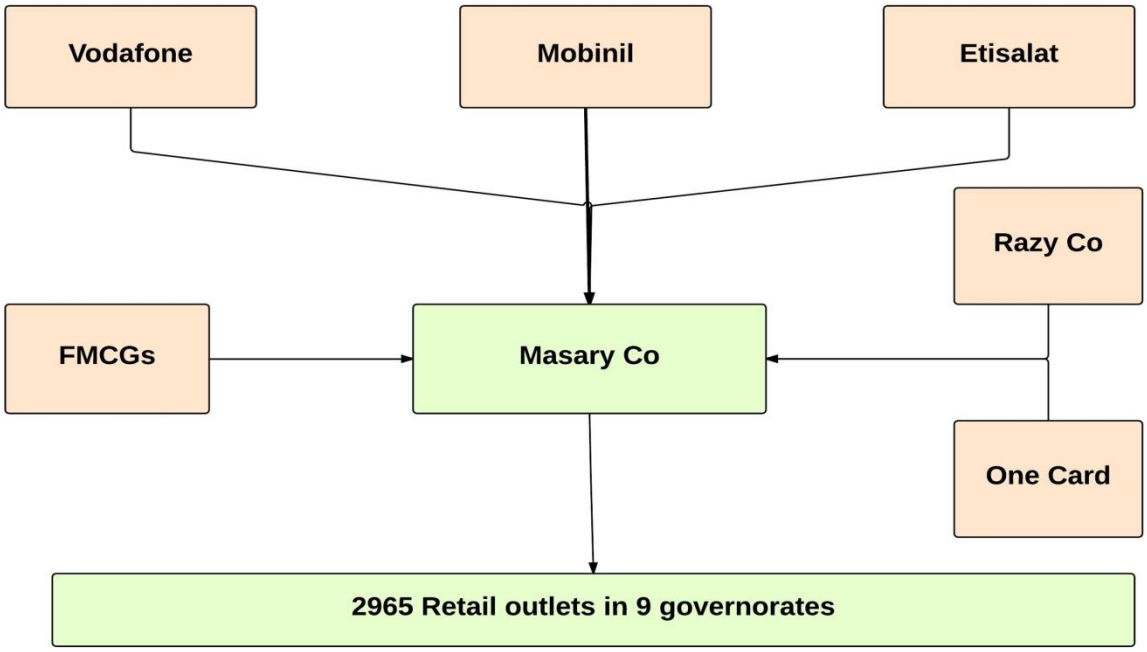
Our initial interviews with the system owner and the selected groups of stakeholders revealed a problem of splitting e-Masary system into two separate information systems, namely, mobile payment versus mobile microfinance. Evolving two separate systems

reflects the challenges of using and accepting the fully operating MMS. The mobile microfinance system (MMicro) has been adopted by a network of partners who offer e-Masary microcredit and microsavings services. This network resisted the mobile payment system (MPS) offered through the e-Masary platform. In doing so, we try to understand "*Why there are two separate subsystems for mobile payment and microfinance systems*?"

6.1.1. Mobile Payment and transfer Network e- Masary

After launching e-Masary system in the year 2011, the company faced the threat that *"any MNOs could launch a similar service and count on its huge capacity and reputation to beat Masary*" [Masary's CEO in March 2011]. "*The challenge was to acquire all the three mobile brands under the umbrella of Masary's airtime services to achieve the maximum utility of all telecoms*" [Masary's OM, March 2011].

Figure 6.2: Key actors in e-Masary Commercial Business System



In parallel, Masary's founders used their personal ties and business relationship to build other alliances with two big IT solution companies "***One Card***" and "***Razy***". These companies helped Masary develop two information platforms. The first is a Web-based system (www.e-masary.com), and the second is the mobile-based system (SIM application toolkit). These platforms facilitated Masary's control over the three MNOs. As shown in Figure 6.2, the MPS includes Masary and their commercial partners who co-supply the service to the BoP in Egypt.

Masary's board of directors invested 2,000,000 L.E in One Card shares and 1,250,000 L.E in Razy. Since then, "*We outsource all system upgrades and security firewall development to Razy*" [Masary's IT manager]. In addition, "*One Card batches have been allocated to Masary's agents to sell them*" [Masary's sales manager]. Later, the company acquired a network of 2965 retail agent outlets. Each agent (kiosks/supermarkets/airtime shops) has POS devices costing 800 L.E. This machine enables Masary's customers to use One Card - a magnetic striped card - to upload/download virtual cash. During the first two months of operation Masary acquired 1000 agents. At that point, it was very expensive to provide all agents with POS device. Alternatively, agents were asked to use their own mobile phones to serve Masary's customers. Once the agent is registered (using his national ID and trading code), he/she gets Masary software downloaded to his/her mobile either in Masary headquarters or at the closest Masary agent. Agents who have smart phones receive SMS, including a link that automatically directs the user to software download and installation instructions. So, there was no specific handset required to install Masary's menu. However, Masary's menu had to be delivered in Arabic to serve the Egyptian low income users than the standardised catalogue designed in English. In doing so, Masary had to ally with third party mobile solution vendor called Sybase.

At that stage, Masary could not explore the real challenges that poor customers face and how they make their buying decision. Masary's marketing manager exemplified this point by saying that *"customers were looking for the cheapest airtime offered by trusted brands; why they buy our airtime while telecoms' exclusive agents (wholesalers) offer*

lower prices". In response, Masary had to renegotiate their deals with all mobile telecoms to get cheaper offers than the exclusive agents.

Soon, Masary's management decided to scale wide and fill other market gaps. In 2010, Masary unleashed cross selling of products and services in between the MSPs such as Egypt Air, BNP PARIBAS and Egypt's utilities and FMCGs like Coca Cola and Nestle. This facilitated different value propositions such as sending remittances home across the country and making electronic payments, branchless banking, and mobile microfinance services.

Both airtime and real-time payment services had short-term financial objectives rather than social objectives. Examples of Masary's performance indicators are *"customer acquisition cost, working capital, agent acquisition costs, monthly revenue/customer, monthly revenue/agent, customer daily cash in & out"* [Masary's performance appraisal protocol, provided by the HR manager].

As explained in Section 5.1.3, the three telecoms are strongly competing to gain a bigger market share of the mobile telecommunication market. By the year 2010, the ministry of telecommunication announced the market saturation and called for new applications. Instead of the 3G, ADSL internet broadband services that target the top of the economic pyramid, the regime tried to enhance the social solidarity and push the telecoms toward inclusive services to the BoP (Making Finance Work for Africa, 2010).

Despite the early involvement of Vodafone and Mobinil in mobile payment services, Masary's mobile payment system relied heavily on Etisalat to encourage the other telecoms and quickly reach to the BoP. In many occasions, the telecoms offered limited quotas in response to the shareholders pressure and to control this emerging MPS. In March 2011, following the 25th Jan revolution, the biggest two telecoms withdrew their technical and financial support to Masary.

> As said by Vodafone CFO, "*we are working in an unstable business environment and currently losing a fortune in the Egyptian stock exchange. Showing a financial feasibility was unfounded on the return on investment, lack of security, and damage of in infrastructure. E-Masary was in the bottom of our KPIs list and a high risk investment".*

Etisalat saw Masary.Co as the best partner to expand in the Egyptian market and compete with the dominating telecoms. However, Etisalat refused to partner with the MFIs and offer microfinance services. "*The prepaid services drive our revenue model. Offering credit service to a new market is beyond our expertise and of uncounted risk*" [Head of Mobile Payment & e-commerce applications at Etisalat].

Later in April 2011, a follow-up interview was conducted with a Vodafone marketing manager emphasised that corporate policy has been changed. *Masary agents are everywhere and they have access to uncovered market segments*". Affirming the new policy, Vodafone's CFO said "*mobile payment and remittances are the only way to differentiate our brand and scale intro a completely new market. We need to signify our existence in the Egyptian market and invest in our success in other developing countries such as Kenya".*

Masary's top management could benefit from the telecoms' competition to receive an accelerating economic and technical support. However, at later stages, in Oct 2011, the telecoms exercised pressure on Masary through quota limitations. In turn, Masary had to increase the transaction cost and close some of their retails that experienced low foot traffic. Justifying this business behaviour, Mobinil's Business Development said "*Masary's platform absorbed all telecommunication services and offer less price than our exclusive agents*".

Our research proved that Masary's MPS was reliant on the tangible and intangible. For example, Etisalat provided all staff training programs, technical specialists and motorcycles to Masary's distinguished agents. By the end of each year, Etisalat celebrate Masary's top performing agents and provide them with tangible incentives.

The clear problem that we highlighted is the "*scaling wide*" (spreading the new service to new places and bigger number of customers) adds more pressure on telecoms and

lead to resistance. On the other side, recruiting intermediaries and partnering with community mega actors (e.g. NGO-MFIs)[48].

This system is regulated by the NTRA, which protects e-Masary customers from the telecoms malpractices. It is also regulated by the CBE, who set a definition of the mobile payment services, all supervisory regulations, privacy and security controls in managing system accounts (Central Bank of Egypt, 2009). Both of the NTRA and the CBE created a separate committee to issue user protection procedures and manage the customer-provider disputes. In the next section we explain the actors and issues associated with the MMicro subsystem.

6.1.2. Mobile Microfinance System in e-Masary

This subsystem emerged with a philanthropic orientation that would offer a financial return to Masary in the long run, while it offers a social impact for the customers and NGO-MFIs. This financial information system started through a successful initiative called the Poorest of the Poor Entrepreneurs program (PPE) and resulted in a different network of actors as shown in Figure 6.3. Masary's loan tracking mobilizer (i.e. MMicro system) was accepted by Assuit Business Women Association that acted as an Implementing Partner (IP) in the PPE project. In the next paragraphs, we discuss the role of each actor in this MMicro subsystem.

The last three decades witnessed numerous financial inclusion programs funded through a big list of donors that includes, but is not limited to: the United States Aid (USAID), the Canadian International Development Agency, UNICEF, Ford Foundation, United Nations Development Programme, the Egyptian Swiss Development Fund, Save the Children, German Agency for Technical Cooperation, Italian Fund of Egypt, and the European Commission MEDA program (PlaNet Finance, 2008). The USAID and the Social Fund for Development are the biggest sponsors of the Non-Governmental

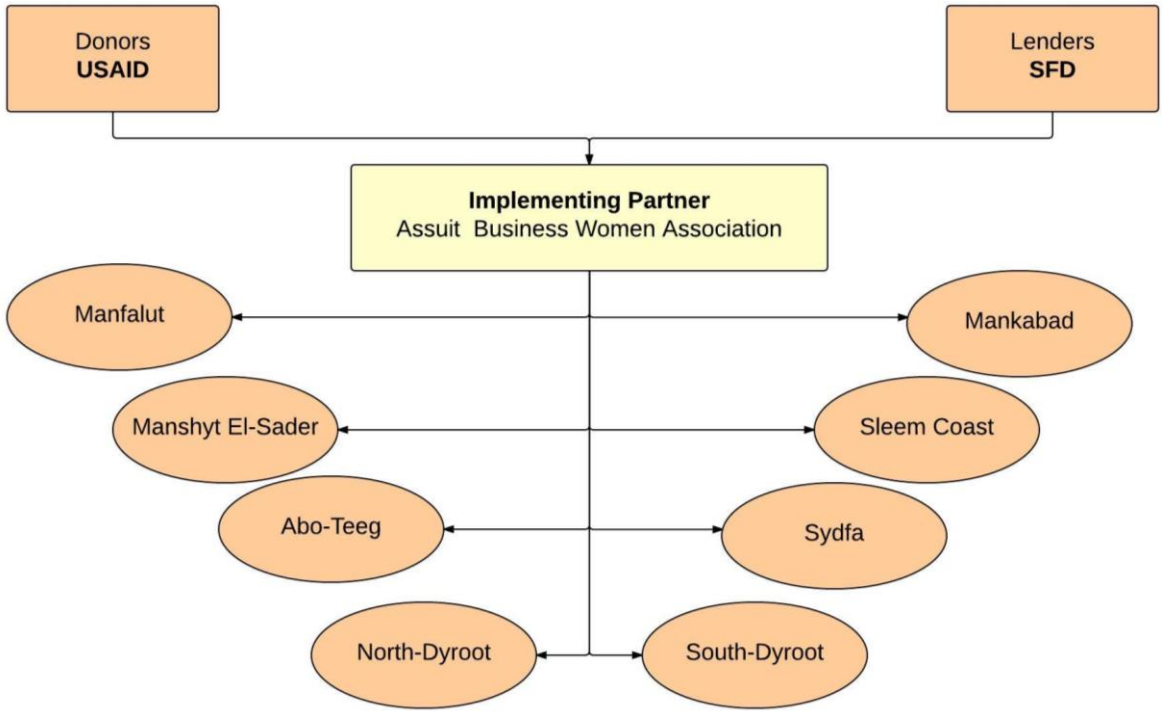
[48] See section 5.1.2.1 that discusses the NGO MFIs as providers of formal financial services.

Microfinance Institutions (NGO-MFIs[49]) in Egypt with a 1.2 billion L.E loan portfolio (PlaNet Finance, 2008).

USAID Egypt finances almost 70% of the MFIs in Egypt. The USAID partners with MFIs who have distinguished records of microcredit services. Since 1989, USAID projects served 10 million Egyptian microenterprises. USAID follows two schemes for microenterprise finance: the *banking scheme* and the *foundation scheme*.

The banking model is implemented through the national bank for development and Banque du Caire to finance rural and urban microenterprises (EFSA, 2011a).

Figure 6.3: Key actors in e-Masary's Philanthropic Business System



USAID's largest project in the country, the Agricultural Production and Credit Project has been facilitated through a partnership with the principal bank for development and agricultural credit. To date 775,000 loans worth over 2 billion EGP has been extended to 305,000 microentrepreneurs with less than a 2% default rate. It is estimated that 240,000 job opportunities were created as a result of this program (USAID, 2012).

[49] Section 5.1.2.1.2 explains how this type of institutions operate to offer microfinance services.

The foundation model was designed to establish private, non-profit, community-based organizations to act as microenterprises financial intermediaries ($EFSA_a$, 2010). Via these foundations, USAID introduced a variety of financial inclusion programs.

USAID's projects under this scheme serve 20 out of 26 cities, including Cairo and Alexandria (USAID, 2012). 98% out of these foundations are Non-Governmental Microfinance Institutions (NGO-MFIs) that operate on a "*self-sufficiency*" basis to cover their costs and extend their outreach to other geographical areas and disenfranchised classes.

The PPE program proved to be the most successful micro-lending program delivering group lending, particularly, for women (EFSA, 2011b). The PPE provided a maximum loan size of 6000 L.E per borrower within a group of five persons. So far the outstanding loan portfolio comprised 72,045 women.

In 2011, USAID in Egypt called for proposals from interested NGO-MFIs who have the capacity and wide network of alliances with local businesses and other NGOs in Egypt to join the PPE program. Alexandria Businessmen Association, REDEC, and Assuit Business Women Association (ABWA) were the finalists chosen to implement the project for the period between 2005- 2008[50] (SANABEL, 2011).

The Social Fund for Development (SFD), a quasi-governmental entity, was founded in 1991 to mitigate the negative impact of structural adjustment policies and to serve as a safety net (Microfinance Gateway, 2009). Today, SFD continues to help alleviate poverty and combat unemployment. In this capacity, they manage the microfinance sector, and *"acts as an APEX[51] organization that supports the creation and/or development of successful MFIs in cooperation with many of the aforementioned*

[50] USAID operates on the basis of grants of the US government, which enables it to directly contract with NGOs without the requirement of a sovereign guarantee. USAID executes its microfinance programs by extending of refinance facilities and technical assistance both at zero costs. The refinance facility is usually placed as a USD guarantee deposit at a local bank and used as collateral for a commercial EGP line of credit to the NGO.

[51] APEX finance is a wholesale finance to MFIs and other financial intermediaries both commercial and non-profit.

international donor agencies (mostly the USAID)" [SFD microfinance director in April 2011]. In addition to this role, the SFD, under Law 141 of the year 2004, is mandated to coordinate the SMEs' sector in Egypt (Microfinance Gateway, 2009).

The SFD offers their partner NGO-MFIs a mixture of grants for building capacity and loans for microenterprises finance. Credit is given to either a start-up microenterprise at an interest rate of 7% or to existing microenterprises at a rate of 9 %. NGO-MFIs are allowed an interest spread of just 1% to cover both risk and operating costs, which does not allow for cost recovery let alone to allow for growth (SANABEL, 2010).

> As an exception to this rule, "*the NGO-MFIs operating under the PPE program of UNDP are not bounded by the interest cap and in addition receive professional technical assistance for microfinance best practice*"
>
> [SFD microfinance director in April 2011[52]].

SFD and its retail lending structure face the typical sustainability risk of all SFD's worldwide due to high dependency on external funding ($USAID_b$, 2010). Although continuous access to APEX finance may be a double-edged sword in motivating improved MFI financial performance, practitioners seem to agree that the absence of follow-up financing severely weakens APEX's ability to promote capacity building at the retail level. In this case, highly subsidized funding is being provided to NGO-MFIs on a first-come, first-served basis, and borrowers will receive second loans only after all those applying for first loans are served.

In 2011, the SFD joined the PPE program as a sponsor for the MFIs nominated by the USAID in 2005. By the end of September 2007, the ABWA received 30,086,000 L.E loans and 2,000,000 L.E grants (for operation and fixed costs) to refinance existing microenterprises in Assuit City and its hamlets (ABWA, 2011).

The PPE proposal sets social indicators such as the percent of rural members, number of active borrowers, the number of training hours for loan groups, group attendance for monthly meetings, percent income increase for borrowers and number of loan renewals.

[52] The SFD microfinance director and USAID's former deputy manager have been helpful to get detailed data about the performance of the PPE project applied by ABWA.

Financial indicators are average annual loans outstanding, adjusted overdue rate, adjusted profits, subsidy dependence index (PPE final assessment report, 2008). Nominated NGO-MFIs had to report the aforementioned indicators using periodic financial statements. In addition, they had to report their periodic "*due diligence*" or "*snappy visits*" to monitor the performance of micro-entrepreneurs.

In December 2006, the SFD initiated a project for computerised loan tracking to be adopted by partner NGO-MFIs and to maintain standard high quality reporting. The project was funded by the USAID and the final product[53] was available for sale in early Feb 2007.

ABWA started in 2000 as an NGO-MFI founded by a group of businesswomen to serve the poorest microentrepreneurs in Assuit City under the patronage of the Ministry of Social Solidarity and according article 524 of law 141 year 2004. The association is run by an elected board of directors, which represents a mix of microfinance professionals. By the end of 2010 it could finance 200,000 microenterprise with 362,129, 700 L.E. ABWA implemented nine microfinance projects other than the PPE.

ABWA is a "*Not-for-distributing-profit organization*" rather than "*Not-for-profit organization*", *because they achieve financial surplus (but do not distribute profit) and keep it to extend their social quest*" [SFD director in March 2011].

Under the PPE program, ABWA (the implementing partner), applied ready-made lending methodologies already pre-designed by the USAID. To win the auction, ABWA set a long term plan to provide group lending and develop different methodologies for peer selection, peer monitoring, dynamic incentives, regular repayment schedules and collateral substitutes. These mechanisms are supposed to help ABWA, to reach the preset social and financial indicators of the PPE program. Moreover, ABWA had to provide a list of potential local partners expected to join the PPE program. The list included commercial banks, consultancy and training companies, and independent auditing companies.

[53] To install this computerized information system, NGO-MFIs spend 12,000 L.E set-up cost and 1,500 maintenance cost.

"*Our biggest partners are Alexandria Bank, Sawiris Foundation for Social Development, Construction Germany Bank, Catholic Relief Service and UNICEF who provide us with technical as well as financial support*" [ABWA's deputy manager in August 2011].

For example, "*every February the Catholic Relief Service used to send us a group of financial specialists to train our loan groups on how to self-manage their microenterprises and maintain good communications between the group members as well as with our loan officers*" [ABWA's HR manager in August 2011].

To form a loan group, 5-10 members voluntarily get-together and choose their group leader. Members have to be rural poor woman and have an existing microenterprise each. Moreover, they have to be in between 18 to 60 years old and have a good credit history. Most importantly, each member has to submit an appropriate feasibility study[54] of her project. In addition, they have to bring their national IDs and sign a contract of joint responsibility against group loans. By this contract, all group members have to attend a monthly meeting.

Once all of these conditions are fulfilled, the assigned loan officers issue a loan request and send it to the credit committee for approval and eligibility assessment. Within 15 days, the committee issues a bank letter to enable the group members to receive their loan. After the committee's approval, groups receive their "log book" that includes the unit code, repayment dates and the group's internal bylaws. All of these procedures have been set by the USAID and the SFD as a standard cycle that should be followed for loan approval under the PPE program.

Ghatak (1999) argues that peer selection can be instrumental in improving repayment rates, allowing for lower interest rates, and raising social welfare. His insight is that a group lending contract provides a way to price discriminate that is impossible with an individual lending contract. The following examples point to the presumed heterogeneity within the borrowers, which is not consistent with the literature review (Arora & Romijn, 2012),.

[54] The study should not only include the business idea and required budget, but also clarify why each member can afford sustaining his existing project. Reasons are usually social (e.g. Having a big number of dependents, partner's death).

The SFD's director also agrees that "*this peer selection assures that some members invest in safe business whilst other invests in risky ones. In case of success, risky businesses achieve higher returns than the safe ones and in case of failure some group members will be able to pay the due amount*.

The ABWA deputy manager confirmed this and said; "*peer selection results in classified groups which usually invest in similar microenterprises and have the same cultural characteristics. We simply consider each group as one*".

In contrast, a borrower of ABWA said that; "*The problem is that each one of us is investing in his own microenterprise and in some cases we could not gain enough money to pay our instalments; We partly know each other and we do not do business together to jointly guarantee each other; We are just neighbours"* [Focus group conducted in September 2011].

The PPE loan period ranges between 12-18 months. Borrowers pay 18%[55] interest rate, 2% in advance and the rest gets scheduled into monthly instalments. They usually begin with 1000 L.E each and then the loan size increases on satisfactory repayment. Every month, groups have to attend the branch to which they are affiliated to update their loan officer and pay their due amount. Then the payment is processed through the documentation cycle. This cycle shows how the accountants and others (e.g. staff of the Management Information Systems Department) process all payment data into manual as well as electronic records and report them periodically to the loan officers and top management. Two days is the grace period for arrears and if the group failes to repay two consecutive instalments, their assigned loan officer reports this to the treasurer and cuts off any future lending. These different mechanisms followed by the AWBA anticipate a stream of increasingly larger loans or what is called progressive lending (Hulme & Mosley, 1996). One of the loan offices explained the following during one of the focus groups:

"*There is a high mobility rate among women micro-entrepreneurs in Assuit and in turn we found difficulty catching the defaulters who move across town trading their goats or handcrafts. They simply come and go, and then they start borrowing again with a clean slate at a different branch or program*".

[55] ABWA pays only 9% interest rate for the SFD and earn 9% to cover the administration fees in addition to mark up.

ABWA's deputy manager emphasised that group bylaws and commitment to attend monthly group meetings are really important to avoid information asymmetry and trace defaulters.

At the beginning of the PPE program, ABWA announced internal vacancies among their loan officers to join the PPE as team leaders. However, "*Most of the loan officers and treasurers were anxious to join the new program. One year after we called for a branch manager and a loan officer team manager, but no one applied for the job"* [Said by AWBA's HR manager in October 2011].

On the other side, loan officers justified this by saying that "*the expected salary increase is far less than the cost of daily field visits, including travel and communication costs; our salary is poor enough and we could not risk taking on more responsibilities"*. This example shows that the staff incentives should match the expected task, which is difficult under a standardised program with preset job descriptions and fixed incentives.

In September 2011, the mutual agreement between the USAID, the SFD and their partner NGO-MFIs terminated and the PPE reached 72,045 micro-entrepreneurs. 71% of the borrowers had commercial microenterprises that sell FMCGs, while the rest had services and agricultural businesses. This 29% started with commercial projects and when proved successful they ask the MFIs for bigger size loans to build other microenterprises (including financial leasing and mortgage finance).

Our interviewees think that conflicting policies between the USAID and the SFD have led to an inconsistent approach to the development of the PPE program and have raised concerns regarding the sustainability of these efforts. Moreover, "*ABWA failed to maintain the financial sustainability in the PPE program*" [ABWA's Deputy Manager in August 2011].

In December 2011, the ABWA started its transformation to be a microfinance company ($USAID_b$, 2011). It aimed to gain two significant benefits in transforming:

1) *the ability to provide a variety of microfinance services besides microcredit, and*
2) *the increased access to funding, whether through debt or equity.*

Other reasons for transforming are related to escaping the current constraints of the NGO Law, which gives the same treatment for all NGOs regardless of their types of operation and sets restrictions on governance and management matters. Moreover, it limits the NGOs' ability to best utilize advanced computerized management and financial systems, and overall, to waive the obligatory approval of the MSS before accepting any funds from private enterprise. The first step toward this transformation was to establish its own commercial projects and to acquire more equity via its partnership with private enterprise such as Masary.Co.

The above section discusses the nature of the two separate systems and the stakeholders involved in both. We clearly noticed that those stakeholders stand on different technical, organisational, and personal perspectives. We also found that the MPS follows a market-based (commercial system), while the MMicro system is based on philanthropic approach. In the following three sections we discuss these multiperspectives using the root definition, CATWOE analysis, and other tools of the Mutliview**4**.

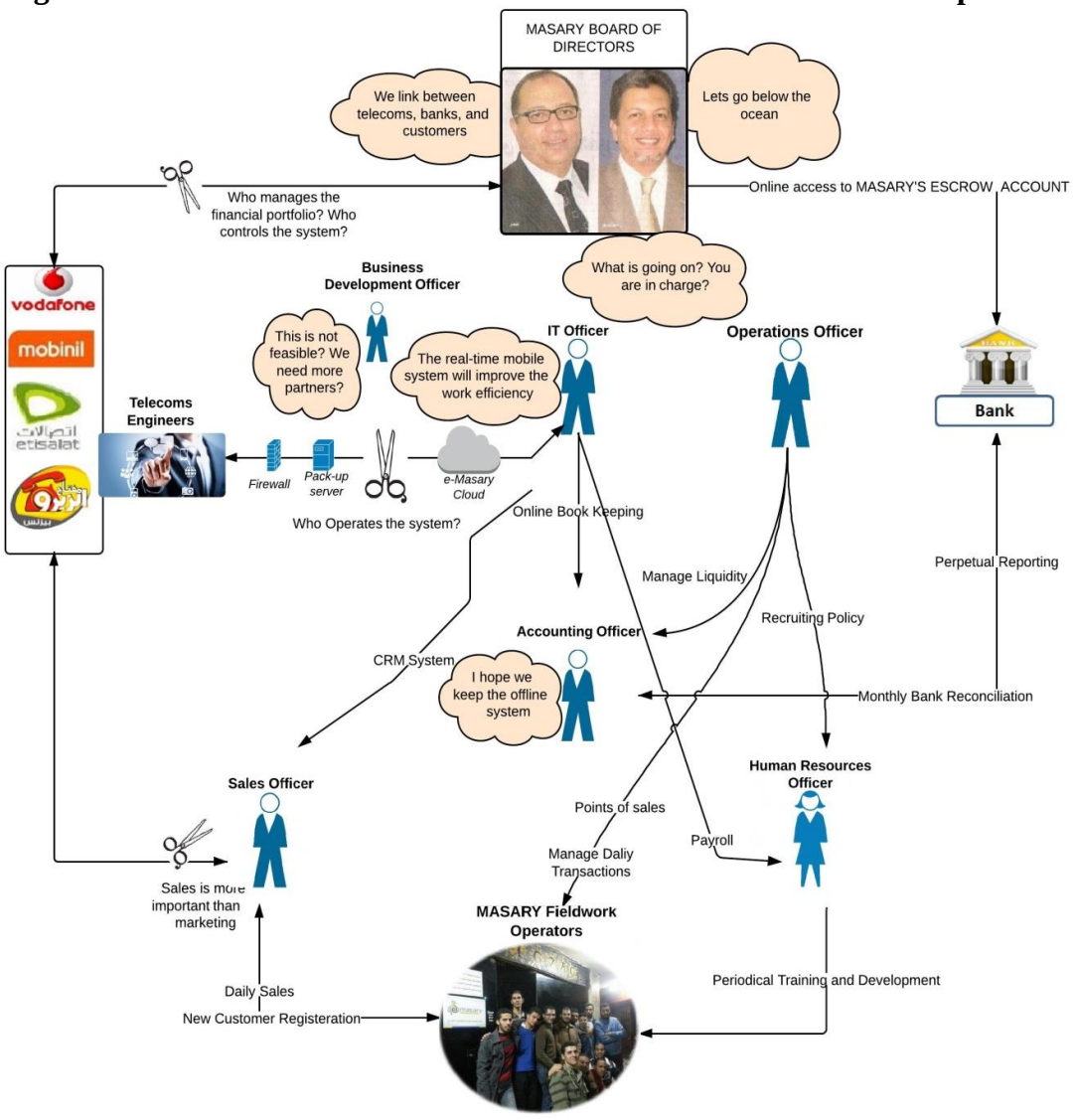
6.2. T perspectives of e-Masary Implementation

6.2.1. e-Masary Design

This view discusses all technical/rational issues in the evolution of the above mentioned subsystems. The problem owner in this case is Masary.Co who invested heavily in the technical infrastructure and the diffusion plan to assure fully operating MMS. Masary's directors faced financial difficulties with partner MNOs. The starting microcredit system follows the telecoms' policy of prepaid services. Accordingly, "*we refused to take the risk of managing the financial portfolio and deal with low income creditless customers*" [CFO of Vodafone Egypt, in April 2011].

The conflict over the financial issues, also raised another concern of "*who controls the system database and hosts the GSM modem*" [Senior security specialist at Mobinil Egypt] (see Figure 6.4). The MNOs asked to host the Masary wallet database to assure a high level of customer security and privacy. Using a normal mobile number as a registration ID for Masary's customers, increases the chance for hacking the secure systems of the MNOs.

Figure 6.4: Rich Picture of the Problem Situation from Technical Perspectives



The IT and business development officers at Masary argued that "the company needs to partner with qualified software developers who can help build a strong firewall and secure the e-Masary cloud system." Etislat's head of IT, doesn't seem to agree and raises the issue of integrating MFIs in the system. He sees a high level of risk that

neither telecoms nor Masary.Co can afford. Etisalat's head of IT, doesn't seem to agree and raises the issue of integrating MFIs in the system. He sees a high level of risk that neither telecoms nor Masary.Co can afford.

Internally, Masary's system developers and operations officer believed that real-time MMS can improve the company's work efficiency to manage their own bookkeeping, manage liquidity, and evaluate the agent. Masary's HR manager seems to agree with this technical potential despite the fact that she has limited experience with mobile computing technologies.

> "*I believe the technology adds value and improves the overall efficiency, but I cannot trust the computerised calculations as a replacement or my face to face performance evaluation and follow up to process the payroll*" [Masary's HR manager in April 2011].

Masary's accounting officer stays in the other extreme and keeps the manual book keeping rather than the real-time processing of the corporate operating costs (see **Figure 5.10**). The CRM system in Masary serves both of the MPS and MMicro system. It is led by the central marketing team where they manage the GSM modem to help customers with technical, financial, and telecommunication problems.

> However, "*we see that the CRM system has no use, because the customers trust us in the first place and do not contact the CRM team located in company headquarters*" [Masary operator/Salesman in April 2011].

The RP shown above reflects the resistance of Masary's accounting manager who still keep shadow manual records of the daily transactions. The operation manager argued that the accounting manager needs to follow less rigid approach and employ e-Masary system in the internal operations to save time for fieldworkers and operators who still have to keep receipts for each transaction and the monthly bank reconciliation sheet.

We also found another problem with the procedures that the sales manager and the fieldwork follow to target only big size retails and business customers who conduct a big amount per transaction and multiple transactions per day. Their objective was to get a bigger amount of commission over the transaction cost. However, this contradicts with Msary's strategy of wide outreach at the BoP to reach more than 15 million customers.

The MFIs do not appear in the above rich picture, because they rejected the e-Masary system in terms of technical feasibility. They asked Masary's board of directors to sort out the installation and maintenance cost and ensure a low interest microcredit service. We found that their technical challenges accompanied with personal vested interests to keep using the loan tracking mobiliser that has been developed earlier by Masary.Co.

Customers	Masary Staff
Actors	Telecoms IT, Maary IT manager, IT Vendors
Transformation	*Work with the IT vendors to build a system firewall managed by Masary. *Enable the staff to process real-time mobile payments and remittances efficiently through efficient mobile IS, online administration and management system, and CRM system. *Develop a business model that reduces the operation costs
Weltanschauung	E-Masary system can improve our back-office operations and enable our staff to serve as many customers as possible. Partnership with MNOs is essential to expand in the Egyptian BoP.
Owners	Masary board of directors
Environment	Bankless banking

Following our analysis of the key problematic issues in the RP, we have drawn the above CATWOE analysis for the MPS from a technical perspective. This analysis emphasizes on building a firewall to maintain a high level of system security and the full employment of e-Masary system on the internal operations (e.g. accounting and informing technologies) (McCain, 2002).

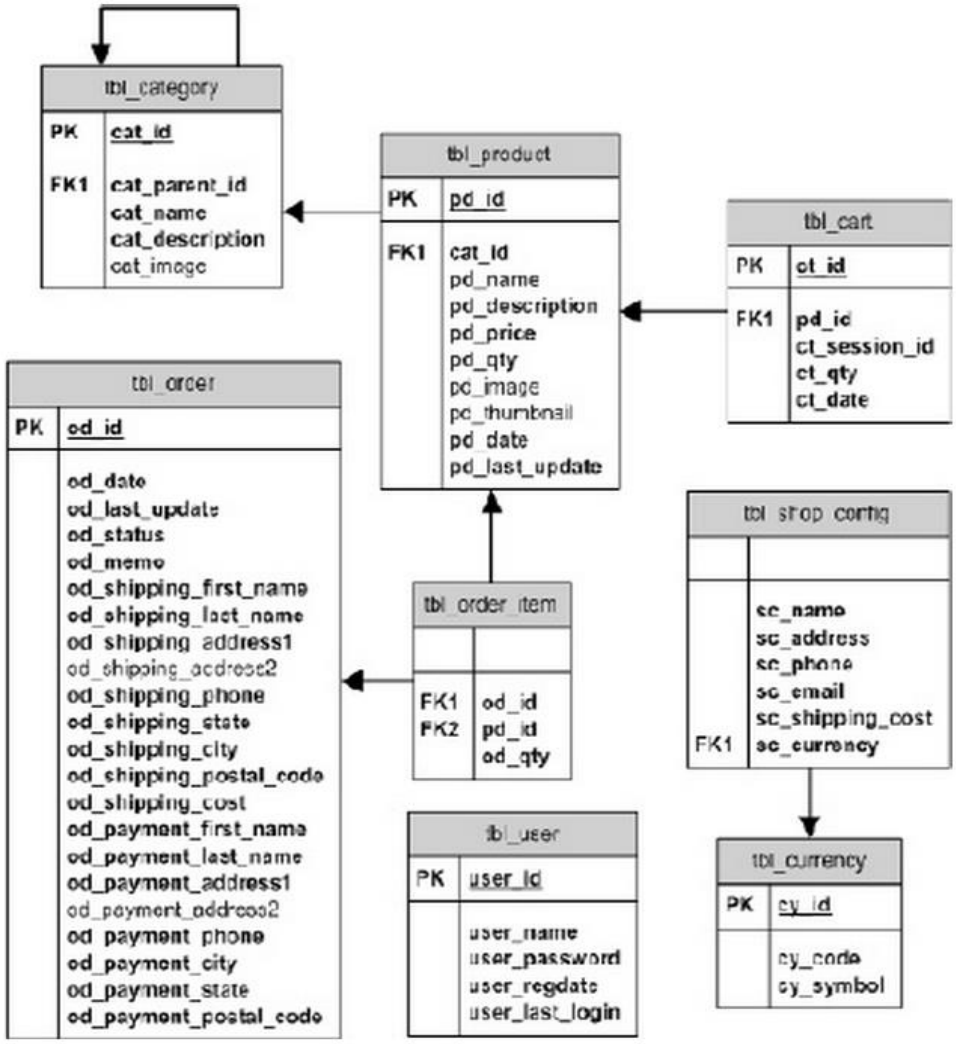
Table 6.1: Attributes of the Entity Relationship Diagram

Table Name	Description
tbl_category	Storing all classes of services & product
tbl_service	Services available in e-Masary menu
tbl_product	Services available in through the FMCGs
tbl_wallet	When the customer initiated the transaction The agent ID, where the agent is located and the amount of the transaction.
tbl_transaction	This where all transactions are saved according to customer ID, agent ID.
tbl_ transaction _item	What type of services or product in each transaction.
tbl_user	Stores all user's transactions and account settings
tbl_agent_config	Includes the agent/operator configuration details such as name, national ID, trading code, address, contact number.

In order to map how the internal operations work and enable efficient services/products for customer, we have drawn Table 6.1 to show the attributes of entity relationship diagram shown in Figure 6.5.

The RP shown in Figure 6.4 refers to fieldwork issues that Masary operators faced and might apply to the MFIs' loan officers. As discussed in **Chapter 4**, we approached three MFIs who partnered with Masary.Co. The following sections explain the average settings for MFIs

Figure 6.5: Entity Relationship Diagram for MPS



These MFIs work on a centralised organisational hierarchy that is different from Masary's decentralised structure. The ABWA, for instance, is managed by an American-Egyptian professor who has more academic knowledge of microfinance than a practical one that works in the Egyptian slums. Her ties with the USAID and the Egyptian Swiss Development fund increased her chances to reach the top of the organisational hierarchy. She leads the public assembly to extend the service outreach to all cities in Egypt. Our initial interview with the ABWA's president (see **Appendix 3**) shows lack of training for MFIs staff on how to use the mobile technology. This led to lack of system trust. Extra efforts were also required to train customers. While the new technology safe their daily travel cost to collect the loans and offer technical assistance to the customers, they were required to buy mobile handsets.

Figure 6.6: Organisational Structure of the ABWA

The ABWA's accounting manager also reported a problem of reporting e-Masary transactions to the SFD who control the microfinance industry.

> *He said; "The SFD officers do not accept the electronic printable reports issued by the MMicro system. They only accept documents approved by the branch managers, president, and directors. We feel painful, when we receive a letter from the SFD stating that our reports and funding report have been denied. We feel punished for accepting Masary's MMicro System"*

The MFIs top management did not think that the MMicro system pays off the cost. They think that offering 3-9months loan is not useful for low income microenterprenures who need to fund their startups. They also benefit from the

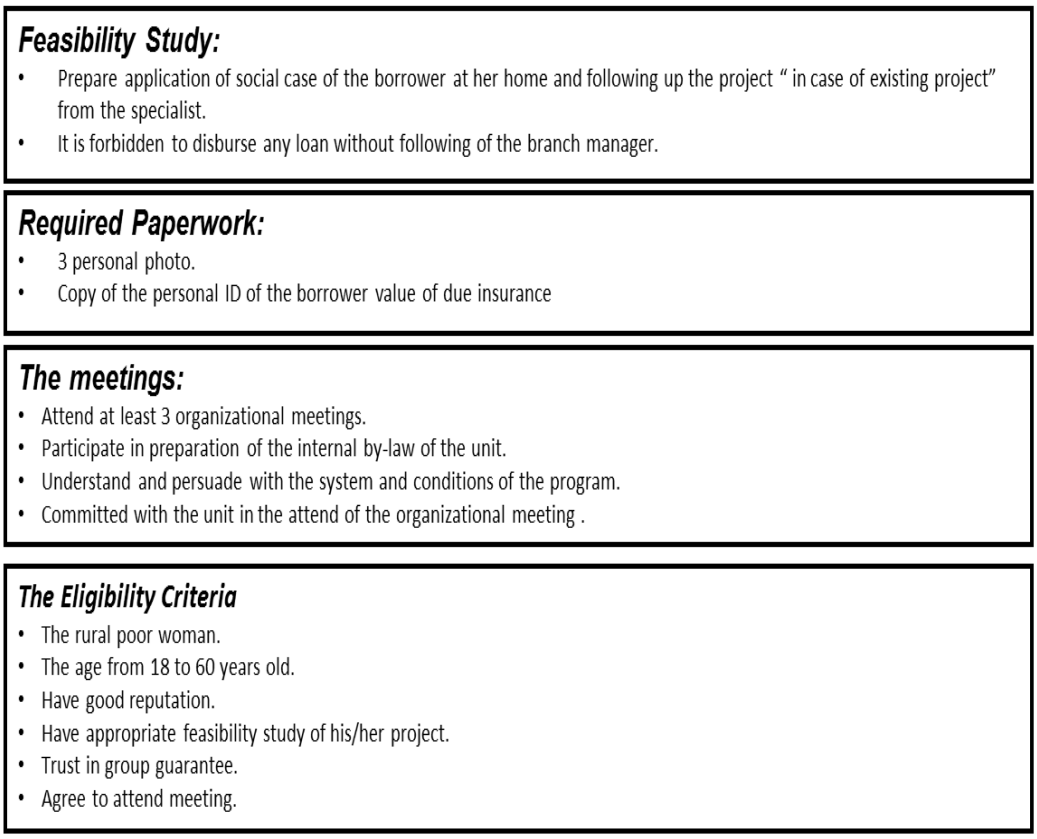
continuous business relationships with their international sponsors. Such experience improves their resumes and enhances their chances to get a better future job. The above mentioned problems and the required transformation are clarified in the CATWOE analysis shown below.

Customers	MFIs staff and the SFD
Actors	MFIs IT manager, Masary IT staff, IT Vendor
Transformation	*Train the MFIs staff to use the MMicro system as a platform for collections and disbursements through mobile phones. *Create authorised access to the SFD to monitor the system and allow more funding inflows. Develop a business model that reduces the operation costs for the MFIs and their sponsors.
Weltanschauung	E-Masarysystem can improve our back-office operations and enable our staff to serve as many customers as possible.
Owners	Masary board of directors
Environment	Bankless banking

A continuing debate started between Masary's board of directors and the MFIs on the credit approval procedures. On the one side, Masary lacks the technical expertise on how to evaluate microcredit customers and estimate their ability to redeem their debts. Further, they lack the databases required to manage such a service. Above all, the microfinance industry has a loans portfolio that manages the flow of funding disbursement and collection. Delivering a massive scale was, however, a challenge for the company. On the other side, the MFIs exercise power over Masary to get a profit margin from on the top of each microfinance transaction. "*Our professional network with businesses, the USAID, and the SFD, is what Masary looks for. Business relationships count a lot in any deal and we have to invest in our life experience*" [REDIC, Chariman, in April 2011].

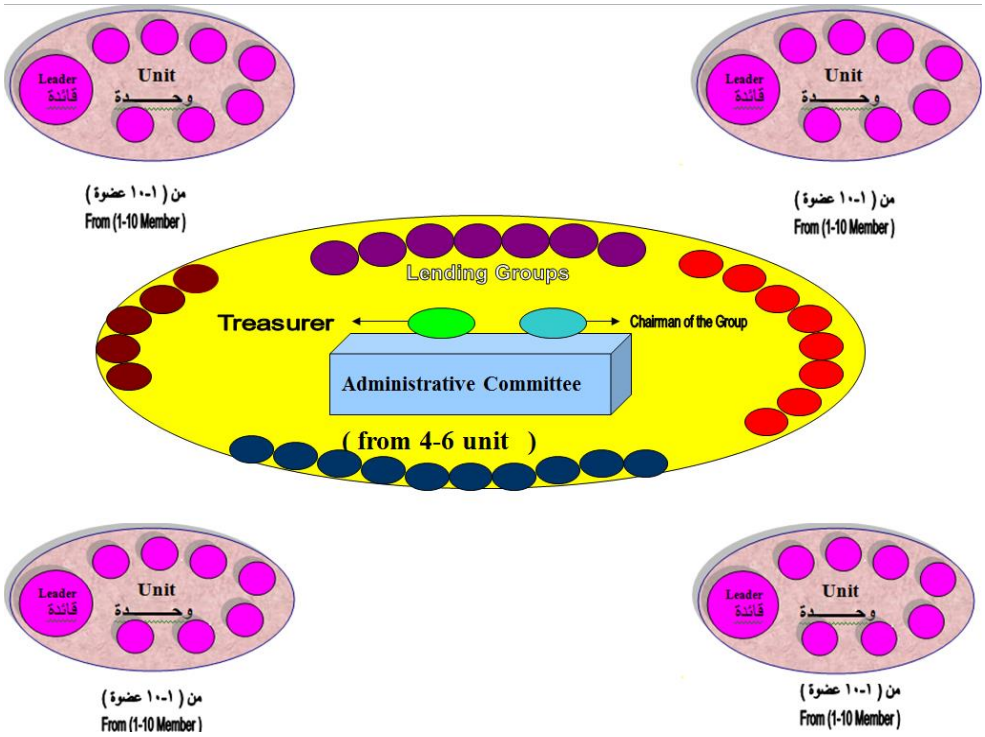
Our intervention is to reach to a win-win situation where the MFIs manage the approval process and the financial portfolio, while Masary.Co manages the system operation, maintenance, and security. In exchange, the MFIs get credit out of Masary wallet for 3-6 months to be escalated within 2 years to an annual quota.

Figure 6.7: Procedures of Credit Approvals in Masary's MMicro System



As shown in the Figure 6.7, a feasibility study needs to be conducted by the MFIs loan officers and fieldworkers who already live at the BoP and who are familiar with the borrowers' daily life. Once the applicant (i.e. borrower) proved creditworthy, a meeting needs to be set with loan officers and branch manager to finish the paperwork and discuss the loan provision conditions. Every 15 days, the microfinance approval committee discuss 25-40 applications and usually approve 50%.

Figure 6.8: Monitoring Group Lending though e-Masary MMS

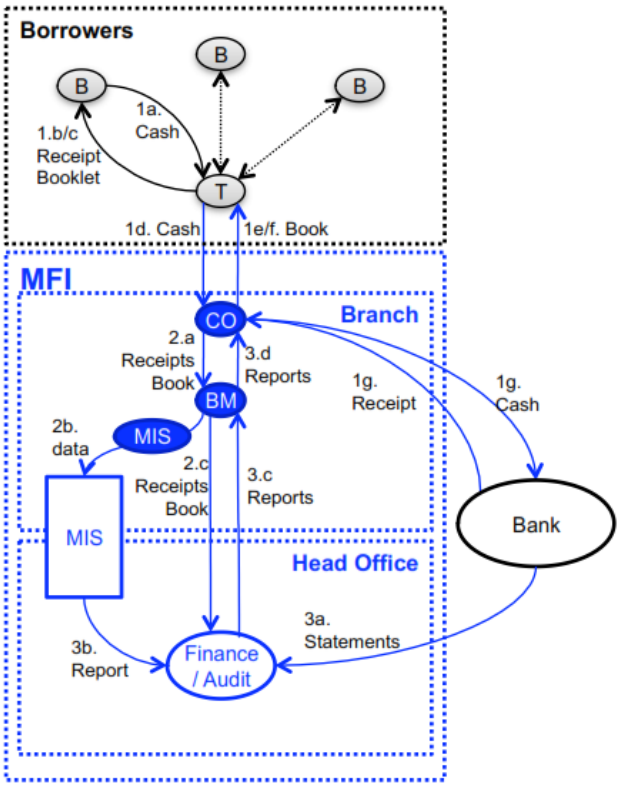


These procedures get more complicated in ABWA who offer group loans. The starting point here is to form a loan group that includes up to four units. Each unit includes up to ten members and one unit leader. These four units have make a proposition to a loan officer who completes the application and sets a detailed schedule of collections and repayment instalments (see Figure 6.8). As shown in Appendix 8, this process includes special techniques for peer selection and social collateral among the group members.

Previous studies such as Besley & Coate (1995) & Khandker (2012) confirms that access to local sources of information is necessary to provide group lending services. Such knowledge only exists for the locals and by the locals (Parikh et al., 2006). The MMicro system is, however, capable of saving and processing such data and provides future analytics. Once data are entered by the MFIs for the first time, then the actionable information can be retrieved for an immediate decision making process.

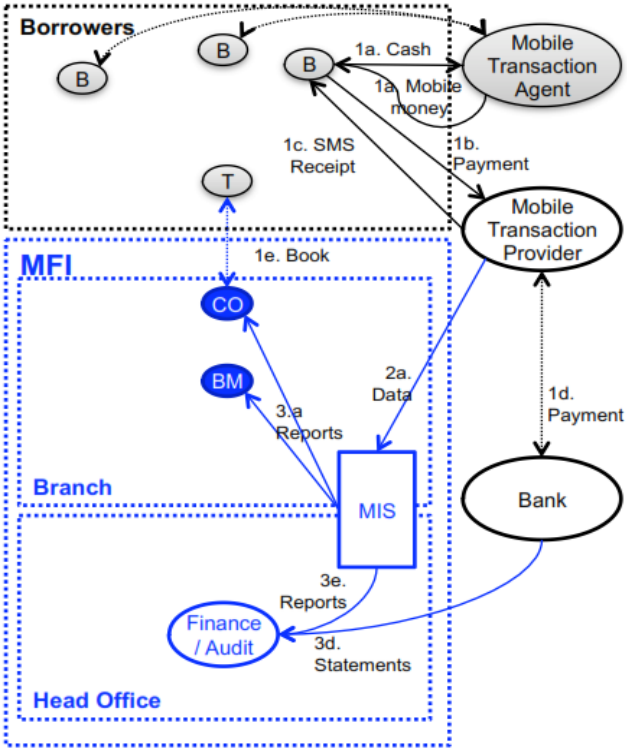
Figure 6.9: Data Flow Charts from Traditional versus MMicro

6a: Traditional Microfinance System



1. Repayment
   a) Borrower (B) hands cash to treasurer (T)
   b) T, B and credit officer (CO) sign B's booklet
   c) B receives a signed receipt
   d) T hands cash to CO
   e) T updates repayments book
   f) CO signs off book and hands it to T
   g) CO goes to bank, deposits cash and gets receipt
2. Registration
   a) Branch manager (BM) receives all receipts and the book from CO and signs off
   b) Branch MIS staff inputs data manually in system
   c) BM sends all documents to head office
3. Reconciliation
   a) Audit/Finance receives and checks bank statements
   b) Audit /Finance reconciles statement with MIS data
   c) Report sent to BM
   d) BM gives reports to CO
   e) CO manage issues with delinquent B
   f) CO forwards amendments to branch for registration

6b: Mobile Microfinance System



1. Repayment
   a) Borrower (B) loads money on their mobile phone with an agent as she wishes
   b) B pay via their mobile phone as she wishes
   c) B has a receipt of the payment as a SMS message on their mobile phone
   d) The mobile transaction is mirrored in the bank account
   e) At meetings, the book can be kept up to date
2. Registration
   a) Mobile transactions report is downloaded into own MIS by MIS team
3. Reconciliation
   a) Branch managers (BM) and credit officers (CO) access repayment report from MIS
   b) CO manage issues with delinquent B
   c) CO forwards amendments to branch for registration
   d) Audit/Finance receives and checks bank statements
   e) Audit/ Finance can access reports from MIS

"I am afraid; e-Masary is fully operating system is a threat. Our indigenous knowledge will be no longer required. The technology will represent how the locals live and do business" [ABWA' senior loan officer, April 2011].

Figure 6.9 shows the data flow charts that we have drawn of Masary's MMicro system. To critically evaluate the efficiency of the system, we had to compare between the traditional microfinance system and the MMicro system offered by Masary. We found this technique useful to discuss the real benefits and challenges with the MFIs top management and with the SFD officers.

6.2.2. e-Masary Diffusion

6.2.2.1. Alliance with the MNOs, the FMCGs, and the MSPs

To develop the MPS, Masary.Co aims to develop non-traditional value chains to create competitive advantage and achieve long-term economic benefits (Porter, 2011). These new chains usually require additional investment that is not risk free. For instance, the risks of getting involved in the Egyptian slums conflicts with situations where some elites try to control the settings within which other disenfranchised groups act and interact (Arora & Romijn, 2012). Masary also faced a considerable risk due to the lack of awareness of regulatory rules and government interference in the market. These together make working with the poor a new venture with uncertain economic benefits (Wilson & Wilson, 2006). This made it difficult to link the MPS with the MMicro system serving the low income customers.

To overcome such risks, Masary requires support from their partner MNOs, MFIs, IT vendors, and regulating partners. The real challenge was, however, how to work with the poor and these non-traditional partners if they lack partnering skills. Masary could not easily identify the most purchased consumer goods and the key services required by the low income customers without help from non-governmental institutions such as MFIs. To build partnerships with FMCGs and MSP, such knowledge was necessary.

The literature offers similar problems that have taken place in Grameen DANONE Food Limited (GDFL), a 50-50 joint venture between the Grameen Bank Group and the French Group DANONE. It was founded to bring daily healthy nutrition to low income people in Bangladesh. Over the last three decades, DANONE has elaborated many humanitarian initiatives with social missions. DANONE perceived a business prospect in employing local women, but they have low level of indigenous knowledge and expertise to craft a suitable strategy. Trying to fill this gap, Grameen Bank offered support to DANONE working directly with Grameen women. By agreement, Grameen Bank grants, micro-loans to farmers to raise the cows needed to produce the milk locally. Then local carriers transport this milk to a small factory to be sterilized before being distributed door-to-door by Grameen women (Yunus, Moingeon & Lehmann-Ortega, 2010).

The IT vendor, Razy, faced a problem updating the protocols of the system structured language and fit them with potential partners from the FMCGs and MSPs. They also got other competitive financial deals from the MNOs to help build another MMS paralleled to e-Masary. Our focus groups revealed that Masary CFO is a preferred shareholder (34%) of Razy and accordingly, all competitive deals were suspended from this IT vendor and exclusive services have been offered to Masary.Co.

6.2.2.2. Alliance with MFIs

At this stage Masary tended to leverage microfinance experience and build partnerships via two steps. First is to invest resources in a targeted industry (such as utilities, education, groceries, and mobile telecommunicatiosn) or Subsector (such as dairy, livestock breeding or micro-lending) and call organizations for bids. In doing so, the Masary issued a “Request for Proposal” and “Requests for Assistance”. Each stated the general objectives (including performance indicators) required to improve the competitiveness of the chosen sector. Within 45 days, 22 MFIs submitted business proposals to intermediate e-Masary new services at the BoP. Eight of these have been

approved based on their long-term experience in the Egyptian slum areas and their rating in Planet Rating (see http://www.planetrating.com/).

Mohamed, Wood-Harper & Ramlogan (2014a) reported a similar case where USAID-Zambia, sponsored the Production, Finance, and Technology (PROFIT) project to help unbanked farmers collect payments from cotton ginners and food processors via mobile banking agents like airtime dealers, gas stations, or grocery retailers. Further, it enables them to pay for supplies (e.g. veterinaries and fertilizers' providers) against purchases of inputs (Ducker & Payne, 2010). USAID-Zambia identified the country-level needs as wider access to poor markets, enhanced value added and production technologies, increased financial and business development services, an improved enabling environment for growth and infrastructure for electronic payment platforms. Then USAID/ Zambia requested proposals from a third party or implementing partner to address these issues.

Masary's selection metrics include the MFIs (i.e. implementing partners) ability to increase the customer outreach, conducting a minimum of 5000 daily transactions for each branch, and 10 hours daily training for customers on start-up business skills.

For the PROFIT project, USAID/Zambia set other objectives such as increasing the value of per unit production of harvested lands, and increasing the number of female workers in producer organizations (Snodgrass & Woller, 2006: 6). Further, candidates had to identify the resources they dedicated to the project, their potential partners, and their action plans (including yearly activities, budgets, and expected outcomes). Above all, IPs had to have long experience and enough knowledge of the problems and challenges facing the poor farmers. Potential partnerships are an asset for the selected implementing partner who identifies the key organizations and individuals enlisted to execute the project and the business model to be implemented. For instance, the Cooperative League of the United States of America (CLUSA) has been selected as the implementing partner for the PROFIT project due to its five decades of experience in developing countries and extended worldwide network of partners.

On the philanthropic side, Masary direct microfinance services includes electronic microcredit services with a 3% transaction cost for the first allocation. No interest rate is required from Masary's side. Potential customers (i.e. borrowers) need to apply to the nearest MFI that holds a Masary license. Once approved, the MFI grant the loan to the borrower who can then payback the instalments through e-Masary MMico system.

By 2011, Masary could reduce the loan prices from 16-18% to 5 % for the second allocation directly to customers, increase the revenues of mobile network providers by 15% (NTRA, 2013), increase revenues of merchants licensed by Masary, and increase the Gross Domestic Product (GDP) as a result of less liquid loans and providing the loans in forms of points against tangible products.

This indirect microfinance service allows MFI borrowers to conveniently receive and repay loans using the network of airtime resellers and a list of 2105 Masary's licensed merchants. The starting point was getting the license of the three mobile network providers that dedicate assigned quotas to Masary in forms of virtual cash wallets. The value of these mega virtual wallets is 104% of the prices that Masary pays (i.e. Masary pays 96 L.E. to get 100 points in the virtual wallet). The second point in the supply chain is that Masary supports the MFIs with an agreed quota out of its mega virtual wallet. This financial support allows the MFIs to lend money to the poor and return it not only without interest, but also with 3% profit (i.e. the MFIs may take 100 points and return back only 97 L.E.). The final point is the delivery to borrowers against 5% interest rate after following the legal procedures.

In Sep 2009 e- Masary's representatives gave MFIs agents the phone and then trained them to process Over The Counter (OTC) transactions, so that they would become comfortable with the service (Masary$_b$, 2010). The borrowers did not need to have a mobile handset at all to transact at the agents, but they would get an SMS receipt if they did. Six months later Masary launched the mobile cash wallet, which allowed customers with mobile phones (regardless of the network provider) to have their own account hosted on their personal phone (Masary[a], 2010).

After admitting the loan request, each borrower will be allowed to exchange his virtual cash wallet against tangible products available at Masary's outlets around in eight Egyptian governorates and allocated in the rural areas. At the time of repayment, every borrower has three options. The first is to go to any close merchant licensed by Masary to replace the cash in hand with points in his virtual wallet. The second is to follow the traditional way by returning the money back to the loan officer to redeem his virtual points. The last repayment option is to go to any exclusive agent of the mobile network providers to repay the money and his due amount will be settled directly.

This enabled microfinance institutions (MFIs) to offer more competitive interest rates to their customers, as there is a reduced cost of dealing in cash (0.5% operating cost). Although that service was trialled to enable borrowers to track their finances more easily; they adopted it for a variety of alternative uses (NTRA, 2008).

However, Masary's board of directors were always suspicious of building partnerships with non-governmental MFIs that are mostly for profit. Therefore, Masary put more emphasis on a consensus of their general mission as a condition to their collaboration and signing long term contracts with the MFIs as system operators and intermediaries. Such logistics required almost three years to build a unified technical agreement with the MFIs and retail agents.

At this stage, Masary's CEO sets a focus group with three MFIs managers to allow us (as system analysts) to explore the technical problems. The main issues that associated with the cost of switching from their credit information system approved by the SFD to e-Masary system. Another concern was the usage of Nokia phones to operate e-Masary wallet and securing a permanent internet access to print real-time reports for daily transactions.

6.2.3. Explored Impact: Benefits, Challenges, and Sustainability of E-Masary from a Technical Perspective

In this section we explain our key findings, from the technical perspective. They include challenges such as *designing* a *friendly-use interface for illiterate customers* who in the BoP market. Customers of mobile payment and transfer found that the service is "*not suitable for livestock trading*" as they usually take place far from the mobile coverage. It also shows "*security*" and "*universal access to real time data processing*" as key challenges for the integration between Vodafone, Masary, and the Central Bank of Egypt in the MMS. "*Training*", "*installation and maintenance costs*", and "*affordable internet connected handset*" are the key challenges facing intermediaries (MFIs and retail agents). The "*shift from prepaid policy to credit policy*", "*transaction cost*", and "*customer services performance*" have been found crucial to the collaboration between Vodafone and Masary.Co. Further, designing an "*aligned compensation system*" was challenging for Masary, retail agents, and MFIs to assure "*staff satisfaction and motivation*".

Above all, technical issues with Sharia-Compliant financial services was found critical to the system owners.

6.2.3.1. Implanting vocabularies and performance indicators:

Our research pointed to significant differences between reporting procedures in e-Masary and other mobile bankless banking initiatives.

> "*The governance codes adopted in e-MASARY represents the first CG initiatives led by the private sector in Egypt, especially in the field of financial services*" (Financial accountant in the SFD, Interview no.12).

Masary.Co require periodical reporting to different financial measures such as *customer acquisition cost, working capital, agent acquisition costs, monthly revenue/customer, monthly revenue/ agent, customer daily cash in & out* (Copy of Masary contract with REDEC MFI). They also require social indicators via maintaining a balanced growth of customers and retail agents. Accordingly, Masary uses measures such as the number of customers/agent, the number of transfers/agent. Moreover, Masary.Co ask all of its retail agents and MFIs to keep diaries or paper-based log book beside the electronic records to maintain a high degree of accuracy.

> *"The paradox is that Masary do not send any auditor or inspector to check if the data provided by the partner MFIs adhere to MASARY internal controls (e.g. accuracy and completeness), despite the fact that eight out of the nine partner MFIs are working for profit*" (Microfinance's project manager in MSS, Interview no 15).

Masary.Co use social indicators such as MFIs service outreach, borrowers' assets building capacity. However, they set these measurements based on the consultant points of view. It was noted that this consultant is rather academic and did not visit any of the partner MFIs to know about how they define their social indicators.

> *As a result, "we as fieldworkers could not understand these indicators and or how to analyse our data in that unfamiliar way" [Senior accountant in Assuit Business Women MFI).*

Our study revealed that Masary.Co provide periodical skills and technical training to its retail agents and MFIs' staff. However, this consumes time and efforts of Masary small team (reached to 60 employees in March 2011).

> *As confirmed by Masary IT manager " we lose a huge amount of time to train our agents on how to apply the new settings and follow the new system diameters, which requires preparation and overtime work without bonus". Moreover, it puts more burdens on the MFIs' staff and retail agents. "We have to attend in Masary headquarters in Cairo, which means spending*

more money and efforts and cancelling the debt collection for one complete day, every month" [Loan officers in Assuit Business Women MFI).

This means that loan officers have to contact the borrowers to make sure they will not come in the training day. Otherwise, *"borrowers*[56] *leave their kiosk and family and waste the whole day waiting for the loan officers in the MFI"* [Branch Manager in Assuit Business Women MFI].

6.2.3.2. Create Flexibility

Integrating the philanthropic and commercial business system requires building flexible partnership platforms. The BoP BM requires trial and error as the actors proceed throughout the design and deployment stages. It also requires inclusive work to escalate the dedicated investment and efforts to harvest gains in the long-run. In our e-Masary case, for instance, the mobile network operators did not fully trust Masary's capabilities to expand in the unbanked area and pay back the full amount of the airtime. Prepaid airtime is the standard way the telecoms use to sell their service and it was difficult for them to change to credit unless Masary.Co makes an inclusive, sustainable business model to enhance the telecoms diversity and penetration in the Egyptian market. The telecoms consider electronic money as an investment that should start small and be scalable-up with profitability and liquidity performance. Not until late 2013, did the mobile operators see the strong potential for fully operating MMS and the worth of the new credit policy. To gain such trust Masary.Co kept equal distance from the three network operators to escalate their support and business alliance.

Implementing e-Masary projects required learning rather than execution. Thus, at this stage, Masary.Co negotiated flexible support from the donors (i.e. SFD and USAID) and mobile network operators. Flexibility is usually in regard to the types of resources and the length of that support. Different types of support are required at different stages of development. Actors in the MMicro system (the SFD, USAID and NGO-MFIs) provided Masary.Co with knowledge and experience as well as access to the poor. This

[56] The MFIs mentioned in this report provide MASARY services parallel to traditional individual and group loans that are based on paper documentation and physical attendance.

knowledge includes strategies on how organizational issues such as building trust with the local communities, and technical issues like selecting loan groups and lending cycle. Both the organizational and technical strategies help "*overcoming infrastructure and profitability"* challenges as discussed in the first section of this chapter. The MMico network in e-Masary also had strong business relations with banks and training companies, which enhanced the company's chances for success.

In addition to type, the timing of the supporting resources should not be predetermined. The donors and sponsors should not set a certain amount of resources each year. Private enterprises start with a low cost investment to maximize the return from a learning orientation. Then they need to be capitalized for scaling-up. Once the business model is investment ready, donors and sponsors can facilitate greater investment. The timing and success of these developments, however, are difficult to predict in advance. Masary.Co required access to modest amounts of subsidized capital to facilitate experimentation. But once their pilot proofed economically feasible, the telecoms as well as the donors scaled-up their investment in building infrastructures for the unbanked areas and sponsoring point-of sale machines with Masary's trade mark.

MMicro system's deployment requires a willingness to accept learning outcomes and a long-term orientation as part of their metrics. Not all new business models, for instance, will be worthy of additional investment. Only high-potential ones should be expanded by committing additional resources. The less successful ones should be stopped or redirected. These failures can generate learning, but the investment in the MMicro is non-recoverable. Trying to accurately predict in advance, which models will be worthy of investment, the type and amount of investment needed, and timing for these investments is challenging and likely to be inaccurate.

6.2.3.3. Financial Aspect with Islamic Finance

Islamic finance is a Sharia compliant financial service that prohibits investing in production of pork, alcohol, gambling and pornography (Khan, 1987; Iqbal & Mirakhor, 2011). It also forbids usury (Reba in Arabic). Such practices require special skills and experience by e-Masary accounting, operations, and CRM teams. Religious scholars

who attempt to study the commercial-religious debate around usury usually conducts extensive research and charge sizable fees and fail to offer business wise advice to professionals. However, it was found common in the literature that providers of Islamic finance do not charge interest (Fang, 2014). The service providers, then need to innovate new business models that maximize the return and decrease the need for borrowing money from non-Islamic financial institutions.

e-Masary services provided through the MAWADA (an Islamic NGO-MFI), do not impose interest payments on loans. Instead, it entitles customers to partial ownership of an asset that generates income through direct production or rental payment by a producer. Another form of e-Masary Islamic finance service is mortgage services to buy houses and share them with customers. Instead of charging interest, Masary asks the customer to pay monthly rent less than the standard rental fees. However, Masary share the profit when the house is sold. The customer has the right to buy the house back from Masary (at an agreed market price) in monthly or quarterly instalments. In total, the customer uploads cash to MAWADA's Masary debit account with rental fee and an installment of the purchase price until he pays the nominal price of the house. This Sharia principle is called "*murabahah*". Accordingly, Masary.Co had to recruit a professional team for the real-estate industry to assure accurate evaluation of properties and production assets.

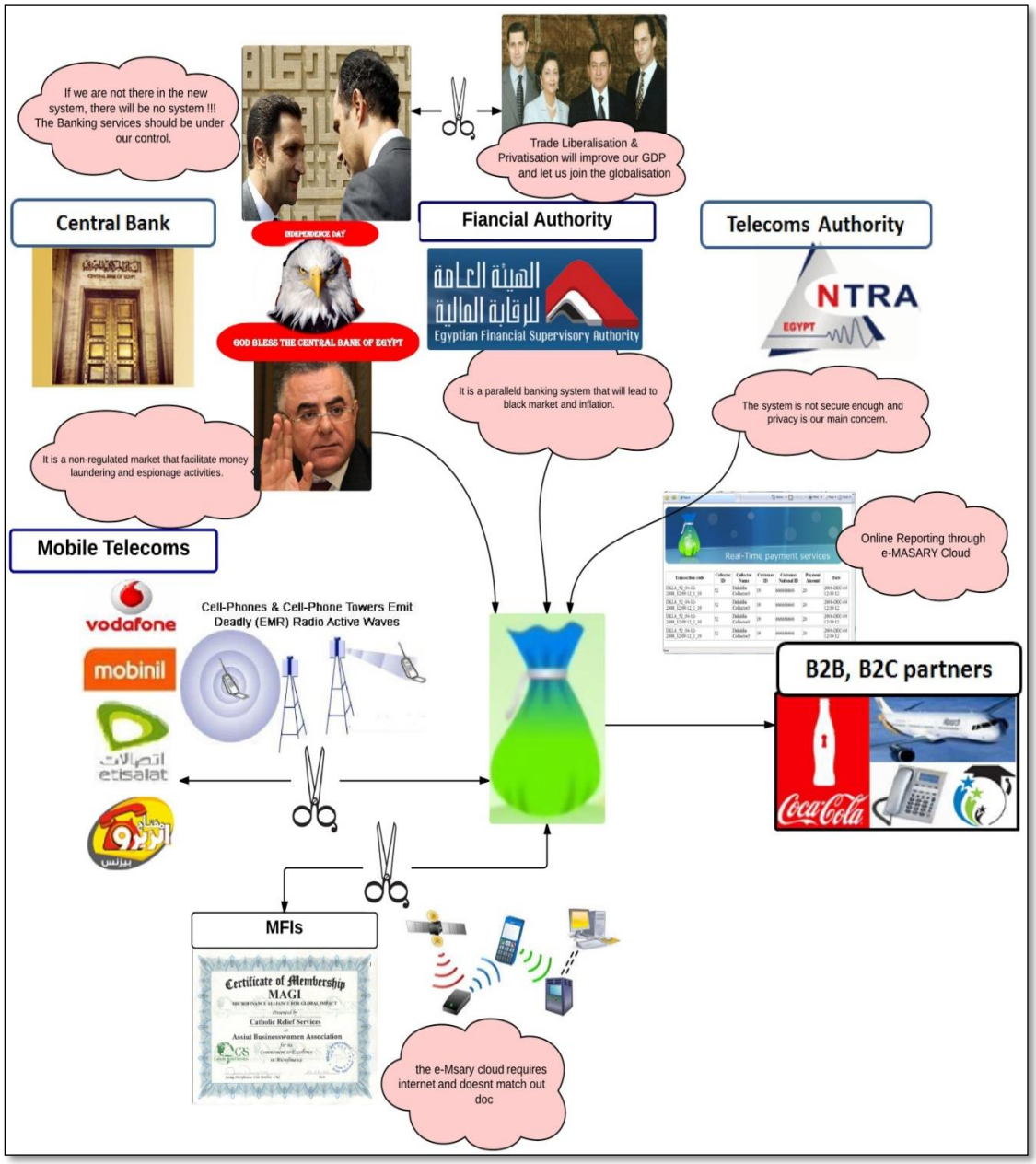
Managing risk in Islamic finance is different than in traditional finance. The uncertainty principle is not accepted in the core calculations. Accordingly, the e-Masary system does not employ the derivatives, options, and future value. This required a system developer with a background in Islamic finance mathematical techniques.

6.3. O Perspectives of e-Masary Implementation

From the organizational perspective, we found that the lack of "financial expertise", "trust", "transferring resources", and having a flexible budget out of the shareholders

wealth are the key challenges facing the MNOs and Masary. "*Business model experimentation*" and "*creating a competitive advantage*" are also significant challenges facing these providers. Overall, "*Balance metrics (Online Scorecard grid)*" had to be agreed and co-designed by the providers, the central bank, and the intermediaries. "*Capped level of investment*", "*staff resistance*", and "*lack of unified intranet*" are unsolved problems for the MFIs. This technology was als found tobe difficult by customers of "*group lending*" who used to have face to face meetings with loan officers and do not trust the mobile calculations.

Figure 6.10: Rich Picture Organisational Perspectives



The organizational perspective offers a deep insight on how Masary.Co deal with the regulators (e.g. the CBE, NTRA, EFSA) on one side, and other meso-level business partners on the other side. As shown in Figure 6.10, the CBE was controlled by former president Husini Mubara's who delegated most of his authorities to his two sons Alaa and Gamal Mubarak. In 2010, the former president announced his attempts to liberalise the Egyptian economy and improve the contribution of MNOs to the GDP. Ironically, he appointed his two sons on the board of the CBE.

> *In his interview, the head of the CBE reported that "it was a tough period of time when Mubarak family controlled the financial system in the contry and customized the banking bylaws to maintain this control. But, now we are independent. Only now, we can proceed with alternative banking systems such as e-Masary mobile money"*

The articles of the EFSA law were also manipulated by the president's sons to classify e-Masary system as a window for over the counter financial market. These two sons also imposed unusual privacy and security regulations on e-Masary system. Our focus groups revealed that Masary.Co top management did not have informal relationships with the people in power during the first three years of operations.

On the contrary, our analysis revealed the role of Masary's top manager as boundary spanners who extended the idea of MMS from Vodafone to a network of public-private partners that serve more than 15 million by the year 2013. The starting point was to create a new market opportunity and identify the so called "below the ocean strategy" (Kim & Mauborgne, 2004). The strategy suggests delivering an innovative service(s) that is not provided by others in the market.

To define the problem situation from the organisational perspective, we conducted the following CATWOE analysis:

Customers	Telecoms, Government, FMCG, Retails, MFIs.
Actors	Masary board of directors.
Transformation	Enable universal access for relevant stakeholders to access relevant systems (e.g., Information provision system, Web-based system). Develop an inclusive business system to offer economic return for business actors and social return for public actors.
Weltanschauung	Universal access with authorized passwords will help reconciling varying organizational objectives and creates mutual benefits to the private-public partnership in the mobile money network.
Owners	Government.
Environment	Politics and Millennium Development Goals MDG

6.3.1. e-Masary Design

From the organisational perspective, Masary.Co did not build long-term relationships with the MFIs. They only aimed to get the indigenous knowledge transferred to Masary's team and then, they planned to uncover new business chances through stakeholders short term engagement. This contradicts with the literature that suggest collaborating with socially oriented partners to explore new market need and co-develop innovative solutions that meet these needs (Yunus, 2004).

Masary designed their system in a way that did not match the needs of the illiterate low income customers and the MFIs organisation procedures. The company followed the commercial rationale that is usually followed by providers of MPS that target the high income customers.

> *The IT manager of the ABWA, reported that "We did not see Masary system as the best alternative. We had cheaper and more flexible electronic financial information systems such as "el-mohasel". This is an off-the-shelf, ready made, software can be installed in our PC with affordable prices. It also matches the standard documentation, and organisational cycles that are usually followed by MFIs in Egypt"*

The head of the SFD microfinance programme supported this comment by saying *"e-Masary system is well designed, but seems that the developers are not aware of the*

regulatory rules and government interference in the market. They do not know how to play around to win".

The challenge is, however, how Masary.Co work with the poor and these non-traditional partners if they lack partnering skills. NGOs and the local communities are often skeptical in working with for-profit enterprises, and therefore put more emphasis on a consensus of the general mission as a condition to their collaboration. So Masary spent two years trying to customise the system design to match with the rules and organisational procedures followed by those non-traditional partners to attracting them. As shown in Figure 6.11, Masary followed the business cycle of MPS. The addressed an opportunity of unbanked market and tried to allie with local partners to exchange knowledge. On the contrary, the MFIs and other community partners (e.g. international aid associations) continuously engage with the people in the BoP and partner with private business to laverage more resources. They plan to invest resources in a targeted industry (such as agriculture, handicrafts, fast moving consumer goods microfinance or mobile telecommunication) or Subsector (such as dairy, livestock breeding or micro-lending) and call organizations for bids (London & Anupindi, 2011).

6.3.2. e-Masary Deployment

The organisational perspective sheds light on Masary's radical experimentations to change their pricing model and serving a wide based of customers than to serve big size business customers. The MAWAD's manager reported than "Masary sent us a team of operations, marketing, and IT manager who spent a long time analysing our records, procedures, and routines. Then we introduced them to an expert on Islamic banking to teach them what is Islamic financing and how it works". Masary's operation managers confirmed "We failed repetitively to embed the sharia law in our business model. Learning was our key advantage to get closer to the required service"

A series of small experiments minimizes risk and maximizes learning, [this is] not intuitive, but involves the ability (and intention) to make changes if the first chosen path turns out unsuccessful" (Yunus et al., 2010: 8). Enterprises who pilot their business model to gain wider understanding and polish their skills at the lowest cost. Once the

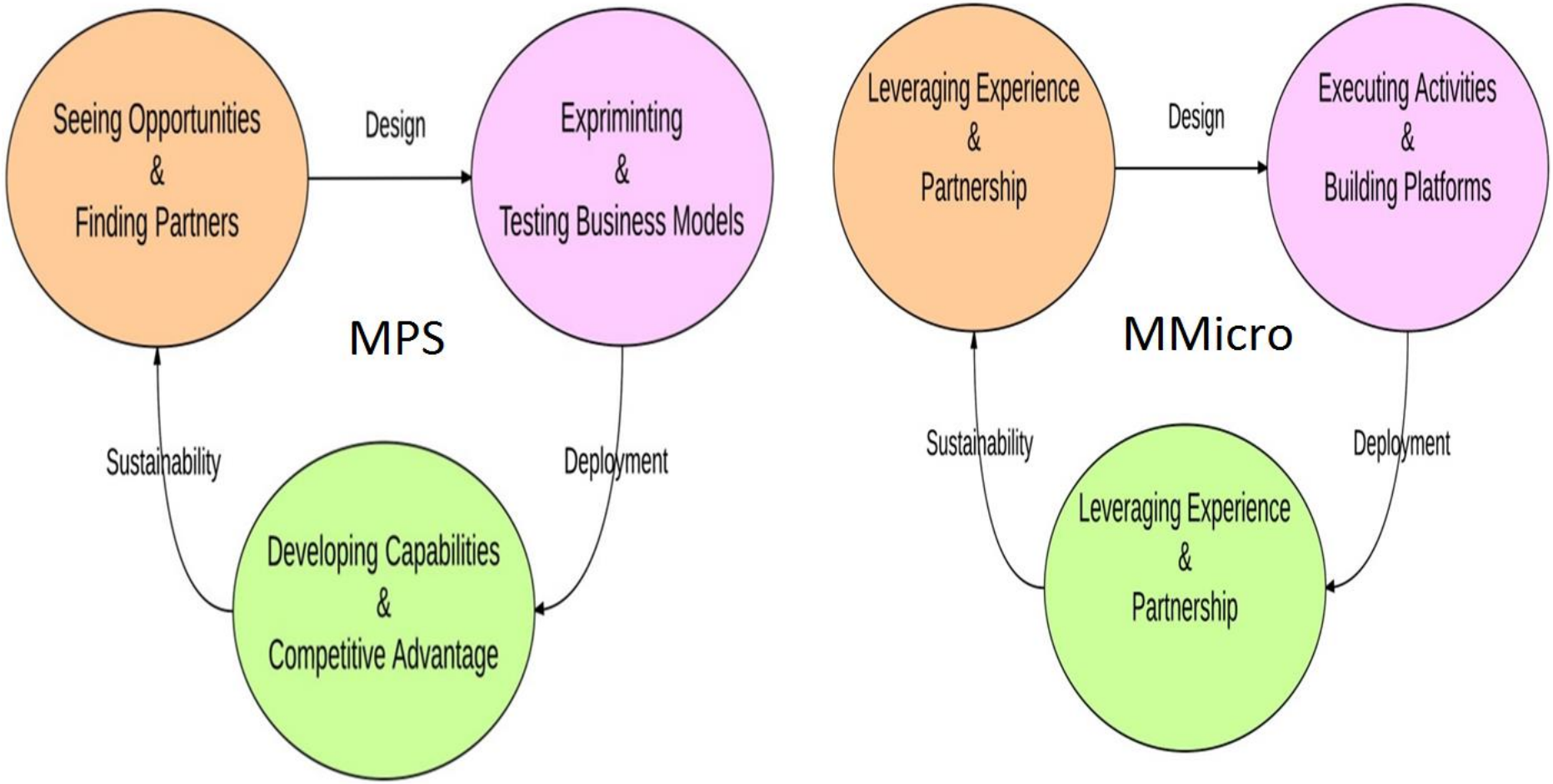
pilot shows sufficient economic return, the MPS are able to scale-up their investment. Solution design and deployment have to be conducted iteratively until a robust business model is found or the initiative is abandoned.

Masary recruited retailers who merely sell airtime minutes. Those retailers, however, lacked the minimum degree of education and management skills. In turn, they failed to use technology and to appropriately record real-time transactions. Accordingly, Masary.Co recruited an expert HR and IT members - who previously served at Egyptair and Vodafone Egypt partnered - to training their 3460 retail agents and fieldworkers. Once the pilot succeeded, Masary extended their bankless banking services (e.g. mobile transfer, mobile payment, micro-savings, and micro-insurance) using their extensive retail outlets.

Grameen Bank's founder, Mohammad Yunus, spent a long time with the villagers together as a community: in the rice fields, in farming projects, in afternoon conversations at roadside tea stalls, and in late-evening dinners and debates. By working together and learning from one another, Yunus's and the villagers' unique knowledge, insights and perspectives came into creative collision, sowing the seeds for a profitable and scalable village banking model that neither could have conceived independently (Simanis & Hart, 2009). The huge economic potential encouraged the bank to replicate this pilot in different geographical areas which increased the outreach to seven million women borrowers across some 75,000 villages of Bangladesh, with annual loan disbursement exceeding 800 million dollars.

In contrast to the MMicro system, the MPS system emphasizes testing new business models. Since they are directly engaged in the value chain, they need to create skills and capabilities to bridge the gaps identified. Given the inherent risk in working in an unfamiliar context, it treads cautiously, using pilots to learn and test the initial design. An enterprise may choose to work with other partners (private, government, or donor); however, the nature, viability, and usefulness of such partnerships are also tested during the piloting process. In the MPS, Masary work as a network maestro while builds dynamic capabilities, innovates the business model, and create a trade-off, rather than maintain control over partners to achieve their own interests.

Figure 6.11: MPS versus MMco Business Systems



Masary evaluated the feasibility of creating a competitive advantage in the Egyptian market and developed the essential dynamic capabilities for scaling-up. Masary.Co created dynamic capabilities by integrating new resources from the community and non-traditional partners, by transforming resources to their staff, and by acquiring new technology to deliver a unique value to the community and micro-entrepreneurs. Masary set three strategies to expand their deployment plan; the first is "*scaling-up"* in which they co-generated competitive advantage with an expanding set of partnerships with the SFD, MFIs, and FMCGs; the second is "*scaling-deep"* in which Masary offered new products and services for the low income Egyptian; the final is "*scaling-wide"* in which Masary created new value propositions within the same set of products or services to satisfy new customers in new markets.

For instance, Masary partnered the SFD to leverage the credit scoring service. The SFD supervises 450 MFIs that work in different cities in Egypt. This extensive network helped Masary to scale-up by building a national platform for credit rating services.

Concluding the above discussion, during the design stage the actors of MPS aim at leverage new market opportunities. Then deployment proceeds cautiously, using pilots to assess the solution design. A successful pilot demonstrates the viability of the business opportunity, helps the enterprise develop skills and capabilities, and generates a competitive advantage. A deliberate process of business development helps ensure the sustainability of the initiative in its existing market. It also creates an opportunity to gain more capabilities and essential for scaling. As business environments are dynamic, sustainability is at risk.

Once the implementing partner is selected, they act according to the presented plan, including detailed metrics with measurable objectives. Because MMico systems are usually short-term, there is no chance for trialling and learning from mistakes (Woolcock, 1999). So the implementing partner and its network of allies are responsible for educating, transferring knowledge, and help creating social capital among bottom line performers (Woolcock & Narayan, 2000). They are also responsible, in some cases, for providing technical and/or financial inputs.

The MMicro system sets the key performance indicators for monitoring project effectiveness and translate them into "*process-related metrics"* and "*outcome-related metrics".* The process-related metrics assess how much intervention (including resources, efforts, knowledge and experience) required and the latter tracks the result of this intervention.

The process-related metrics take different formats, according to pre-set indicators. In agricultural projects, for instance, the process matrices include the number of farmers trained, number of training, exhibitions, and groups formed (London & Anupindi, 2011). Epstein & Crane (2007: 22) developed a massive process-related metrics for micro-lending in Ghana which includes four sections

1) *Leadership indicators* (e.g. Average years of experience of MFI senior executives and loan officers);
2) *Strategy indicators* such as amount of loan portfolio, loan size (average & range) and credit ratings of clients; *Structure indicators* like number of loan officers, % of decisions made by loan officers, and amount of group vs. individual loans; and
3) *System indicators* such as dollars invested in training (client & employee), number of clients per loan officer, % of income clients are required to save, frequency of payments and quality of IT and credit monitoring systems. Simultaneously, these assess the magnitude of the common platforms being developed. The outcome-related metrics must be consistent with the process-related metrics [57].

The problem with both types of matrice is that they are internally developed and monitored. In order to cover this gap, developers of the MMico need to outsource this task to an independent an auditing company to evaluate the results against the pre-set performance indicators. The reason for such practice is to help donors fairly assess the project's success (Copestake, 2003).

E-Masary project aimed to collect sector-specific market information and to train low income users and microentrepreneurs via SMS. In doing so, the SFD developed a

[57] There are comprehensive matrices that include both of the process-related metrics and outcome-related metrics such as Balanced Scorecard by Kaplan & Norton (1996), Global Reporting Initiative, Market Efficiency Audit by George (1996), Wealth of Nations Triangle Index by Sullivan (2002) and social reporting by CGAP and MIX (2012).

process-related metric that reflects the number of services available on the system and the number of trainees using each service. The outcome-related metrics based on better farmer knowledge of market opportunities and cultivation practices, and increased use of appropriate tillage service.

Despite that fact that, e-Masary aimed at "*scaling up*" with an extensive network of qualified agents, only 46% of the clients became active and the average sales of agricultural inputs and other related products is 15% less than the expected average. This reflects the service lagging and limited demand. In addition, some suppliers such as "Telecom Egypt" who joined the SFD's network to provide customers with technical training and political awareness skills.

6.3.3. Explored Impact: Benefits, Challenges, and Sustainability of E-Masary from a Organizational Perspective

From the organizational perspective, we found that the lack of "financial expertise", "trust", "transferring resources", and having a flexible budget out of the shareholders wealth are the key challenges facing the MNOs and Masary. "*Business model experimentation*" and "*creating a competitive advantage*" are also significant challenges facing these providers. Overall, "*Balance metrics (Online Scorecard grid)*" had to be agreed and co-designed by the providers, the central bank, and the intermediaries. "*Capped level of investment*", "*staff resistance*", and "*lack of unified intranet*" are unsolved problems for the MFIs. This technology was also found difficult by customers of "*group lending*" who used to have face to face meetings with loan officers and do not trust the mobile calculations.

Masary.Co launched its first microfinance initiative in partnership with eight MFIs (see Table 6.2). They are located in eight different cities where financial inclusion recorded the lowest levels for microentrepreneurs. Through this partnership Masary.Co provide loans for the young micro-entrepreneurs, mobile loan tracking, and e-wallet services.

To deliver such services, the company integrated their MMicro and MPS sub-systems and their adhered business systems. This mutual collaboration between donors and their implementing partner on one side, and the private enterprise and its network on the other side mixes the commercial chain with the microfinance chain and links between micro-entrepreneurs and the financial system.

Table 6.2: Partner NGO-MFIs in e-Masary initiative

Name of MFIs	Location	Key Sources of fund
Mawada Organization for Community Development	Kafr El-Shiek	Self-fund & Donations from Masary Co
Dakahlya Businessmen's Association for Community Development	Dakahlya	Ford Foundation & The Egyptian Swiss Development Fund
EL-Basaysa Association	Sharkiya	SFD & The Canadian International Development Agency
REDEC Association	Beni-Suef	SFD & USAID
Assuit Business woman Association	Assuit	SFD& USAID
Sana Association	Sohag	SFD
Feda Association	Qena	SFD
Egyptian Family Development Foundation	Aswan	SFD

ABWA is the most successful NGO-MFI out of the aforementioned eight. Through this partnership, ABWA was able to take advantage of Masary's mobile payment services to track loan payments, disbursements and repayments in real-time and also expand its client base. In June 2011, the Central Bank of Egypt allowed mobile transfer of up to EP 3000 (USD 505) per day via mobile phones (IFC, 2012). As a result of this approval,

Masary's e-wallet service is likely to expand in many fields. The rest of our discussion draws examples from the interaction between the above mentioned networks.

6.3.3.1. Balance metrics and align incentives

E-Masary BoP network creates mutual value for telecoms, SFD, ABWA, and microentrepreneurs. While Masary.Co and telecoms generate economic returns, they create social value for the micro-entrepreneurs and other local stakeholders. This win-win situation maintains the project's sustainability (Prahalad & Hammond, 2002).

In mobile airtime top-up for example, Masary.Co relies more on the performance of their sales representatives and retail agents to expand Masary's brand and increase the company's sales. So the company develops monthly training programs for both reps and agents to get more sales and marketing skills. Then each of them had to achieve a minimum monthly target. However, Masary management did not realize that their sales reps focus their efforts to sell to one or two big wholesalers than to spend more time and money to get to the poor community in villages and hamlets. Despite this, Masary service was intended to link the disenfranchised. In reality it links the more banked people.

To develop a BoP business system, a balanced scorecard is essential to capture relevant information about the economic returns and social impact. Capturing the financial indicators is routine for private companies, but measuring the local social impact is a challenge. The actors of the MMico system and the local community possess knowledge about the local effectiveness, efficiency impacts, and best practices of financial inclusion. This customer-level data represents a source of indigenous knowledge that complements the Anglo-Saxon financial matrices developed by the actors of the MPS. During the pilot stage, the MPS used this data to create inclusive business models in a way that best meets microentrepreneurs' needs. For instance, Masary.Co allied with the SFD to set valid social indicators for mobile microfinance services and transform them into a mobile-based questionnaire. In doing so, the customer receives an automatic phone call after conducting each transaction. "*This electronic questionnaire helps the partner NGO-MFIs to get a feedback loop about*

customers' social indicators such as the assets building capacity, the income increase, the education level, number of dependants and the essential production inputs for their microenterprises" [AWBA's deputy manager in August 2011]. However, *"this represents an extra training and development cost for Masary.Co to facilitate using the service by staff and customers. Masary.Co had to develop a voice command questionnaire that operates in the local Arabic dialect and also offer routine training programs for their sales operators, loan officers, and borrowers*" [Masary's business development manager in April 2011]. New services have associated risks and failure chances. Nevertheless, Masary learn from these risks and failures to improve their business models during the design and deployment stages.

Once appropriate metrics are developed, a track of lessons and best practices (for both the financial and social domains) can be accessible for all parties using an authorised password for the e-Masary grid. This grid is an "online Balanced Scorecard" that holds real-time data for all direct stakeholders. It has been developed by a team of IT specialists from Masary, ABWA and the SFD. The blueprint of this grid was drawn from the "GIRAFE Scorecard" [58](see **Appendix 10**). GIRAFE is an innovative and analytical methodology developed by PlaNet finance to assess the performance and institutional risks of financial inclusion projects. It addresses the project "governance" including issues of decision making, planning, and HR management. "Information system design and bid data analytics" is the second elements of this methodology. This covers human computer interaction, data modelling, minimum system requirements, and programing languages. "Risk management" is the third element, which traces the documentation cycle, internal controls, and auditing reports. The fourth element, or "Activities", covers technical issues of financial service management such as credit risk, portfolio risk, and credit coverage. The fifth element is "Funding and liquidity ratios" that highlights the capital adequacy, liquidity and market risks. The final element concerns with the "Efficiency and profitability ratios"

[58] There are other two commonly used performance scorecards for financial inclusion initiatives in Egypt: the first is the "*Camel system*" that was originally proposed to manage the performance of *the American Federal Bank* and then has been adopted by the microfinance regulators; and the second is the "*PEARL system*" that was developed in Uganda to measure the performance of women-focused microfinance programs.

By the end of the year 2009, the SFD director who is also a senior analyst in PlaNet finance mandated a team of PlaNet finance specialists to train Masary's staff on how to follow the GIRAFFE system and feed it on the grid. Masary.Co also recruited 30 researchers from the ministry of social solidarity to fulfil the same purpose. The pilot succeeded and resulted in a detailed socio-financial scorecard for the e-Masary grid. Examples of its social indicators are an efficient use to I-Score and credit bureau, staff incentives, and staff communication. Other indicators are client-related such as prevention of over indebtedness and respectful treatment, number of complaints and privacy. Furthermore, there are governance and regulatory indicators like internal audit and quality of performance reporting. Developing socially oriented metrics expands beyond technical and financial indicators (e.g. infrastructure and budget). Rather, it should be tied to local impacts that the private enterprises and their local partners are encouraged to deliver. The social indicators are usually long-term and concern with the effectiveness of financing microentrepreneurs toward their wellbeing and poverty alleviation.

After developing this grid, the Central Bank of Egypt could find potential for a controllable and secure mobile money system. In turn, a detailed mobile money regulators framework has been issued inconsistent with the socioeconomic indicators on the GIRAFFE system (Central Bank of Egypt, 2011). This is a clear example of overcoming the regulatory barriers using the BoP business system.

The employees' incentives should align with the overall performance measures. For instance, designs for Masary's operators, retail agents, and loan officers consistent with the performance measures set in the grid to improve their job satisfaction and quality of life (Mumford, 2006). Appropriate incentives include not only promotions, salary increases, or a higher commission, but also social incentives such as training, business advice, and job empowerment to conduct new transactions for new customers. Hughes & Lonie (2007) confirm that mobile money agents carry more responsibility and credit risks than the normal airtime agents, while they take less commission and are restricted to work in the slum areas. To enhance these long-term social indicators, a bonus pool could be saved to reimburse (or reallocate) compensations for those who contribute more towards the long-term socio-financial indicators. At the end of this section, we argue that the balanced performance metrics show how the BoP business system

facilitates embedded business models. However, does it help escalating investment even when success is limited during the pilot stage? This is what we discuss in the next section.

6.3.3.2. Embedded Innovation and Competitive Advantage

In the future, competitive advantage will depend more upon the capacity to generate disruptive innovation and creative destruction through competitive imagination and legitimacy, and to integrate stakeholder interests to create value on multiple fronts (i.e., synergistic value creation) (March, 1991). By doing so, it is argued that firms can improve customer loyalty, build transformational customer-supplier relationships, lower employee turnover, and improved reputation (Berman et al., 1999).

Based on the case of e-Masary, we found it challenging to manage stakeholder concerns while some of them are more important than others and have control over critical resources or centrality in a network. Only in cases of threat (e.g. new legal rules or market pressure) do stakeholders unite and change the way they collaborate. By then, they achieve emerging or transformational change.

Masary.Co experimented with new value propositions for mobile payment, microfinance, and transfers throughout stakeholders' involvement in creating new values, designing new services, and presenting a sustainable (long-term) initiative for financial inclusion.

To be competitive the partners need to manage radical uncertainty by exchanging knowledge among each other and with the community. Knowledge from diverse and dispersed heterogeneous stakeholders, many of whom may be adversarial (e.g. regulators and bankers), prevents the surprise emergence of threats (Hart & Sharma, 2004).

To scale-up, BoP ventures (like all ventures with a goal of long-term self-sufficiency) must create and sustain competitive advantage. But because these ventures must straddle the border between the formal and informal economies, they face unique

challenges in generating that competitive advantage. Unlike businesses operating solely in the formal economy, BoP venture leaders cannot rely on establishing competitive advantage based on investments made within and secured by the firm's protective boundaries or by a country's legal system. Businesses operating in the informal economy must accept the possibility of copyright infringement, the presence of counterfeiters, a limited ability to enforce contractual terms, and the prospect of product adulteration (Hernando, 2000).

Unlike businesses operating solely in the informal economy, BoP ventures cannot rely on a strategy that primarily depends on extracting value already present in these markets, such as accessing locally-available expertise or utilizing a pre-existing infrastructure. These assets may be limited, and also available to other competing firms. Common availability levels the playing field, and nearly all local businesses that operate in the informal economy remain small (Banerjee & Dufflo, 2007).

A good example of innovating new services and creating a competitive advantage is I-Score services in e-Masary. I-Score is a credit rating service normally available in the "I-Score credit bureau" that costs 30 L.E per borrower. The service is currently available for e-Masary's partner NGO-MFIs to investigate the credibility of borrowers and discover double borrowing. The idea of this service came out of the social interaction between NGO-MFIs and their customers that could threat e-Masary's long term sustainability. Due to the mobility nature of e-Masary wallet, many borrowers could escape their loans and never paid them back. In response, Masary.Co (with the help of the SFD) invented a central online platform that links all member NGO-MFIs with each other and the banking system.

In 2011, Masary developed "*the Network of Egyptian MFIs*" in which all member MFIs pay only 5 L.E to investigate the credit history of each new client. This reduced price is more reasonable for microloans. As said by a loan officer, " It is not fair to pay 30 L.E to test the eligibility of a small amount of loan; adding 30 L.E. to 2% nonreturnable advance payment discouraged many of our clients to join".

From the organizational perspective, our participants referred to innovative value propositions for financial services that target the low-income customers. "*The new peer-*

to-peer remittance service does not include third parties such as SFD, CBE, nor the NTRA as providers; rather they just assure the quality controls" [Masary CEO in April 2012].

Public institutions and many governments around the world are facing difficulties due to the difficulties of regulating a system coming from the evolution of IT and cryptography.

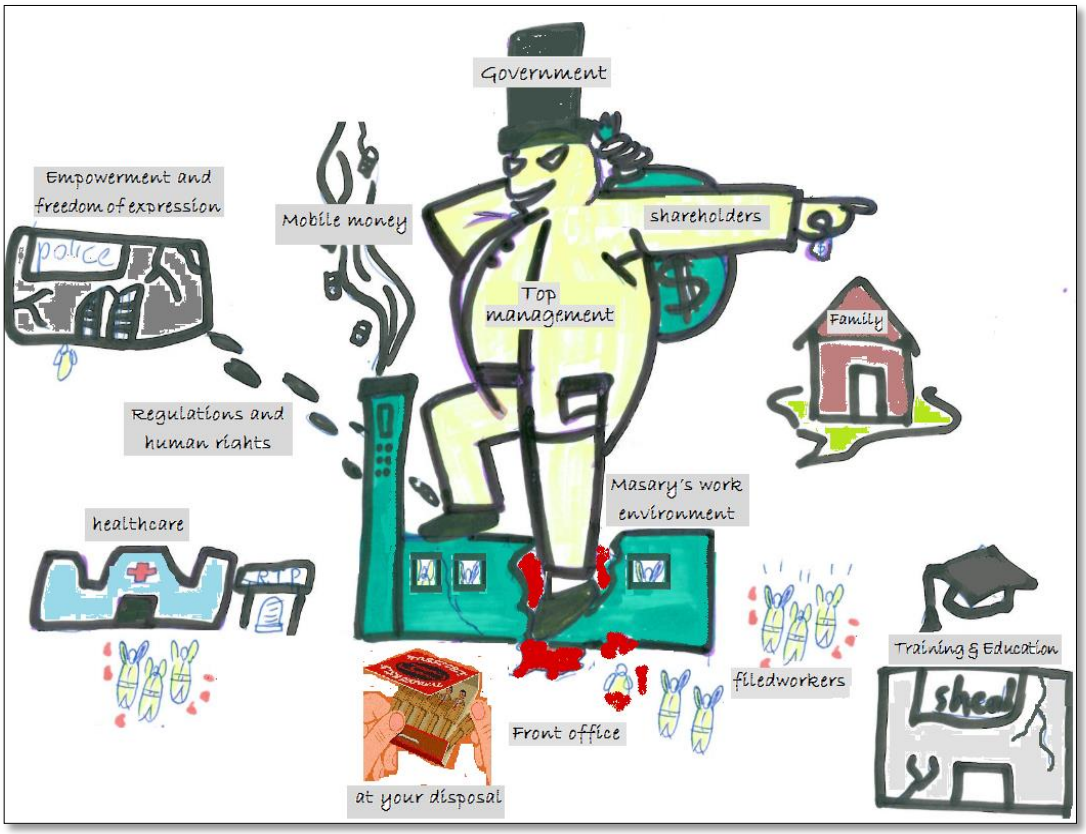
6.4. P Perspectives of e-Masary Implementation

The rich picture drawn from this perspective is centralised on how Masary offer tough work conditions for their team and the loan officers located in the partner MFIs. Masary front office employees and fieldworkers are required to work more than 10 hours a day with only 1000 L.E /month. This is the minimum salary level for private business. To get promoted, operators and fieldworkers need to recruit at lest 10 retail agents and conduct a minimum of 2000 mobile money transactions for customers. As said by a Masary team leader in Minia city "*We offered no health insurance and coverage for economy transportation only. This limited salary is not enough and we have to work with end customers as agents as well as operators*". A female operator in Benisuef city reported that "I feel less secure and stable with Masary, because of the low income and limited chance of promotion.

Masary fieldworkers also reported that "*e-Masary is a new project in Egypt and we do not know what is right and what is wrong. There is no way that we can follow to compare our payment and compensation systems with others. We do not also have staff benefits". The HR manager, replies "We still struggle to issue staff handbook and benefits plan. Our key concern now is to train operators and arrange their national insurance and tax deductions"*

Figure 6.12a: Initial Rich Picture of e-Masary from Personal Perspective

Figure 6.12b: Final Rich Picture of e-Masary from Personal Perspective



Our RP also refers to families (e.g. parents of female retail agents and fieldworkers). The Egyptian slums have conservative culture that restrict women and young age women to stay outside their homes in the night time. "*E-Masary system, however,*

allows our daughters to work from home and conduct phone calls to recruit new customers and expedite the instalment collections" [Customer in a focus group, Sep 2011]. Healthcare provision was also a major problem with e-Masary project. The healthcare service in Egypt is mainly private and requires treatment coverage from Masary.

6.4.1.e-Masary Design

6.4.1.1. Infrastructure aspects

Here we distinguish between the human trust and the system trust. System trust is a technical issue that can be measured using security and privacy scales and constructs. Human trust is, however, social constructed and irreplaceable. Borrowers trust in the loan officers was found crucial to the sustainability of microfinance services.

6.4.1.2. Islamic Finance as a Value Proposition

Following Masary success for Islamic financial services, the national bank of Egypt issued *sukuk*, the Islamic equivalent of a bond. Later, David Cameron announced his strategy to transform London to the biggest Islamic banking city to attract the Middle East investments, $2 trillion Islamic finance market (UK Trade & Investment, 2013; The Independent, 29th Oct 2013). Soon, after the Hong Kong Monetary Authority, the governments of Luxembourg and South Africa issued equivalent Islamic bonds. Accordingly, less resistance will be found for non-Muslim customers in the Egyptian market.

15% of the Egyptian population are Christians who long rejected using Islamic financial services. 2% of the population are Jewish who seem to have the same view of as Christian users. Our focus groups and follow up interviews revealed that Islamic

financial products are catching on outside the Muslim community (The Economist, Oct 8th 2014).

> *"I believe that e-Masary fully operating system will link between the Islamic microfinance and other channels of mobile commerce. It might create a national electronic system for Islamic finance with less resistance from all social groups of Egyptian society" [The SFD' head of the Microfinance sector, in April 2011].*

Interest free microfinance services are available through MAWADA association. This service requires property and job collateral instead of group collateral.

6.4.2. e-Masary Deployment

6.4.2.1. Go-Consumers

Our research revealed some personal issues such as customer's demographic characteristics, and limited understanding of how the MMS works.

Our focus groups included a sample of 300 customers, out of which 33% were male and 67% female. 35 percent had a degree or diploma, 25% had completed Advanced Level (High School), 20% had completed Ordinary Level (Middle School), 15% had completed primary school (junior school) while 5% had no formal education.

All the participants had used mobile money. They were residents of the area of study and 40% percent had personal bank accounts. Of the 25 agents, 80% were female and 20% male. The next section discusses the design gaps for the mobile money service in Egypt revealed by the feedback obtained from a focus group of customers and agents.

6.4.3. Explored Impact: Benefits, Challenges & Sustainability of e-Masary from (P) Perspective

From the personal perspective, top executives of Masary had to have strong business relationships with the MNOs and the software providers to reconcile their conflicting financial interests and offer affordable services at the BoP. Masary's CEO worked as a boundary spanner and extended the e-Masary services via three MNOs (Vodafone, Mobinil, and Etisalat) to assure none of them start his own MMS away from Masary (as a first mover). It was also a strategic market tactic to find a substitute service provider in case of any political conflict with one of those MNOs (Mohamad, 2011).

Section 5.2 shows some other interesting issues from the e-Masary case (e.g. the how to make MMS a Sharia Compliant Mobile Payment system in Egypt, where 90% of the population are Muslims).

6.4.3.1. Low operating costs for Merchants

By using Masary's payment service, merchants can reduce the cost of their products and services as they will be able to bring down their operating costs by eliminating the need to build up their own mobile payment service. Moreover, they will be able to tap into a wider market. By 2010, Masary's payment services had reached a total sales volume of EP 20 million (USD 3.350 million) (Egypt Finance, 14th October 2010).

6.4.3.2. Pro-poor Financial Access

Currently, the e-wallet system allows Egyptians to finance small businesses with 500 L.E (USD 84) without having to rent a shop or premises. The company also has a "Masary's Small Entrepreneur MFI program" which connects MFIs with start-up microenterprise ventures (e-masary.com, 22nd November 2009).

6.4.3.3. Low-cost Services for Clients

Mobile banking offers an e-wallet payment service, money transfer options and most importantly, access to microfinance on a 24/7 basis, low cost, low interest banking solutions and financial aid brought to the rural poor's handset (CGAP, 2011).

6.4.3.4. Women's Economic Participation

In 2009, there were 1.4 million microfinance borrowers in Egypt, 50 percent of whom were women, with a total outstanding debt amounting to 2.2 billion L.E (over USD 370 million) (SANABEL, 2010). The expansion of mobile microfinance will enable more women to take up loans from MFIs, thereby increasing female access to employment and enhancing financial independence.

6.4.3.5. Rural Poor Economic Participation

REDEC, a highly active NGO in Upper Egypt values its partnership with and through Masary as it is able to access the rural unbanked community members on a large scale. Through its "needy job creation program", Masary started to fund small businesses of 100 microentrepreneurs along with the MAWADA Organization for Community Development (Ahram, 21st July 2011). Such microenterprises are expected to gradually empower the poorest segments of the rural community, through generating employment and income opportunities (Adams, 2001). There is a potential for greater outreach with Masary partnering with more local institutions across the country.

Currently, there are 289 institutions offering microlending, of which only 6 are banks and 283 are NGOs (EFSA, 2011). Almost 65% of the microfinance services are catered by six NGOs and one bank. Yet, 90% of the potential microfinance market remains untapped and can be reached by microfinance providers expanding their client base through mobile microfinance.

Mobile microfinance has major potential for replication in MENA and other parts of the world. For instance, CHF International, which provides microfinance services in Iraq, Jordan, Lebanon, West Bank, Gaza and Yemen, intends to rapidly expand its projects by providing mobile payment systems to its clients (Braniff, 2009). Tunisia's microfinance sector which is under pressure for mitigating youth employment could resort to mobile microfinance to tap the unbanked (MIX, 2012). Also in India and Indonesia, where microfinance is largely agent based could expand its client base through their fast expanding mobile users (Kabeer, 2005).

From a personal view, we question the distinction between cultural and technological preferences of a society (Abrahamson, 2011). These two elements influence the digital artifacts (e.g. Bitcoin) used by the businesses and society. For the author, technologies are also subject to periods of gradual evolution. There are some areas in which we can find really exciting applications of VC that also demonstrate the similarities between the virtual and real worlds (Orlikowski & Scott, 2008). Our participants refer to personal issues such as reputation-based incentives, trust, fraud, public media, social networks, anonymity, and privacy as key risks that face them when adopting Bitcoin (Bogliolo et al., 2102). The three perspectives complement each other and offer a rich picture of systematic risks associated with Bitcoin adoption (Reid & Harrigan, 2013; Blundell-Wignall, 2014).

6.4.3.6. New Business Models

Instead of thinking of New Economy companies as mobile network providers, we may think of them as companies that use the mobile infrastructure to create effective mobile financial services (Yoon, 2007).

> *"I buy a quota prepaid from the three partner telecoms and then reallocate the quota to my fellow merchants (retail agents). The telecoms hold the license of the platform, but we didn't. When the telecoms decide to invest in our new services, they disseminate between 30-40 million electronic cash. Sometime Mobinil and Vodafone ask us to deal with their exclusive agent. This motivated us to escape from their control and we tried to get our*

independent license. We have to be at a higher level and allow the three MNOs to be part of our e-Masary system" [Masary CFO, March 2011].

Our mobile money services empower Masary's customers to build social capital and conduct financial transaction to improve their business. Because of this, different business models have been created. Similar examples includes Village Phone program by Grameen Bank, which achieved international acclaim for offering small ''entrepreneurial'' loans to impoverished Bangladeshis who lacked collateral (Selinger, 2008), and the m-banking services provided by the Ministry of the Interior in Pakistan. While working to increase national security, this also provided banking services, while the mobile network provider gains commission from every transaction.

The second generation of mobile technologies enhances customer value via Rich Communication (RC) and Smart Environment (SE). High quality, secure, affordable and real life contents are the components of Rich Communication services. In some contexts (e.g. BoP) mobile telecommunications need to be context-aware, simple, and user-friendly. These elements create a Smart Environment for the mobile users depending on their context (e.g. location, culture, education level). An example of this is the IBM video interfacing software that has been adopted by many people in South Africa.

6.4.3.7. New Educational Models and Institutions

e-Masary system have a major role in the globalizing a new business culture at the BoP. People are increasingly becoming nodes on communications networks, not just in places where they live, study, or work, but globally. "The model of pedagogy is also changing with the growth of interactive, self-paced, student-focused learning" (Tapscott, 2002; 5). For instance, e-Masary system created 12000 job vacancies and resulted in thousands of female owned SMEs.

The e-Masary system has contributed to the creation of a new language between people, a language known as “kashy language”. This language is Franco-Arab language that includes financial words, icons, and numbers to write sentences.

6.4.3.8. New Governance

Masary created a new mobile-driven governance structures, that enhances the accountability of governments, MNCs, NGOs, and citizens who conduct transactions in the informal economy (Mohamad, Dec 2011). Recently, e-Masary system has been used as a platform for M-voting that create a democratic reform of the Egyptian politics. A similar example discussed in the literature, is the impact of 40 million mobile votes in the election of President Barak Obama in the United States. M-voting builds a greater democratic link between citizens and the state.

Mobile telecoms enable NGOs and governments to control the open market and to remove middlemen (Heeks, 2008). An example of this is the M-agriculture provided by e-choupals. This project enabled the Indian government to control the market prices of Indian agricultural products.

In their work experience in the MNCs, Prahalad and Hammond found that bringing technology to rural villages and hamlets builds a foundation for other applications that help create microenterprises and increase the chances of the poor to leap out of poverty (Prahalad and Hammond, 2002a). Examples of this include applications such as tele-education (Rangaswamy, 2009), tele-medicine (Yuanchun & Weikai, et al., 2003), m-banking (Alampay, 2009), m-lending (Yunus, 2004), and weather forecasting and environmental monitoring (Ming-Hsiang, 2004).

Prahalad and Hammond (2002b) found that private IT companies enable shared access to ICT products and services, and in turn differentiate between access and ownership.

This may result not only in a wider customer base, but also in increasing asset efficiency (Endo, 2009). Moreover, the shared access on a pay-as-you-go basis increases the companies' return on investment.

Simanis and Hart (2006: 44) asked for "truly appropriate" technologies and marketing strategies to serve the indigent needs of people at BoP, for example the global e-inclusion main stream of HP in India. Schwittay (2008) thinks that the BoP approach is a way of transforming the social needs of the poor into technical needs that private companies can address using ICTs and business knowledge.

By using Masary's payment service, merchants can reduce the cost of their products and services as they will be able to bring down their operating costs by eliminating the need to build up their own mobile payment service. Moreover, they will be able to tap into a wider market. By 2010, Masary's payment services had reached a total sale volume of 20 million L.E (USD 3.350 million) (Egypt Finance, 14th October 2010).

6.4.3.9. New Sources of Value

The current era is a liberalized one in which knowledge is core for all levels in all fields. Accordingly, personal communication has become a source of value. Today, the airtime of mobile calls represents a source of funding for television programs and in some cases a source of aid to charity organizations (Dholakia and Kshetri, 2002; Coyle, 2005; Heeks, 2008).

6.4.3.10. New Ownership of Wealth

Most economic growth comes from microenterprises. Mobile maintenance services and mobile spare parts have created new paradigms of entrepreneurialism. A further source of wealth from small businesses is the selling of prepaid top-up cards which enables

young poor people to gain income from the profits that the MNCs achieve (Heeks, 2008; Mohamad, 2011).

The founding of the MobileApps Academy for mobile telecommunications [59] and maintenance is evidence of how large organizations can be built around the mobile services. 500 undergraduate students pay annual fees to be educated and to guarantee their places in the biggest mobile telecoms firms (Gerpott & Jakopin, 2007).

6.6. Transformation and the researcher's involvement

6.6.1. System Design

Due to the continuous divide of the e-Masary system, Masary's revenues started to decline in December 2011 (see Figure 6.13). At that time, the author of this thesis was in his fieldwork trying to find a technical solution that integrates the MPS with the MMico systems, a female borrower introduced her personal suggestion as follows:

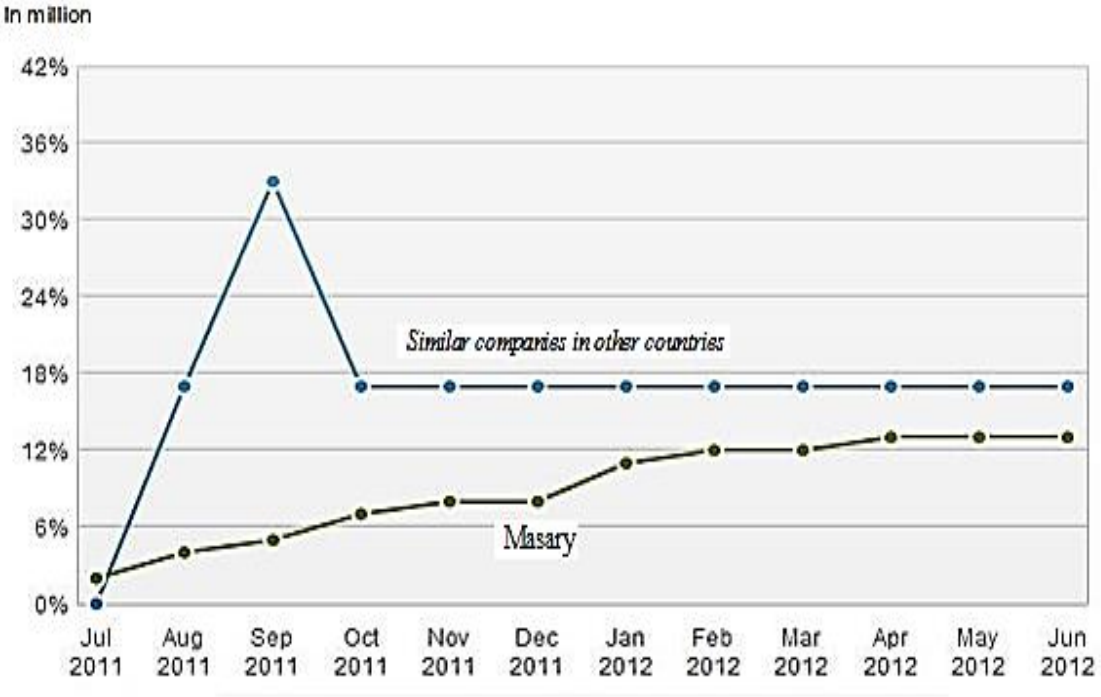
> *"My husband used to steal my loan and spend it on entertainment, smoking, or failure business. I am also afraid that he might divorce and marry another woman with my own money". I prefer to receive to take my loan in terms of tangible products and raw materials, so I can resell or produce a product. Can you partner with all retailers to accept e-Masary credit? Can you also ask the MFIs to partner with you?*

After conducting a focus group with Masary microfinance manager and managers of the three MFIs, we agreed to partner with the retail on shared profit/loss basis. This means that borrowers use their loans to buy tangible products from the retail agents, while we pay commercial (in batch) prices to the retails. The retailers then add a profit margin to sell. This business model does not impose interest payment. However, Masary and their

[59] An Egyptian academy the is founded by Vodafone Egypt which partnering with Egypt's information Technology Industry development agency (ITIDA)

partner MFIs had to study the retail markets in the slum area to maximise their profit and avoid losses.

Figure 6.13: Masary Market Decline due to the System Split



On the technical side, Masary developed a SaaS model that enabled MFIs to use e-Masary system on a pay-as-you-go basis. Then, MFIs pay monthly to use the service. At this stage, we constructed an entity relationship diagram to map the new system (See Figure 6.14). The proposition started to firm up around the design and test of a platform that would allow a customer to receive and re-pay small loans using his or her handset. We wanted to allow the customer to make payments as convenient and simple as they do when they buy an airtime top-up, so a central feature of our proposition was to use the distribution network of Masary airtime retail agents to facilitate this process.

This service should also bring business efficiencies for the MFI and allow it to grow its business more quickly and to more remote locations than is possible using traditional paper processes.

Figure 6.14: Data Entity Modelling for e-Masary Mobile Money System:

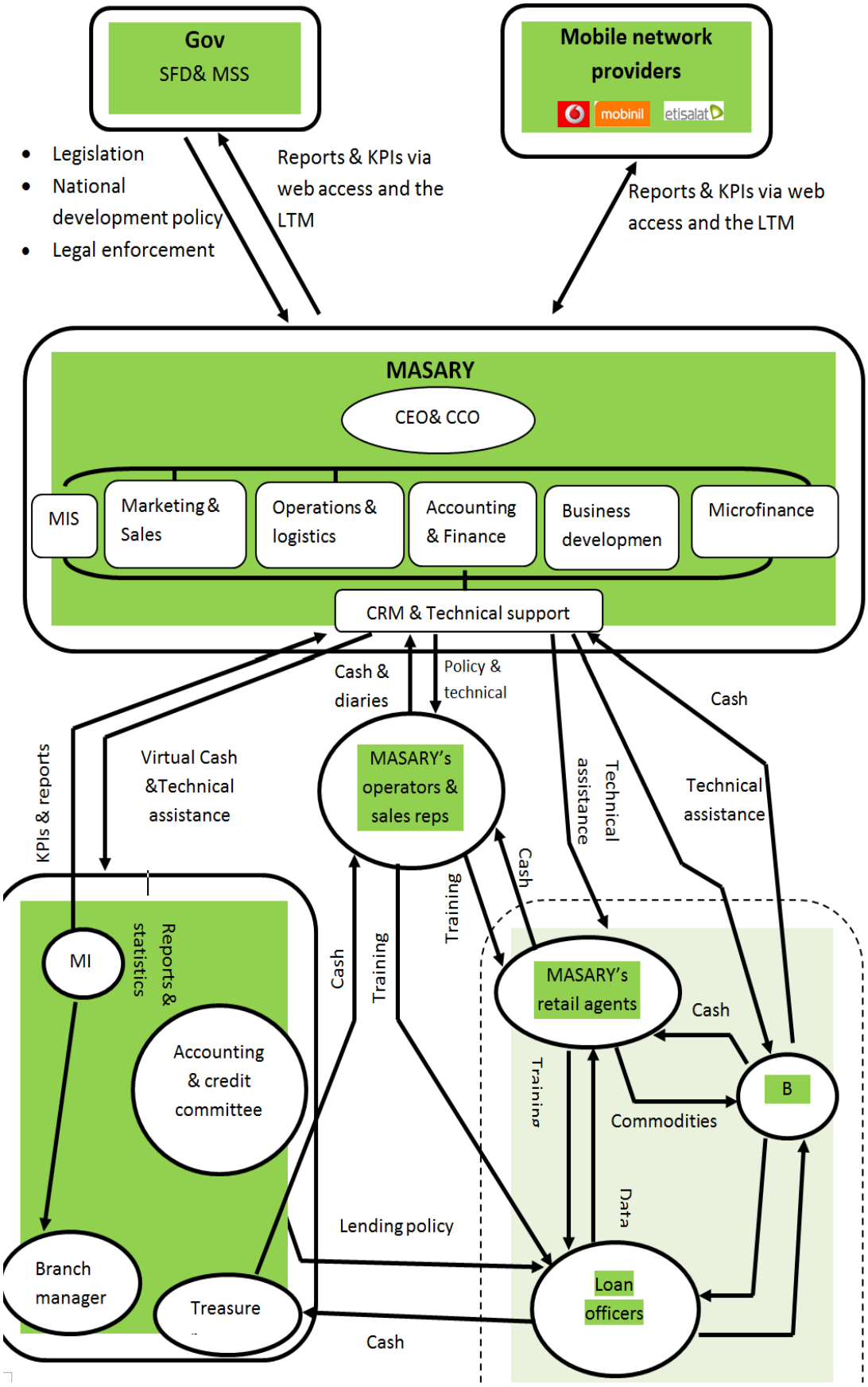
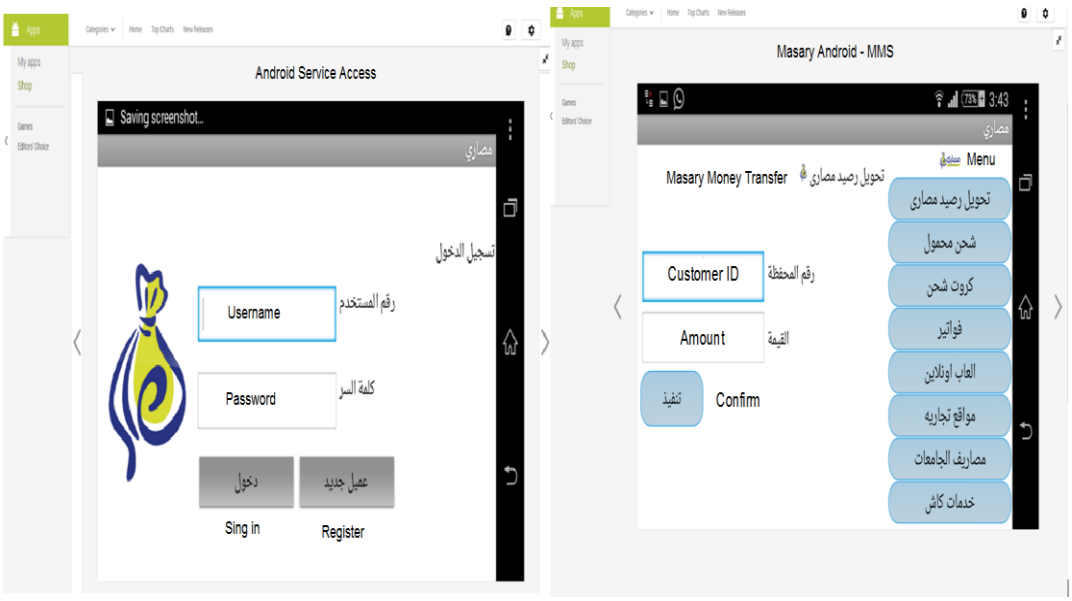


Figure 6.15: Masary's Mobile and Tablet interface

We also engaged in designing e-Masary android that can be installed in smart devices (see Figures 6.15,6.16 & 6.17). These new interfaces have been developed to extend the microfinance services to the customer of MPS and also to attract borrowers to the wide variety of mobile payment and transfer services. Borrowers can use a very cheap Nokia handset available in e-Masary PoS to use the voice-based and icon-based services (see Figure 6.15 & 5.6.

Figure 6.16: Masary's Anroid Tablet Interface



The system development team considered the digital divide issue and the culture difference. In doing so, we developed Arabic as well as an English interface. The new system can now be accessed through traditional mobile devices, smart phones that connect to the web (www.e-Masary.com), and the personal computers through Masary desktop as shown in Figure 6.17.

Figure 6.17: Masary's Desktop and Laptop Interfaces

6.7. E-Masary after the Transformation

This section discusses the potential for the e-Masary fully operating system. We draw alternative scenarios for the Masary corporation, regulators, MFIs, retail agents, and end users. These scenarios clarify the entry modes that can be followed by the system owners to develop MMS and the potential impact for the end users (i.e. Customers).

6.7.1. Entry Modes for the BoP market in Egypt

6.7.1.1. Capitalists' mode

This is a state-led strategy in which a limited standardized set of mobile telecommunication services is provided for business-to-business market and high-income users. The success of this mode comes from replicating the institutional and market ecosystem into new promising markets. It also encompasses high prices and limited institutional use. Telecoms that follow this mode impose a high sales tax on the top of their bills and offer multilink services. For instance, "Telecom Egypt" is the only governmental network provider of mobile telecommunications who granted the license for the three corporations "Vodafone", "Mobinil", and "Etisalat" and provides them with the needed infrastructure and technical support. "Telecom Egypt" can also provide big airtime slots to MFIs to allocate them to loan groups in the villages. Another example is the broadband service available for more than 70 US Dollars per month. The standard users of this service are internet Cafés who used to extend illegal wires and the intranet to their neighborhood community to cover the high cost and get a satisfactory profit margin on top. The capitalists' mode results in limited services in terms of geographical expansion and narrow use within communities.

6.7.1.2. Skimming mode

This is a strategy led by multinational telecoms where they push their services into the developing markets through extensive promotion campaigns. This mode encompasses high quality, high price, and advanced telecommunication services such as web 2.0 applications, 4G services, and electronic payments. Such a mode targets the high and middle income classes. It also helps mobile users in the developing countries to follow the accelerating technological advances and bridge the digital divide. The life cycle of this mode, however, is very short and lacks the "going concern" principle. High competition between telecoms, changing user needs, and a high sales tax makes it easy for the elite users to switch to rivals or alternative services. Another problem in this mode is the focused marketing strategy that covers only the high income class

(estimated 20% of the Egyptian population), while neglects the biggest share of the population that proves to be a profitable market (Prahalad, 2009). Last, but not least, this mode offers a limited number of advances services for personal use as against business use. Services here can only be provided through central (short) distribution channels where users have to deal directly with the network operators and not through intermediaries (i.e. they do not spread in the rural areas).

6.7.1.3. Social responsibility mode

This is a private-led entry mode in which the multinational telecoms partner with NGOs to build trust with the poor communities and penetrate the BoP market. Such a mode commences with a short-term (normally pilot) from the telecoms to increase their reputation by doing good for the disenfranchised users living in the slums (i.e. doing well by doing good). This help can be in the form of financial grants or by selling the mobile telecommunication service with special prices for the poor community. As a prerequisite for this entry mode, telecoms need economies of scale to maintain a fixed flow of surpluses and create socially responsible mutual investment funds (Hamilton & Statman, 1993).

Then the telecoms adjust their traditional marketing mix to target the less-educated low-income users. It offers affordable services within a limited period of time, distributed to particular regions with a minimum quality level. So, sustainability and limited geographical scope of operations are the major challenge of this mode.

Deskilling the customer service and retail staff is another challenge that telecoms face in this mode. They usually rotate socially oriented experts to serve low-income users than to recruit employees from the BoP community to satisfy poor needs and how they are best served. They need employees who speak the same dialect and have the same mindset. The governmental providers are normally marginalised from the service both technically and administratively.

6.7.1.4. Sustainability mode

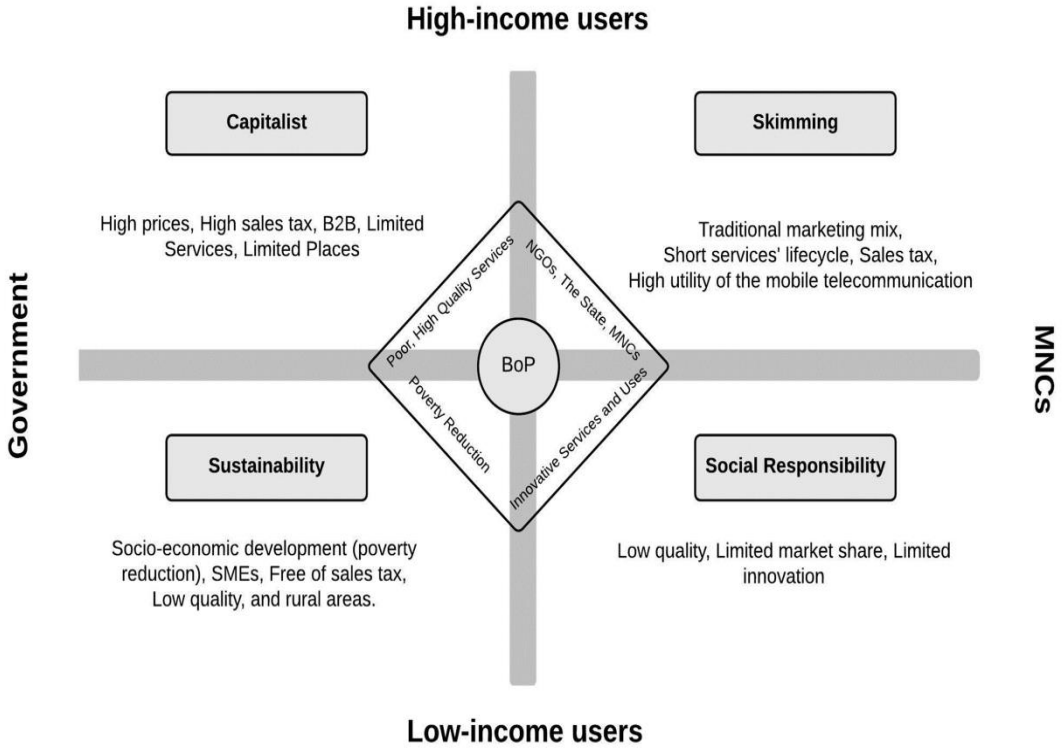
This is a state-led market strategy that serves the poor communities. It requires collaboration with non-traditional partners such as NGOs who have long experience and accurate information about the slum areas. Those partners act as market intermediaries and work on a not-for-profit base and time limitations. Such strategy has a wider outreach in the poor community by helping microentrepreneurs to build their own business using mobile telecommunication as an enabler. For instance, the Social Fund for Development (SFD), a quasi-government financial provider, recruits low-income youths and trains them to develop their skills to work as operators for "Egypt Telecom" and then asks them to train others in the poor community on how to build telecentres. This entry mode is characterised by widespread penetration in the low-income community, low prices, non-profitability, but short-term lifecycle.

6.7.1.5. Base of the Pyramid mode

This is an entry mode that is led by MNOs through full collaboration with the state, the NGOs, and the poor community. They work with various stakeholders to co-create new business values in a sustainable manner (Prahalad, 2009). This strategy tends to maintain mutual socioeconomic return for the stakeholders in "e-Masary". Our case achieved fast penetration of mobile money services in the slum areas, hamlets, and farming areas.

e-Masary succeeded to absorb other mobile financial services "such as Vodafone cash. The BoP entry mode introduces the MNOs as enablers of digital and financial innovations such as m-banking, m-health, m-government, m-cloud computing (Mohamad, Wood-Harper & Ramlogan., 2014a).

Figure 6.18: Scenarios of Telecoms Entry Modes to the Egyptian Market



In this mode, telecoms build special branches (retailers) in the hamlets and to serve disenfranchised people. Telecoms that follow this strategy develop an escalating price policy and user friendly technology for the less educated users. A Vodafone executive says "*Mobile Skype services can be used to call local carpenters, which means a Skype ID book can be issued to look for craftsmen on their own handsets. Mobile users can very easily, and at no cost, call the craftsmen to fix urgent breaks*". A national wide Skype ID can then create more jobs for craftsmen and faster services for the slum areas. Electronic payment for games at the Café shops was another innovative use where teenagers transfer airtime to the manager of the Café instead of cash.

Achieving sustainable growth in Africa is a key millennium development goal. This, however, requires building sustainable foundations that achieve mutual return for the majority of varying stakeholders (Culey, 2014). African business leaders have to play as boundary Spanners across sectors of the economy and learn from the failures of the rest of the world.

6.7.2. Development Scenarios for the BoP

The final section of this chapter draws on different forms of development based on our follow up interview with Masary customers and retail agents after the transformation. The sample has been selected from the three cities to explore their different uses of e-Masary MMS (see **Tables 4.3 & 4.4**). This helped us to get ideas about the degree of empowerment and improve on the poor standard of life (Mohamad, 2011). Based on our transcribed data, we developed the second scenario matrix (see Figure 6.19) that helps setting a vision for the development impact of mobile use at the BoP market. This matrix guides the service providers, the multinational telecoms in particular, how to maximise the potential of the BoP entry mode and to start a deep dialogue with Egyptian society to improve governance of the standard telecommunications and other diversified remittance services. The second matrix, shown in Figure 6.19, is based on two main pillars of socioeconomic development: *location* and *source*. The participatory development studies in the areas of agriculture (see Puri & Sahay, 2007), Biomedical engineering (see Boulos et al., 2011) and society in general (see Wilson, 2002) reveal that the development at the BoP can be top-down, led by the MNOs, or bottom-up led by the disenfranchised community itself. The development might start overseas where the MNOs operate or at the BoP where the poor communities face their daily life challenges. In some cases, the development policy gets designed overseas and then transferred to the local neighbourhoods.

Based on these two pillars, five mobile for development paradigms emerged: Pro-poor, Para-poor, and Per-poor, Per-poor exports, and Networked.

6.7.2.1. Pro-poor

This is a development approach where mobile telecoms design special packages for the poorest communities in their homes in mainly western countries in isolation of the targeted users. Then they replicate their successful experiences in different international

markets through foreign direct investment and transfer the technological infrastructure to the new markets. Despite the prompt impact of this paradigm on the poor community, it is not sustainable in the long term. In e-Masary, low income users absorbed the new mobile telecommunication service to expand their social capital and human networks aiming to secure a fair source of income through their new kiosks and the loans collected from E-Masary and the Vodafone foundation.

Ayshaa, a retail agent, started to communicate FMCGs to help them collect their credit sales from a far area in Assuit city. She then uses her allocated quota to perform business-to-business transactions rather than to sell to individual users. In doing so, Ayshaa saves time and money for the FMCs and secures commissions against her collections from groceries in the neighbourhood.

It has been reported by a senior retail agent that he trained Ayshaa on how to replicate successful cases of Grameen women in Bangladesh. This paradigm, however, is not fully customized for the BoP community and does not help them bridge the digital divide (Kappel et al. 2005). This paradigm takes a long-time to pay back the investment (i.e. it can be interrupted) an observable impact and the payback period of the foreign direct investment take one decade on average (Costa & Filippov, 2008). Further, this paradigm does lead to service improvement and helps telecoms to push their traditional call and data services offered in the western market. Even innovative use, like Ayshaa case, will stay in the informal market.

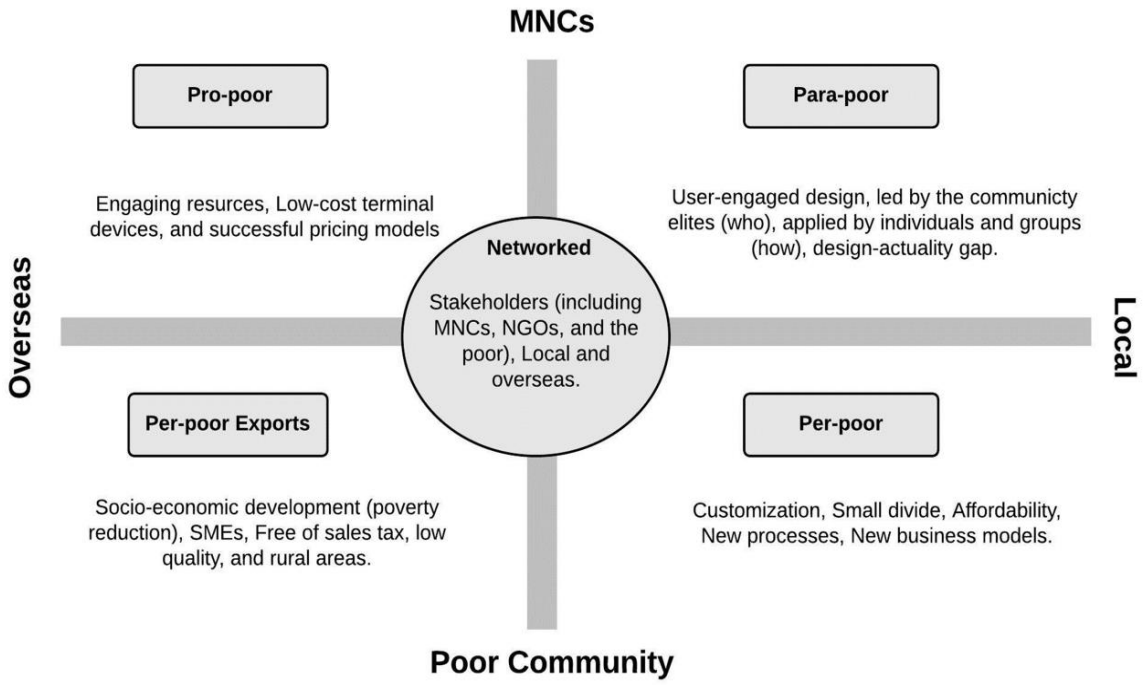
6.7.2.2. Para-poor

This is another development paradigm that arises locally and is driven by the social needs of the poor community. M-PESA in Kenya is a reported example of this paradigm, where the Vodafone Group acquired 40% of the national Kenyan mobile network operator (i.e. Safaricom) to tap the unbanked people in the country with mobile-based financial services. Masary delivered a similar impact through partnership with the ministry of social solidarity and e-Masary to recruit the retail agents. Local customised business model and government collaboration are not enough to assure the

users' satisfaction. In this model, the multinational telecoms create R&D centers located in the area where the service is delivered. However, only community elites and engineers get involved in the system design (including mobile interface) and the marketing mix.

Heeks (2008) argues that this paradigm does not also heal the digital divide rather makes the MNCs think they know what is needed, but they do not really know what it takes to bridge it. A member of "ABWA" loan group said "*We have not been involved; We see the wall of retail agents who have no control over the service. In case of having a weak signal, delay in the airtime top-up, or any technical difficulty, we have to wait for the retail agent to solve it for us. We never meet people from the Vodafone Foundation to tell them about our concern".*

Figure 6.19: Development Scenarios for the BoP Entry Mode



To succeed, the para-poor paradigm requires the collective efforts of individual executives and functional groups to create jobs and microenterprises with and around mobile telecommunications.

6.7.2.3. Per-poor

This is the third paradigm where service design, diffusion, and use take place in the Slums areas by the hands of the local community. Social need and disenfranchising push the locals to invent artefacts and add new innovative uses of mobile telecommunications. Kareem, a retail agent, started using his airtime slot as a store of value to pay for the grocery shop. [*Being an Arabic teacher in a small village, I used to give private courses to students after the school time. I do accept airtime transfer instead of cash; because I can sell to others and get my cash back in my pocket. The student's parents easily transfer the airtime from any distance and do not need to meet me in person. This way also assures the parents that the tuition fees reached my hands and that their kids did not spend it on playing video games at the Internet Café; Said by Kareem*].

Heeks (2008) argue that this paradigm usually leads to new processes, new business models, and perhaps new products/services at the BoP. An example for new processes is texting the street vendors (instead of making a phone call) to place an order and track the order in progress (Donner, 2008). Using airtime (electronic mobile top-up) and a currency is a sign of new business model. Complementary products also get invented such as mobile accessories and ring tones that create jobs for the loan groups and retail agents.

6.7.2.4. Per-poor exports

This is the fourth development paradigm that takes place overseas where the telecoms export their standard call and data services to the BoP market, but offer a license privilege to local exclusive agents in the local market. In this case, those agents customise the marketing mix and deliver the products and services through other intermediaries in the villages and slum areas. They, however, have no control over the technical issues of the service. Our participants reported that Nokia handsets are available for less than $100 US Dollars at the local stores. However, the maintenance

service is only available in towns and is not free. In many cases, members of our loan groups could not differentiate between Vodafone service's technical problems and the device's technical problems.

This paradigm is more flexible than the per-poor paradigm, because it allows the MNCs to economise their scale of operations, while the local agents customise the services and products to the local BoP context (Chen et al., 2007).

6.7.2.5. Networked

This is the last paradigm that we uncovered in the "e-Masary" action case study. It is usually launched by an implementing actor normally a business development company or mobile telecoms who maintain a network of public-private partners. It is based on mutual benefits for all actors as a base for sustainable impact at the BoP. Vodafone's public relations manager possesses a massive business ties with the NTRA, the Ministry of Social Solidarity, and other official. He then opened his doors to a successful entrepreneur and academic Raghda El-Ebrashi who founded e-Masary in the first place. Recruiting youthes from the slum areas and train them as qualified mobile agents was not an easy task for either the Vodafone foundation or e-Masary. So, El-Ebrashi decided to build her team of students and representatives in the poorer communities to select the right people and get them connected to the MMS. E-Masary and their representatives played an intermediary role along with the boundary spanner from Vodafone foundation. The recruited retailers had their own networks of allies in the local community and invented new uses for mobile telecommunication services. While e-Masary offers standard telecommunication services, the project has a unique business web that customises the final delivered service to the loan groups as well as the final users to improve their wellbeing.

6.7.3. MMS and the Re-allocation of Economic Power

Albin (1997) constructed an in-depth conceptual framework of building system dynamics in a multistakeholder context. His model was a revised model of Heroin-

Crime system that suggests four steps to conceptualise stakeholders' interaction; Conceptualization: determining the model purpose, model boundary, shape of the reference modes, and basic mechanisms. Our study also offered a framework of stakeholder interaction and access to the BoP context. In doing so, we used system thinking as a lens to conceptualise our research and explain the antecedent conditions. Afterward, we set scenario models for telecoms entry modes and the consequent development impact. Each scenario has boundaries and stakeholders involved in it. We then offered constructive matrices as shapes of references.

Our next stage is to explain how the interaction mechanisms through which networked organizational structures, and participative value chains relieve economic vs social polarization and return the balance to the equation. In doing so, we present a conceptual framework that is contingent to our qualitative case study. As shown in Figure 6.18, the BoP network (i.e. MNCs, NGOs, the State, Retail agents, and end-users) interact differently in response to the internal and external environment. One of the key internal factors is the shared vision developed by the Vodafone foundation and e-Masary based on which they set policies, regulations, daily tactics, and performance measures. Further, changes in business models (including financial and digital innovations) are performed by the project's staff and the way they inspire the retail agents and loan groups to change the course of actions and open black boxes. Decentralised management would be another essential factor to handle technical and administrative problems in the hamlets and rural areas. Service delivery in this case requires a user-friendly mobile interface. This means developing logo-based and SIM toolkit mobile interface as well as voice commands enabled services to oercome the end-users high illiteracy rate.

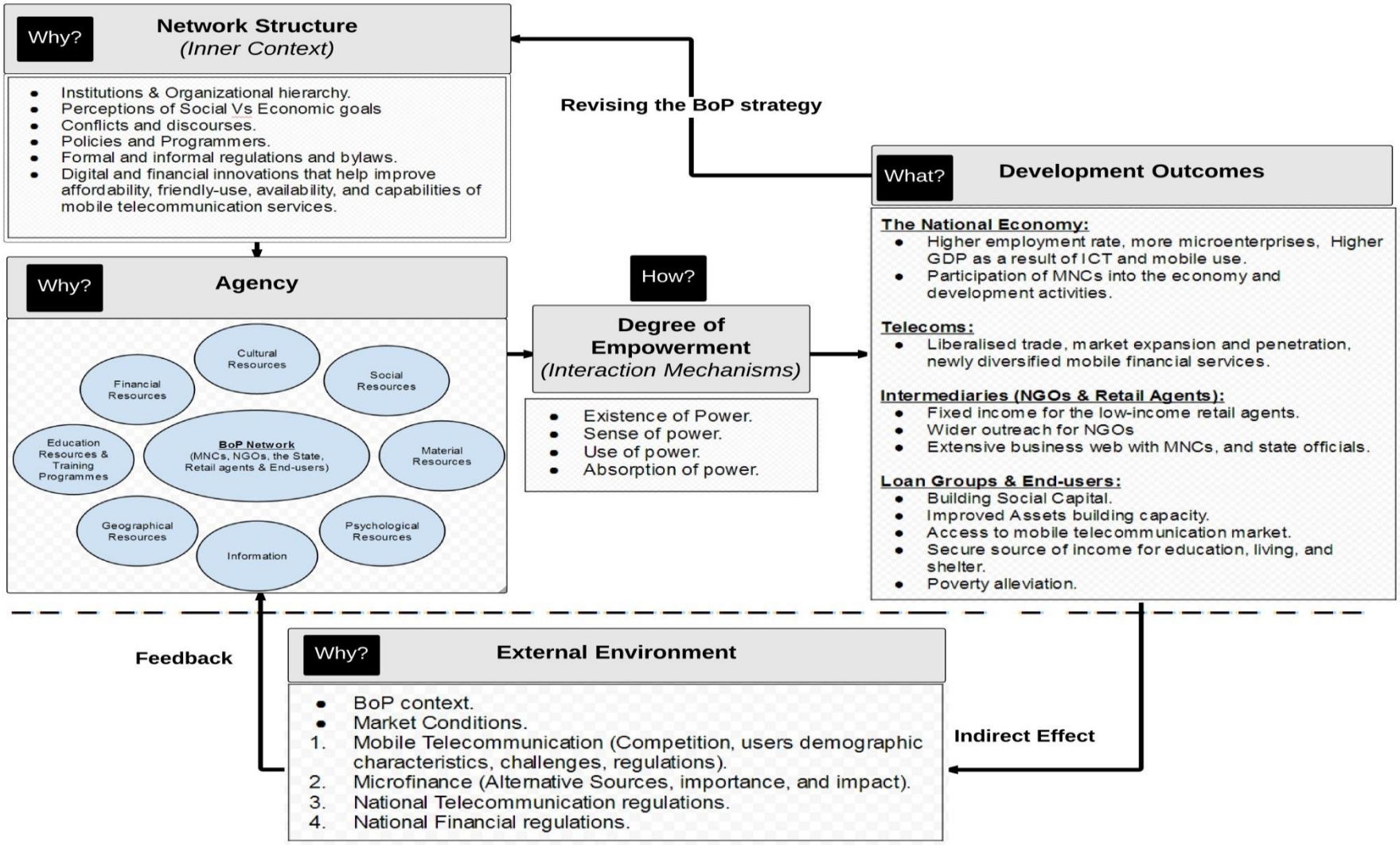
The external environment revealed strong competition between the three mobile telecoms in the market. Such a competition shapes the way Vodafone builds sustainable relationships with other stakeholders at the BoP to secure the biggest market share in the mobile telecommunication market. In doing so, Vodafone succeeded to lead the accelerating move towards mobile payment and money remittance services. High rates of poverty, illiteracy, and unemployment force the poor people to use the microfinance services as a last resort. Limited sources of microfinance and the high interest rate imposed by the money sharks and commercial banks also leave no choice for the poor community to but stay in deep poverty. These factors collectively increased the success

of “e-Masary” and the need to use mobile telecommunication as a source of microfinance that brings a fair level of income.

Each stakeholder (social agency) exchanges a wide variety of technical, financial, and cultural, psychological, material capabilities and gets others in return. In “e-Masary”, telecoms manage the investment, technical infrastructure and assistance, in addition to, offering 24/7 customer service. In return, the telecoms escape from the market saturation and compete with the other two telecoms in new unknown markets (i.e. guerrilla strategy). Then they use the profit margin at the BoP market to reduce prices in the core high and middle-income classes located metropolitan areas. E-Masary holds a wide dataset of social and demographic information about the poor community. They also hold trust-based relationship with the slum communities due to their previous successful projects for youth employment and poverty alleviation. Gradually, both the Vodafone foundation and e-Masary could get full support from the state officials to build legal frameworks for mobile and microfinance that assures security and transparency.

At the core of our framework, we refer to events where stakeholders who share more resources have more power over others. In doing so, they move to upper layers and have more control over the economy. For instance, when the state empowers the MNCs, they will invest more in the economy and create jobs and improve the GDP. In this case the economy will be private oriented and interfere not only on business, but also in politics. Our case evidence shows that the BoP initiatives creates an iterative balance between the economic actors. When the MNCs get tax exemptions and flexible investment regulations, then they need to help the government through helping the public to improve their wellbeing. This means that MNCs get the power, absorb it, and send it back to the state and the public. The BoP then offers power circulation (Al Gore, 2013).

Figure 6.20: Power reallocation framework for the BoP strategy



On the top right corner of our framework, we discuss the outcomes of the BoP entry modes and its benefits for the multinational telecoms, the State and the economy, the NGOs, and the poorest community. At the national level, it liberalises trade and reconcile the power balance between the economic actors. At the institutional level, it helps creating cross-sector innovative value chains. And finally, at the individual level, this approach helps users to create social capital and improve their financial decision making skills (Bessant & Tidd, 2007).

Lessons & Conclusions

Concluding this section, we argue that Masary.Co has uncovered new market opportunities and experimented with inclusive embedded business models to improve the financial inclusion. In doing so, they conducted many partnerships with non-traditional partners (e.g. mobile telecoms) who usually work outside the banking industry. Finally, Masary is still growing (20 million L.E/12% sales increases by the end of 2010), despite their small investment and endless market challenges (Egypt Finance, 14th October 2010).

The TOP perspectives were employed to reconcile the varying views of stakeholders involved in the MMS. In doing so, we aimed to complement the perspectives of technically, organisationally, and personally oriented stakeholders. However, we found technically oriented stakeholders such as the software vendors reject the S-T analysis that has been widely accepted by organisationally or personally oriented stakeholders like the telecommunications authority and customers. This alerted us to mirroring the TOP perspective in a purposeful sample that involved participants who cannot agree on one version of the problem definition and the proposed solution(s).

Following SSM, this chapter offers a systematic thinking about MMS development at the BoP. This context is complex and is stakeholderism oriented (see **Chapter 2**). It is a wicked interacting flux of changing events and ideas which is unrolling since 2007. Within this flux we pinpointed situations (events) which led our thinking. Structuring these situations was set based on the conceptual framework that is proposed at the end

of chapter 3. The first situation in our discussion is system design (including technical infrastructure, value proposition, market access or value constellation, and financial aspects).

The following section describes the case of e-Masary and the network of stakeholders involved. The style of reporting of the case presents a language action view within MMS development (Weick, 1984, Markus & Lee, 1999; Elbanna, 2012).

The role of each actor is not always fixed, rather different actors more forward, back away, or lose ground according to their personal interests in the situation. The mobile telecoms, for instance, wants to keep control over the financial aspect and the credit policy during the design stage, but then during the implementation stage they face the regulators and then decide to back away and leave more space for the system owner (i.e.Masary.Co) to reconcile with the government.

Multiview**4** is a toolkit for MMS development more than a rigid framework that must be followed step by step. Our analysis of the TOP perspectives proved that some elements can be reflected from personal and T & P perspectives, but not from O perspectives. Also, the financial aspects can be considered from T & O perspectives, but not from P perspectives.

CHAPTER SEVEN
CONCLUSION & RECOMMENDATIONS

Introduction:

Our research explores the development of a multidimensional information system at the BoP context where telecoms ally with non-traditional partners who have varying interests. The choice of an appropriate contingent ISD approach in this context was challenging. Multiview**4** framework is a trial to overcome this dilemma. It helps explore the problematic situation and pinpoint the appropriate methodology from three complementing perspectives; technical, organisational, and personal views (see **Chapter 2**). We explored how our intellectual framework – Multiview4 bridges between the information systems and business systems based on which the mobile money system is developed (see **Chapter 3**).

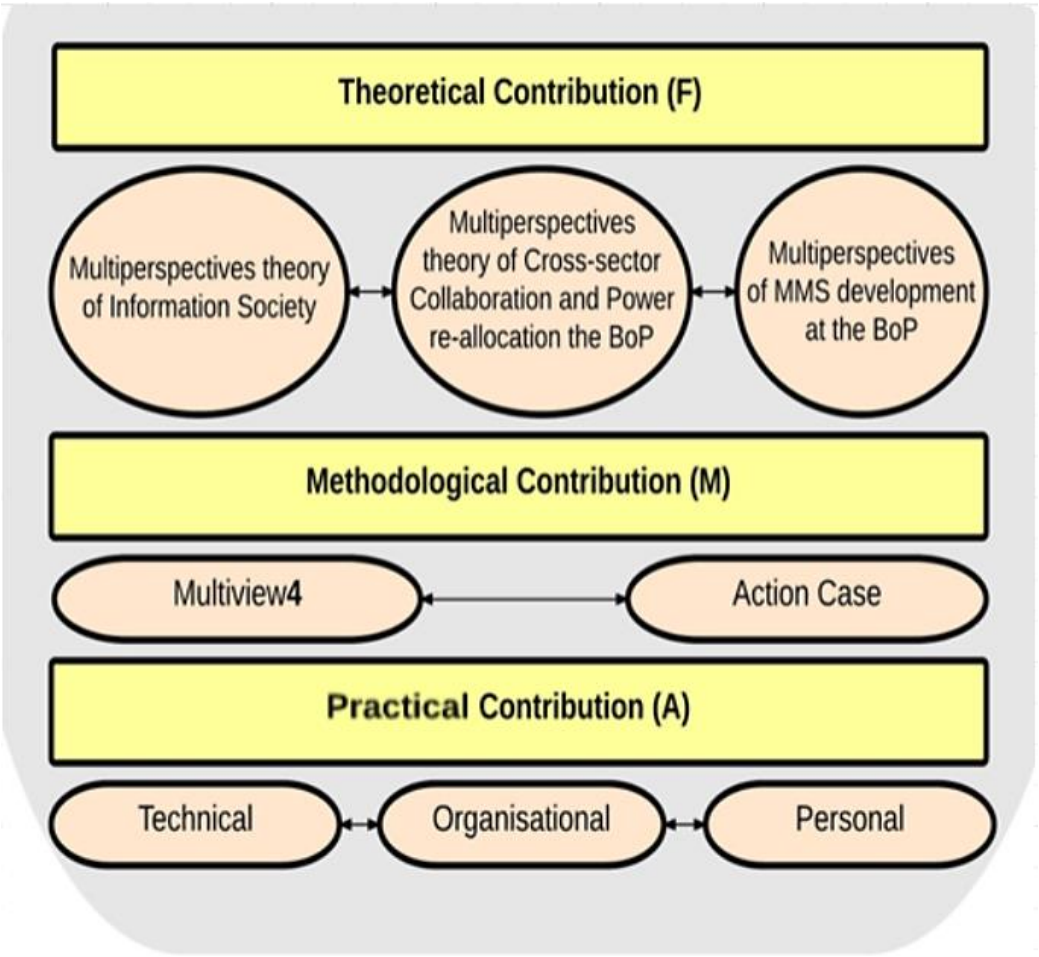
Which research philosophy and research methods were relevant to employ Multiview**4**? How can we use these methods to explore the development of MMS and analyse existing problems from the technical, organisational, and personal perspectives. We then explained all candidate research approaches and methods and suggested the action case study to reflect our learning in understanding the problem of dividing the mobile money system into two separate systems and proposing a transformation/change model to maintain a fully operating MMS (see **Chapter 4**).

The context of developing MMS in Egypt (including alternative sources of finance, mobile telecommunication market, and revolution of mobile money services) has been explored as a problem context. In doing so, we employed Multiview**4** to analyse the natural view of the system owner and how they developed the system in that context. Further, we analysed the owner's strategic plan (see **Chapter 5**).

After the system owner started the system deployment, a problem has been defined from the TOP perspectives. We introduced a change model to reduce the gap between what was expected by the system owner and what was perceived by the stakeholders during the actual deployment. Later, we introduced a foresight/scenario analysis of the impact (including the benefits & challenges) of the MMS during the next 10 years (see **Chapter 6**).

This chapter draws the lessons that we learned at each stage of our research process (including, identifying the area of concern, developing the intellectual framework, selecting the research methodology, and defining the problem situation). Our conclusion includes theoretical, methodological, and practical lessons and contributions that have been discussed respectively.

Figure 7.1: The Structure of Chapter Seven



7.1. Theoretical Contribution

This study bridges ISD, financial inclusion, and development studies. In the field of ISD, our research offers the Multiperspectives theory (Linstone, 1988) as a promising lens for illustrating emerging multidimensional systems as platforms for the information society. Our research revealed similarities and differences between the Multiperspectives theory and other theories of the information society that have been discussed in our thesis. Examples of these theories are the public sphere (Habermas, 1991), the network society (Castells, 2011), the information society (Webster, 2007), and

Socio-technical foresight (Al Gore, 2013). Our research, then offers the multiperspectives theory and a contingent epistemological lens that encompasses the advantages of other inquiry systems offered by the existing information society theories.

After reviewing the BoP literature, we found a lack of a systematic conceptual framework that helps evaluate successful versus failure cases (see **section 2.5 & 2.6**). In response, we used the multiperspectives theory to build a conceptual framework that works as a benchmark for BoP cases. It conceptualises the BoP as a business system for cross-sector collaboration.

Our review of mobile money studies also revealed to the lack of systematic literature reviews that identify key research themes, stakeholders, champions, and methodology employed. In light of multiperspectives theory and Walsham's systematic approach for IS research, we conducted such a review to fill the gap (see **section 2.7.3.1**). In doing so, it sheds the light on how system analysts can explore and understand information system development in this context. All the aforementioned theoretical contributions are discussed in the following sections.

7.1.1. The Multiperspectives theory as a theory of the Information Society

Our TOP perspective analysis considered the triple relationship between the regulators (i.e. the state), the public (customers), and the economic actors (Masary, telecoms, FMCGs etc). Habermas's theory of the ***public sphere*** discusses these three epistemological lenses to understand the information society (Habermas, 1964; Habermas, Lennox & Lennox, 2010). We also found that the MMS is another sort of public sphere where a realm of our social life is expressed and public opinion (acceptance/rejection) of mobile financial services can be formed. It arises when a number of individuals or businesses poll their private votes and engage in conversation to build a public entity like a Sharia-Compliant mobile money provided through Mawada MFI (see **Section 6.1**). They then intend to exercise their freewill and confer their opinions about the general interest in limitless fashion (Habermas, Lennox, & Lennox, 1974).

On the other side, the state authority as public representative, is expected to protect the citizens' well-being. The legitimacy and institutionalisation of the public sphere improves when it possesses such a political influence that obliges the government to offer public access to the public information and the policy making process. The people of this sphere behave more flexibly than business professionals and members of constitutional order. In the MMS, customer and retail agents created new uses of e-Masary system and created special local communities with specific forums and business activities. E-Masary wallet transformed the Egyptian slums into a universal platform for information sharing. A clear example was the I-Score services that could facilitate credit rating services within 2-3 minutes for one L.E.

Microentrepreneurs also exchanged their business experience and the way they use e-Masary reporting system to evaluate their own performance. However, delegating the public authority to control these communication platforms does not guarantee inclusive sharing of information in the public sphere. Downing Street is an example of how state

authority maintains and disseminates public information. Examples of mismanagement have been documented by Webster (2007) who analysed the official leak taken place in Downing Street and consequent disinformation strategies followed by those of the Defense Department, the parliamentary 'lobbyist', and the judicious 'presenter' of government policy. During the 25th January revolution, the Egyptian authority disrupted the mobile signals of the three MNOs and in turn e-Masary system was disabled for two weeks. During this incident, however, the Egyptian authority (Mubarak Regime) managed to access e-Masary database and send electronic SMS to local people with a special warnings from the police stopping people from exercising their freedom of expression.

Habermas's concept of the public sphere has gained popularity amongst those interested in the democratic renewal of society (Calhoun, 1996). Moreover, there are those (for example, Keane, 1995, Dahlgren, 2005, Coleman & Blumler, 2008) who argue that the ICT can be used to re-configure the public sphere. In these accounts a re-constituted, ICT enabled, public sphere may transform the individual into a political actor, a citizen capable of challenging, in the common interest, the public authority or policy issues of the day.

The multiperspectives theory helped us to understand the relationship between e-Masary system as an information society and the public/private interactions of its inhabitants (i.e. Stakeholders). The personal perspective revealed many occasions when the government's interference resulted in the information being tainted. Officers of the regulating parties might have their vested personal interest in misrepresenting the data and reporting packages to 'persuade' people in favour of certain positions, or 'manipulate' it to serve their own ends, or produce it as a saleable commodity that is 'entertaining'" (Webster, 2014: 161). The Organisational perspective offered a deeper insight on how the regulators justify their personal interest in an organisational frame and speak as a representative of society.

Accordingly, we found that the multiperspectives theory offers a wider view of Habermas' communicative action, and public sphere theories and how ISD evolved.

Habermas' epistemological assumption leads to theories of information that facilitate collective liberalisation of society from a 'worse' to a 'better' situation. In doing so, we as system analysts had to intervene in e-Masary system development to relieve problem situations and improve the human condition by creating better holistic systems. We, however, followed a facilitative role where we provided a toolkit (i.e. Multiview**4**) which stakeholders could use themselves as they saw fit, to free their minds to alternatives. Hence, we highlighted the way in which power within systems subjugates those stakeholders (Foucault, 1980; Brocklesby & Cummings, 1996; Jackson & Mazzei, 2011).

Out TOP perspectives revealed a trilogy between e-Masary MMS (as a technology), the Egyptian economy, and the BoP society. E-Masary action case has the characteristics of the so called ***networked society*** (Castells, 1996; Castells, 2011b). Our research has shown a vast amount of empirical evidence about social structure, which is linked to the MMS and economic trends at the BoP (Mohamad, Wood-Harper & Ramlogan, 2014b) (see **Chapter 5 & 6**). As explained in **Chapter 4**, Karl Marx was an anti-positivist who studies the relationship between economy and society as two pillars of social theory. It is useful to be aware of the Marxist interpretation insofar as it influences the theory of the Network Society. The Marxist stance is built on the assumption that society is shaped by an underlying economic base which determines all other social structures and phenomena. Castells' early career has been described as neo-Marxist and his analysis of urban issues as mainly concerned with structure and collective consumption, building on a heritage of Marxism. However, Stalder (2006) notes that the theory of the Network Society remains purposely coy about any direct Marxist references.

If we accepted Castells' theory, we would reach to a technological determinism theory of how e-Masary system would lead to new social forms at the BoP. However, the multiperspectives theory helped us to see the impact of an inclusive system development process where the dynamic social structure of the Egyptian slums shape the MMS as a technology (Marcuse, 2002). Castells distances himself from his earlier post-Marxist stance, that in the Network Society thesis, human actors (or agency) are portrayed as powerless, or free from culpability for any of the structural inequalities in

society. However, the multiperspectives theory brings the power and conflicts of power to the surface. Manuel Castells offers an urban theory that represents the local communities under detention by global economic and technological transformations (Smith, 2002: 111). Instead, our analysis had shown the inanimate networks in the MMS system as a channel for information "flows" that are shaped by the socioeconomic nature of the BoP.

The epistemological assumption behind the theory of the Network Society emerges from "*a substituting form for content, a particular organisational form for a particular distribution of power*" (Smith, 2002: 136). It highlights that this depoliticised, agent-less theory excuses the outcomes of globalisation and has been used to give support to, "*current third way social democracy*" and "*global cities worship*" (Marcuse et al., 2014).

The multiperspectives theory is based on a social constructionist epistemology in the present research. The social constructionist position emphasises the social context within which ideas are generated and exchanged between individuals and groups, ultimately contributing to knowledge which is "*intrinsically the common property of a group or else nothing at all*" (Kuhn, 1970: 210). Further discussion of the epistemology from the point of view of this research is provided in **Chapter 4**.

Our study also addressed *occupational, spatial, and cultural* issues in relation to MMS. The T perspective determined and ignored the social and political changes accompanied with MMS development. However, it covered some economic/financial issues associated with business modelling and value creation. Complementing the view, the O & P perspectives revealed the characteristics of MMS along the information and activity levels (Mas & Radcliffe, 2011). Retail agents, for instance, have the capacity to manipulate information and do not liquid credit for their daily transactions. Sometimes, they enter the wrong amount and delay in sending the money back to Masary current bank account (Mas & Morawczynski, 2009).

The P perspective also addressed spatial characteristics of MMS information. The data entry initiates at the BoP in a real-time dynamic, socially interactive, portable and location-sensitive fashion. Increasing the number of customers and partner MSPs leads to an exponential expansion of system output (Tapscott & Williams, 2008). The widespread diffusion of the e-Masary system along 26 cities led to an open innovation system that reflects the indigenous environment of different socioeconomic classes in Egypt. Both P & O perspectives covered the social structure of the BoP communities (e.g. loan groups) and their sharing behaviour and motivation for using e-Masary system.

Our study also referred to Frank Webster, who defines the information society as a mix of five types of realities; technological, economic, occupational, spatial, and cultural. His ontological stands require a Singerian approach to hard and soft systems thinking (Mason & Mitroff, 2015). Webster's technological view digs deep in the technological advances and their impact on the reconstitution of the social world (Webster, 2014). In **Chapter 2**, we referred to his book "Information Society Theories" the offers three waves of technological innovation. Such advances have the capacity to enhance economic success; education and the democratic process have stimulated much discussion. The economic view reflects a picture of the financial impact accompanied with those technological advances. Both technological and economic realities require causal quantitative methods to understand the information changes. The other three types (i.e. occupational, spatial, and cultural) require qualitative tools to understand the social systems within the information society. These five views suggested by Webster (2007 & 2014) offer different definition ex post facto reasoning of the so called information society.

Our discussion in Chapters 5 & 6, proves the multiperspectives theory offers an equal insight to Webster's view of the information society. However, we regrouped his five types of ontologies in three points of view and offered a Kantian participative approach rather than a pragmatic Singerian one.

The multiple perspective theory also offered a futuristic (foresight) view of e-Masary system (see **Chapter 6**). Our discussion in **Section 4.3.1**, referred to Al Gore's view of the world future trends (Gore, 2013).

The multiperspectives theory, however, offers wider ontological assumptions and considers the impact of technicality/rationality on the human life.

Appendix 9 offers a detailed comparison between the multiperspectives theory and other theories of the information society based on their definition, ontological, and epistemological assumptions. It also lists some examples of previous studies that adopted alternative theories of the information society.

7.1.2.Multiperspectives Theory and Islamic Finance

In this research, we deal with Multiperspectives theory as a diversity orientation. Page (2008) argues that diversity exists in the way we perceive the problem situation (i.e., diversity perspectives), or in stereotyping and mapping the problems (i.e., diverse interpretations). Diversity can also be found in the proposed solution of the same problem, defined as diverse heuristics. The last type of diversity comes from the way we draw the cause and effect relationship to forecast the future outcomes of the problem situation (i.e. diverse predictive models).

Islam has brought about an essential human morale, namely the principle of "Shura" or "Consultation". The "Shura" chapter was named after that principle to clarify how important it is to manage the affairs of Muslims. It urges decision makers and/or problem analysts to poll the opinion of the stakeholders or their representatives over their issues to govern the problem situation (Sulaiman, 1999; Ayubi, 2004). *Allah's saying: {And consult the believers in their affairs (of moment)}* (Holy Quran, Al-Imran: 159). Scott Page revisited this principle, and found that "collections of people with varying perspectives and heuristics outperform collections of people with homogeneous views" (Page, 2008). This also confirms what is mentioned in Quran *{Do not dispute*

and [thus] lose courage and [then] your strength would depart; and be patient} (Holy Quran, Al-Tawbah: 159).

Fostering such diversity enhances innovative synergy and creates a highly diverse menu of business ventures with hyper-connections (Al Gore, 2013). Developed economies with a widely diverse population such as USA foster their continuous growth through immigrants who develop innovative ventures (or diverse heuristic solutions). However, overemphasis on diversity results in cultural conflicts, miscommunication, and decreases the chance of agreement between different stakeholders. They are also expected to use different planning horizons.

Our TOP analysis in **Chapter 6**, confirmed that the multiperspectives theory can help address financial issues on Islamic mobile money services (including profit sharing principles, zero interest business models, and risk management. In the P perspective, also shown how religion is an important factor in customer utility and acceptance of MMS. The O perspective, however, was limited to explain issues of consensus and compromise procedures on Islamic finance.

7.1.3.Multiview4 a methodology for exploration, problem solution, foresight analysis

Multiview**1** has been developed as a framework of IS definition, while Multiview**2** has been employed as a methodology to explore the whole process of ISD in an ethical manner. Multiview**3** was abstracted to a research method to study the urban context (including agriculture, economic development, and financial information systems) (Bell & Wood-Harper, 2014a). The third version (as a method) works as a self-analysis tool, where owners of the system decide to develop a new information system (Bell & Wood-Harper, 2014b).

As discussed in **Chapter 5**, Multiview**4** could be used as an evaluation methodology where the expected/rational plan of the ISD proceeds. This view contributed to Linstone

(1989) who argued that the technical view can only help define the problems in the technological design. He also added that the system deployment cannot be investigated without incorporating the Organisational and Personal views. This theory, then, assumes a single sided process for system design and a participatory approach (e.g. prototyping) of the system deployment (Linstone, 2010).

In multidimensional systems such as the MMS, it was challenging for the system owner to include all relevant stakeholders in the pilot stage (see **Section 5.2**). Such a system is led by MNCs who usually experiment from their own point of view. In doing so, they conduct a pilot study to set a corporate plan for the system design and deployment, however, within their closed doors. Masary.Co, for instance, mandated the author of this thesis to engage in a late stage of the system's pilot. His role was more evaluative and facilitative than as a developer. In doing so, socially constructed analysis, such as the HHA has been employed to explore the natural/rational view of the whole ISD process, including design and deployment. The technical side was also important to reveal the entity structure underpinning the system to highlight the perceived problems within a year of the system operation.

The previous versions of Multiview separated the T perspective on one side and the O & P perspectives on the other side. Merging the three perspectives together, then gives the whole systematics picture. However, our research led to the conclusion that the TOP cannot be separated and then combined. We realised that the T and O & P are two faces of one coin. As shown in **Figure 6.1**, we employed the TOP perspectives to evaluate the system development plan and define the potential challenges. Then we used them again to explore the perceived view of multistakeholders on how the development plan has worked for them.

In **Section 6.6**, we also used Multiview**4** as a problem solving methodology by proposing transformations in the technical, organisational, and personal sides of e-Masary system. We found that at the BoP context the TOP perspectives are complementary, not just because of the complementary ontological and epistemological

assumptions, but due to the connection between the BS and the IS. Planning the IS takes place alongside planning the BS. In this sense, developing MMS requires tackling both of the Information Systems and Business Systems (or Business Model) domains (Eriksson & Penker, 2000). In **Chapters 5 & 6**, we found that the T perspective of IS complements the O&P perspectives of the BS and vice versa.

In the MMS, BS reflects an abstracted map of the main arrangements for *joint architecture, operational and financial activities as well as products/services required to achieve the organizational vision* (Al-Debei, El-Haddadeh & Avison, 2008: 8).

7.1.4.Developing multidimensional Information System builds a Cross-Sector Business Web at the BoP

Our research revealed that the BoP as a business system builds a cross-sector collaboration and governance. Following this business system helped bank the unbanked and alleviate their poverty (Prahalad and Hammond, 2002: Vidgen, Avison & Wood-Harper, 2002) (see **Section 6.7.1**). We examined how our systems thinking theorization offered a new insight for the BoP strategy and brave the road for mixing the philanthropic MMicro and the commercial MPS to offer a new market approach.

Our findings referred to four versions of the BoP business system. **BoP1.0** provides a convincing argument for bankers to view the unbanked as a missed market opportunity full of consumers, producers, and entrepreneurs (Prahalad & Hart, 2002; Akula, 2008; Prahalad, 2009). It also offers a vision of how microentrepreneurs develop viable business systems through the right mix of mindsets, resources, supply chains and collaborations (London & Hart, 2004; Seelos & Mair, 2007). Other generations of the BoP strategy have been developed (**BoP2.0, 3.0 & 4.0)**.

The second generation, **BoP2.0**, offers a cross-collaboration system where multinational corporations and the local community co-create a fortune[60] rather than find it throught

[60] As discussed in section 3.1.2.2, this fortune emerged from economic and social impact.

an untapped market segment. This close intimacy helps both parties to co-invent new value propositions and deliver a win-win situation (Simanis & Hart, 2009). The recent political and economic reforms (e.g. Arab Spring) suggested a decreasing role of nations-states in the economic and social wellbeing, including poverty alleviation (Al Gore, 2013). Karnani (2009) questioned the role of governments in creating efficient market conditions that protect the poor from unethical marketing practices. The central bank of Kenya and the minister of finance facilitated the expansion of M-Pesa beyond the strict banking regulations in the country and issued customised security and privacy rules (Hayes & Westrup, 2011). Government intervention helps collecting more information about the community's physical and social needs and also motivates building relevant consumer protection agencies (Uppal and Malik, 2009). In response, a third wave, or **BoP3.0** started to enhance the trilogy of the multinational corporations, community, and the state (Arora & Romijn, 2009 & 2011; London & Hart, 2011).

The **BoP4.0**, however, emphasises the interplay of the NGOs (including the international aid organizations) in the public-private partnership in which private enterprises (local and multi-national), and the local community work together toward reaching social objectives byproduct of achieving economic returns (Prahalad, 2009; Simanis & Hart, 2008). These intermediaries interpret the points of view of MNCs, the state, and community and catalyse the deployment of new business systems (Arora & Romijn, 2009 & 2011). This recent version of BoP, helps perform what is "right" for the stakeholders, co-creates and pilots business models in deep dialogue with the poor (London & Anupindi, 2012). In turn, a socially embedded competitive advantage gets created and mutual value creation can be achieved (London, 2009). The **BoP4.0** calls for public-private partnership, where the public offers a top-down philanthropic business system and the private sector develops a bottom-up commercial business system. In Figure 7.2, we present a systematic comparison between both approaches in terms of inputs (floor) and outputs (ceiling).

The MMicro system, on one hand, has a solid floor as a philanthropic - based system. Donors and/or governments replicate the design of previous financial inclusion projects. They invest a certain amount of resources following preset policies adopted from the best practices in these projects. Its ceiling is usually well established in terms of time, investment amount, and evaluation metrics. The predefined list of resources gets

transferred within that time frame to achieve well-known performance measures. However, the sustainability of such a system remains less certain because it aims for wider impact, but in a short period of time. It might also tie the microentrepreneurs into a closed loop of poverty when s/he relies on aids to run a business (Hulme & Arun, 2011).

The MPS, on the other hand, starts with careful steps and minimum risk as a commercially-based system. In doing so, private businesses invest less money and take small-scale experiments. Despite their lower floor, this system relies on continuous testing of co-created indigenous business models that result in a higher ceiling. In many cases, the enterprise design is doomed to fail and its pilots may be deemed unworthy of further investment. However, a substantial long-term impact is usually assured once feasibility is managed and resources are allocated. Private enterprises usually set a strategic plan for the way they experiment, design and deploy their business model including sustainability and scalability measures. If the design and piloting go well, then an enduring and widespread impact can result.

In a number of important respects, both of MMicro and MPS are complementary and work together within certain contexts. Effectively integrating these approaches, however, still remains a major challenge. As discussed above, the MMicro system is increasingly employing a facilitate (help them do it) rather than a structural (let us do it ourselves) approach (Porter & Kramer, 2011). Donors and/or governments are more willing to work with the private sector to help encourage firms having more direct interactions with local producers in their procurement or distribution efforts. In the same way, private enterprise, make voluntary investments of financial, managerial, and technical resources to address specific poverty and financial inclusion issues following the so called “Corporate Social Responsibility” principles.

Figure 7.2: Mobile Microfinance System Vs Mobile Payment System

	Mobile Microfinance System	Mobile Payment System
Floor	**High Floor** • Massive Budget for Investment. • Preset policies for financial inclusion. • To-do-list of activities and procedures. • Transferring existing resources to the targeted market.	**Low Floor** • Limited Budget for initial investment (London & Anupindi, 2012). • Experimentation of new policies for financial inclusion. • Iterative learning cycle of activities and procedures. • Reduce the risk associated with resource transfer.
Ceiling	**Low Ceiling** • Short-term deployment and disbursement of investment (Newman, 2008). • Predefined termination date and procedures. • Wide outreach, but unsustainable impact (Hulme & Arun, 2011). • Wasting the unused resources before the deadline.	**High Ceiling** • Escalating and growing investment (London & Anupindi, 2012). • Termination date is tied to economic feasibility. • Indigenous business model and competitive advantage. • Transferring the unused resource and switch to another feasible investment.

Adopted from Mohamad, Wood-Harper & Ramlogan (2014)

Our study offers the e-Masary action case as an evidence on how BoP cross-sector collaboration creates an inclusive embedded business system, including new distribution channels, value propositions, and scaling strategies in the poor market. Such collaboration offers a hybrid of both philanthropic and commercial business system and grasps their advantages as shown in the matrix above. It also helps overcoming the profitability, infrastructure, and regulation challenges discussed in the first section.

7.1.5.Developing multidimensional Information System Re-allocates the Economic Power among stakeholders

As discussed in **Section 6.7.3**, our research suggests that stakeholders of the BoP initiative collaborate to grasp its full socioeconomic potential. In doing so, we

suggested the theory of power to highlight the shift of low-income people to the middle class by absorbing more economic power (income building capacity). In doing so, mobile telecommunication as a commodity transforms the informal market (the slum) into a more productive and organized market. Then economic power can be transferred to the poor with low intervention from the government. Accordingly, we have been pushed to rethink the theory of the invisible hand of Adam Smith. The incremental transformation offered by the BoP strategy leads to radical changes in terms of new mobile uses and developmental impact.

We then explained the interaction mechanisms through which networked organizational structures and participative value chains relieve economic versus social polarization. In doing so, we presented a conceptual framework that is contingent to our qualitative case study. As shown in **Figure 6.18**, the BoP network (i.e. MNCs, NGOs, the state, retail agents, and end-users) interact differently in response to the internal and external environment. One of the key internal factors is the shared vision developed by the Vodafone foundation and e-Masary based on which they set policies, regulations, daily tactics, and performance measures. Further, changes in business models (including financial and digital innovations) are performed by the project's staff and the way they inspire the retail agents and loan groups to change the course of actions and open black boxes. Decentralised management would be another essential factor to handle technical and administrative problems in the hamlet and rural areas. Service delivery in this case requires a user friendly mobile interface. This means developing a icon-based and SIM toolkit mobile interface as well as voice command enabled services to compete for the end-users high illiteracy rate.

7.2. Methodological Contribution

In this research, we followed the Kantian inquiry system to understand the MMS as a multidimensional information society. We believed that our minds bring a set of categories through which we organised our experience of e-Masary system development processes. Such experience has been mediated by the TOP categories and

tools embedded in the inclusive Multiview**4**. We used this methodology (i.e. Multiview4) as a priori' theory that hlps our understanding of the MMS at the BoP context.

A justifiable mix of the SSM, Multiview**4**, and action case strategy had been chosen to launch engaged scholarship in developing the MMS for the Egyptian unbanked (Van de Ven, 2007a&b; Mathiassen & Nielsen, 2008). This mix led to the following lessons and contributions that have been drawn from **Chapter 4, 5 & 6**.

7.2.1.In relation to the SSM

SSM was adopted as a research process and is reflected in the thesis content as well (see **Table 2.2**, **Figure 4.8** & **Figure 6.1**). The FMA technique was part of Checkland's SSM that we employed in comparing different systems thinking approaches, and in comparing different theories of the information society. SSM helped as contributing toward a new ISD methodology that started from a systematic review (see **Section 2.7**) and turned to be a systematic holistic ISD methodology.

7.2.2.Multiview4 as an inclusive methodology for business and information system development

The intertwining between the IS and BS theories was found useful to explain the collective mindfulness behavior of different actors involved in the development of MMS (Carlo & Lyytinen et al., 2013). The 21st Century witnessed unpredictable and unforgiving environments in which businesses develop technology that helps them act carefully with collective mindfulness and handle dialectic tensions. Technologies in this sense are enacted as multiple, contradictory technologies-in-practice that can fit together without understanding the BS underpinning (Lyytinen & Damsgaard, 2011). None of these theories could help answer the main research questions raised earlier. However, we proposed Multiview framework (underpinned by the multiperspectives theory) as a stronger candidate to explain the phenomenon of developing MMS in the

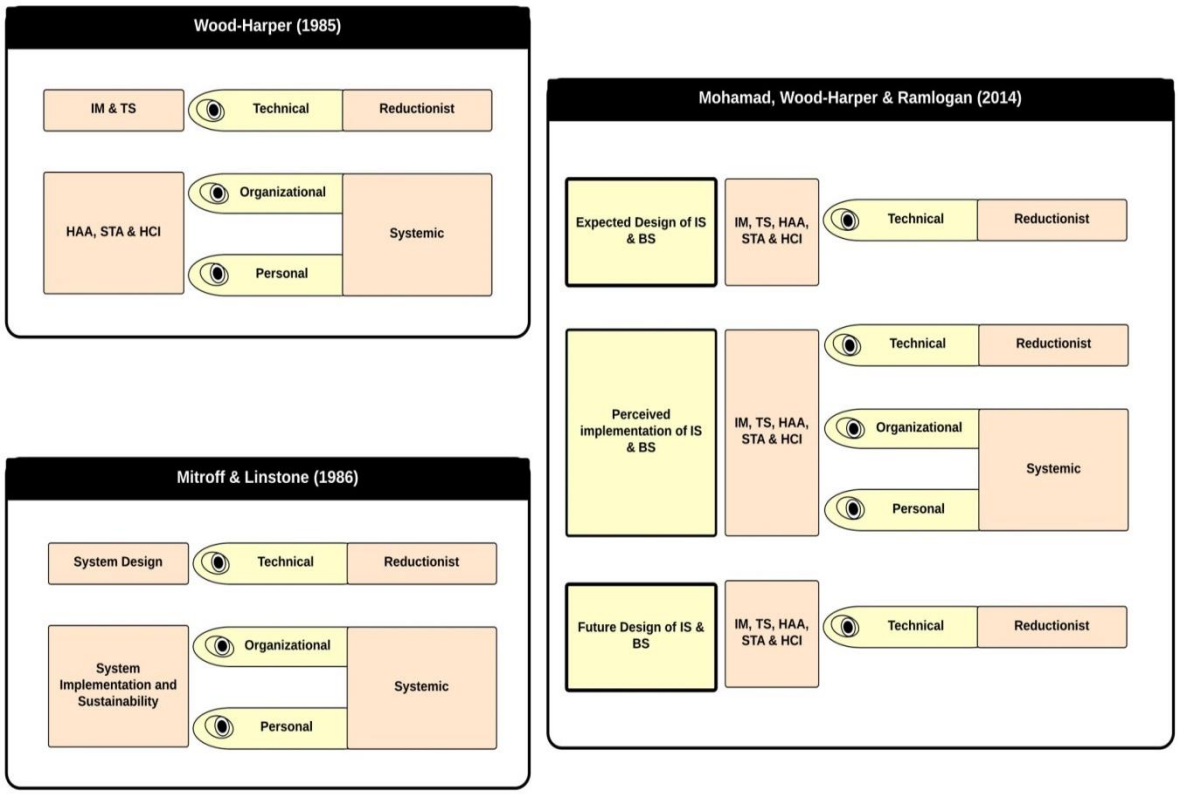
complex unpredictable (wicked) context at the BoP. Multiview**4** offers not only an ISD toolkit, but also a toolkit for BS development. MMS have been challenging to analyse and implement because of the complexity of the multidimensional markets that underlie the payment solutions (Rochet & Tirole, 2003). Such complexity requires adopting a multiperspectives inclusive approach such as Multiview**4** (Ondrus & Pigneur, 2006; Ondrus & Lyytinen, 2011).

As shown in Figure 7.3, the original version of Wood-Harper and his colleagues suggests Multiview as an epistemological approach where the information modelling and technical specification analysis follow hard systems thinking, while the other three stages of Multiview follow the soft systems thinking.

Mitroff & Linstone's view is not based on epistemological stands; rather they reflect their wide experience in system design and deployment. Their early published research about Multiview considers the technical view as a tool to analyse the design of a technology, while the personal and organisational view cover the system implementation and sustainability (i.e. deployment process).

Multiview**4** offers a toolkit that is developed by the analyst(s) and delivered to the problem owners to use it in a contingent manner. For instance, the HAA (including stakeholder analysis and system strategic plan) usually takes a technical form when system owners (in this case Masary.Co) recruit an international consultancy company to conduct it. Rather, they need to recruit a local business consulting company or send their own team to conduct a socially oriented HAA analysis that reflects the real Multiview of the situation. The Mutliview**4** helps evaluating the past, the present, and offers a better view for the future. However, it depends on how the problem owner includes stakeholders in the choice of methods to match the desired business and information systems.

Figure 7.3: Multiview4 as Business System Development Methodology



7.2.3. In relation to research design

The set of data resources used and particularly focus groups was found unusual in our systematic review of the mobile money and payment literature (see **Appendix 1c)**. Focus groups were found useful to reflect multiperspectives of participants and shows how MFIs' senior managers and retail agents intentionally misinterpret customer needs. Our research design was developed based on participation manner where the system owner and relevant stakeholders have been involved in our choices (see **Figure 4.8, Table 4.3**). Our sampling rationale was also explained in **Table 4.4** to link the way we draw analytical themes to the literature and the participants' own perceptions and choices.

7.2.4. In relation to data analysis

As discussed in **Section 4.5**, our data analysis included drawing rich pictures, CATWOE analysis, and template analysis using NVivo 10. While we practiced these tools, we reached the following conclusions (see end of **Chapters 3, 4, 5 & 6**).

1) Developing DM analysis for multidimensional systems is a complicated process that requires involving relevant stakeholders and change actors in a prototyping process starting day one. Against what we found in the literature multinational corporations (e.g. Masary Co and telecoms) who invest at the BoP prefer a rational/technical plan of a system that was successfully developed elsewhere (e.g. M-Pesa) without considering the nature of the new context and the interests of the stakeholders in such a new market.

2) Drawing the ERD and the DFC for multidimensional system cannot be in one piece. Due to the high complexity, the analysts need to develop an ERD for each group of stakeholders and then show the connection between the individual ERDs and DFCs.

3) Multiview**4** has been employed as an exploration to analyse Masary's view of system development. Some stages such as the S-T analysis were not found useful, because of the retroactive involvement of the researcher/analyst after the system was developed in the first place.

4) Some elements of Multiview4 as a methodological toolkit could be employed within the elements of MMS development, but other elements had to be kept in isolation and added as an additional entity to the framework. For instance, the DM analysis would be clearer if kept as one core element that to be part of the infrastructure and value proposition elements. Adopting the DM analysis as part

of the value proposition evaluation serves the S-T analysis rather than the DM analysis.

5) The single technical view of the system developer does not help build a plan for sustainability. It excludes the stakeholders of the system development process and shows more benefits than challenges, which decreases the necessity of a sustainability plan.

6) It might be difficult to draw one RP to represent a single perspective (i.e. Technical, Organizational, or Personal). Drawing a RP might recall and suggest different views in a situation and a wide variety of visualization tools (e.g. social networks, visual brainstorming, imagery manipulation, and avatar simulations) can help achieve one of those two objectives.

7) Adding a hermeneutic element to the transcription, interpretation, and analysis activities reflects a new (undiscoverable) advantage of using Multiview4 as a methodological framework (See **Figure 4.10**).

7.3. Practical Contribution

This section represents our contribution to improve the problem situation(s) that emerged during the development of MMS at the BoP in Egypt. E-Masary action case study is the only case for mobile money services in the Middle East and North Africa that need to be documented and replicated in similar contexts. Filling this gap, this research offered a coherent plausible story which other people could go away and try to apply to their areas of concern, or on their examples with my area of concern (Checkland, 2010).

We propose a sustainability framework that can be a useful guide (or toolkit) for mobile money professionals and policy makers to understand the complex relationship between policy, system development and diffusion, and use of MMS. This guide will help them

understand the challenges facing different stakeholder and maximize their benefits from the MMS. Being aware of both will assure the going concern of the MMS in Egypt and help professionals draw the right policy in the post-implementation process. Despite the results being in an Egyptian context, some replication features will be identified to enable professionals in similar MENA countries to adopt the best practices.

Our research offers a mobile money toolkit for policy makers, corporate providers, retail agents, and individual customers. It answers calls by the International Finance Corporation's practitioners to develop a practical guide for mobile money system development.

7.3.1. Technical Perspective

This section offers insight for mobile money providers and professional consultants regarding to the *infrastructural aspects*, *cash flow and liquidity management*, *performance evaluation Grid*, *staff recruiting and training*.

Our discussion of mobile money ***infrastructural aspects*** helps potential providers of MMS and Masary to leverage extensive agent network, and guarantee high quality of information processing and synchronization between the data entered at the PoS and the data processed and saved in the GSM modem.

In **Chapter 5 & 6**, we offered a detailed DM analysis for mobile microfinance and mobile payment systems separately. Then we have drawn an overall analysis of the entity models and data flow diagrams of the fully operational mobile money system as a result of our transformation action plan. As discussed in **Section 2.2.4**, the data structure can be replicated and extended to new projects, branches, and partner institutions, regardless of the nature of their functions and the context.

While this action case is developed out of the Egyptian context, our data modelling reflects the data structure that can be easily replicated in other mobile money systems that offer the same services and deal with the same actors. The data functions, however, might be different from one country to another, and the types of actors involved (see the bank-led vs non bank-led models of the mobile money system in **Chapter 2**).

Liquidity and cash flow management was another technical issue that has been covered. Transfer cash from retailers and MFIs located in the Egyptian slums to Masary's bank account in Cairo is challenging. We set a financial model that works through e-Masary online reporting and can be easily printed by agents to set their monthly disbursement/collection plan. Our findings can be compared to the IFC financial toolkit to manage cash movement in Papua New Guinea. Our matrix reflects the electronic foresight tool to understand the money movements from and within the community. It also clarifies the detailed transaction fees, time, and authentication required for different channels (mobile, web, PC, or PoS).

Such a technology can also be replicated by banks in Egypt or North Africa who offer real-time financial services. Because it is open source, it offers a cheaper and more agile alternative to the more widely used banking enterprise resource planning systems (e.g. TLM Cash & Liquidity Management software solution used in the Nasr Bank in Egypt and the HSBC in Beijing).

A significant contribution of this matrix is developing a ***customer loyalty database***, which shows which products/services they consume the most and how much they usually pay for them. Such a database, will guide small business, banks, and governments to focus on the product/services that matches the needs of those who live at the BoP.

Defining the targeted market segments and value proposition are other technical issues in developing MMS. Before setting up an agent network, system analysts needs

to identify the customer s– who they are, their needs, wants, and desires. Agents should be native people who live in the slum areas to easily point out the customers' needs, culture, and overcome the technical dimension of trust, which is moving the people from human trust to system trust (Zhou, 2012).

Explore market opportunities through and innovate new services/products that meet the targeted segments at the BoP. Both of the system owners and the development team need to customize the mobile money system to match the nature of information and uses of the indigenous people. They should not assume that the MMS is the solution for all financial needs and that it will be successful, because it has worked elsewhere (e.g. M-Pesa). In doing so, stakeholders' needs to be involved in a Sociotechnical analysis to reflect their social as well as technical objectives. Then the system developers develop their pilot and order the sociotechnical objectives in a trade-off basis. E-Masary entered the Egyptian market with one service – mobile airtime top-up and then unleashed the potential for fully operating MMS and I-Score credit checking platform for the Middle East. Similarly, CelPay started with B2B MPS to help FMCGs with large distribution networks to manage their cash flow.

Explore and prioritize the customer satisfaction requirements. Masary.Co had to assess what the customer is going to require from the MSP, from the retail agents, and the CRM team. In doing so, the sales and the CRM team conduct quarterly customer satisfaction survey through voice command calls to a randomly selected sample of customers. The aim is to understand the most compelling marketing messages, how far they are willing to travel to perform cash-in/cash-out transactions, which PoS they would trust as retail agents, which PoS they would not trust, and to what extent they are comfortable with the mobile technology. Masary also determined how much it would cost the potential customers to obtain mobile financial services and how much they would need to save through a new service to change their current business behavior.

Specify and rank the tasks of your intermediaries. Masary.Co dedicated a considerable amount of effort to determine the roles and responsibilities of the retail agents, and

MFIs and the fieldwork operators who serve 26 cities. By the end of year 2014, Masary recruited a network of 6482 agents that represents the strongest competitive advantage the company owns. The job description offered in the recruitment process includes tasks such as acquiring customers, training customers, performing financial transactions, accepting electronic payments, providing cash-in/cash-out services, displaying branding, providing brochures, keeping transaction logs, and managing liquidity.

7.3.2. Organisational Perspective

Evaluate and identify potential partners in order. Masary.Co lacked the indigenous knowledge of the local Egyptian market and accordingly struggled to select the right partners. This resulted in the problems of having two separate networks and two sub-information systems. Recruiting an implementing partner (e.g. Assuit Business Women Association) as explained in **Sections 6.2 & 6.3,** helped identify the right partners and evaluate their resource and knowledge constraints, rather than starting with too many potential partners simultaneously. Seek the "eagle" partners first (i.e. those that will provide the greatest sales revenue potential, profit possibilities), and then map the MSPs' ability to provide comprehensive training and support.

Building distribution network was also explained in **section 6.3** as an organisational issue. Masary's HR had to design the right ***incentive system*** for retail agents and loan officers. Such a system was introduced in **Section 6.3.3.1** to consider the escalating nature of the agent incentives. We found that designing an effective incentive system will attract the exclusive agents of airtime top up to join the mobile money network. Then it would be easy to provide wide national coverage as quickly as possible or whether agents can be selected regionally first, through concentric rings, or starting in larger population centres before moving down in granularity to locations with sparser populations.

7.3.3. Personal Perspective

The personal perspective of the key stakeholders is more important to solve technical and organisational challenges. While multiperspectives theory offers the Personal perspective as a complementing element to define and solve wicked situations, our action case proved that the personal view of female users led to a new fully operating MMS. We also found that the personal view offers more simple solutions to wicked problems in a way that creates new technical and organisational settings (Mohamed, Wood-Harper & Ramlogan, August 2014)

Conduct Macro analysis of the MMS ecosystem. In **Chapter 5**, we explained the antecedent condition of developing MMS in the Egyptian BoP. In doing so, we highlighted the competitive environment on the mobile telecommunication market and in the financial service provision as well. In **Chapter 2 & 5**, we reflected how Egypt as a developing country replicate ISD strategies that have been developed in the western countries. Then the digital divide was highlighted and led to the technical, organisational, and personal problems discussed in **Chapter 6**. We also discussed how Masary.Co as a MNCs and strongly competed with the market leaders (mainly MNOs) to serve the BoP.

Competing with the new entrants: our study explained how Masary.Co tended to manage the future competition with other MNOs (who will hold the fourth mobile license) and financial service providers are likely to enter the mobile money industry. The speed at which mobile money is moving at the BoP suggests that the market conditions are likely to change shortly with the multistakeholder involvement. Masary's foresight analysis considered potential competition with foreign exchange offices, Post Offices, and international remitters such as Western Union. In conclusion, we found that CASH is competition. Until mobile money is easier, more accessible, and safer than cash, changing customers' behavior will be difficult.

Cash "push" opportunities: Determine the best ways to "push" money into the hands of your customers.

1) In the Philippines, microfinance customers were not hooked on mobile money until the loans were disbursed through mobile phones.
2) In India, FINO, built a POS infrastructure that led to a dramatic uptake when government subsidies distributed through accounts linked to that infrastructure.
3) Salaries, government subsidies, corporate subsidies (as with mining and lumber in the Pacific), and supply chains can be mechanisms for driving the adoption of mobile money.

Masary's Sharia compliant mobile money service is cost effective, sustainable, and can pay off the high risk of providing financial service in countries where Muslims are the majority (El-Zoghbi, 24th Feb 2015).

Personal/informal relationships of Masary's board of directors found to crucial to build business partnerships with individual officers from the regulating parties (i.e. SFD). In Section 6.4, we explained how Masary's CEO invited the microfinance director of the SFD to join Masary's board. Earlier, he promised mobinil operation manager of a fixed commission over every airtime quota allocated to Masary. To some extent, we found this unethical business practice. However, the growing body of reports published in the Consultative Group to Assist the Poor. It was found to be the best way to avoid regulatory challenges (see Hayes & Westrup, 2012). At the early stages, Masary.Co had to start building their agent network while they were still waiting for approval from the Central Bank. The company's board struggled to obtain a letter of non-objection for pilot activities, particularly in those countries where regulations are open but unclear.

REFERENCES

ABDEL-WAHAB, A. G., & A EL-MASRY, A. A. (EDS.). (2010). *Mobile Information Communication Technologies Adoption in Developing Countries: Effects and Implications*. Information Science Reference.

ABERNATHY, W. J., & UTTERBACK, J. M. (1978). Patterns of industrial innovation.*Journal Title: Technology review. Ariel*, *64*(254.228).

ACKERMANN, F., & EDEN, C. (2010). Strategic options development and analysis. In *Systems Approaches to Managing Change: A Practical Guide* (pp. 135-190). Springer London.

ACKOFF, R. L. (1971). Towards a system of systems concepts. *Management science*, *17*(11), 661-671.

ACKOFF, R. L. (2010). From data to wisdom. *Journal of applied systems analysis*, 16**,** 3-9.

ACKOFF, R. L., ACKOFF, R. L., & EMERY, F. E. (2005). *On purposeful systems: An interdisciplinary analysis of individual and social behavior as a system of purposeful events*. Transaction Publishers.

ÅGERFALK, P. J. (2014). Insufficient theoretical contribution: a conclusive rationale for rejection&quest. *European Journal of Information Systems*, *23*(6), 593-599.

AHMED, A. S. (2009). "Yearend special: New market regulator tops year's economic reforms." *The Daily News*. Available at: http://www.thedailynewsegypt.com/index.php?option=com_content&view=article&id=106416&catid=1&Itemid=183%27 [Accessed in 15 August 2010].

AHMAD, A., LYYTINEN, K., & NEWMAN, M. (2011). The evolution of process models in IS research: From a punctuated social process model to a socio-technical process model. In *ECIS Proceedings* (No. 161, pp. 1-13).

AKHLAGHPOUR, S., WU, J., LAPOINTE, L., & PINSONNEAULT, A. (2013). The ongoing quest for the IT artifact: Looking back, moving forward. *Journal of Information Technology*.

AKULA, V. (2008). Business Basics at the Base of the Pyramid. *Harvard Business Review*, 86, 53-57.

AL-DEBEI, M. M., & AVISON, D. (2010). Developing a unified framework of the business model concept. *European Journal of Information Systems*, *19*(3), 359-376.

AL-DEBEI, M. M., & AVISON, D. (2011). Business model requirements and challenges in the mobile telecommunication sector. *Journal of Organizational Transformation and Social Change*, *8*(2), 215-235.

AL GORE (2013). The future. WH Allen.

ALAMPAY, E., & BALA, G. (2010). Mobile 2.0: M-money for the BoP in the Philippines. *Information Technologies & International Development*, *6*(4), pp-77.

ALEXANDER, IAN F. (2005)."A taxonomy of stakeholders: Human roles in system development." *International Journal of Technology and Human Interaction (IJTHI)* 1.1: 23-59.

ALKHUNAIZAN, A., & LOVE, S. (2013). Effect of Demography on Mobile Commerce Frequency of Actual Use in Saudi Arabia.In *Advances in Information Systems and Technologies* (pp. 125-131).Springer Berlin Heidelberg.

ALLISON, G.T., & PHILIP.Z. (1971).*Essence of decision*.Longman.

AL-SAGGAF, Y., & SIMMONS, P. (2014). Social media in Saudi Arabia: Exploring its use during two natural disasters. *Technological Forecasting and Social Change*.

ALTENBURG, T. (2009). Building inclusive innovation systems in developing countries: challenges for IS research. In Lundvall, B. Å., Joseph, K. J., Chaminade, C., & Vang, J. (Eds.). *Handbook of innovation systems and developing countries: building domestic capabilities in a global setting*. Edward Elgar Publishing.

AMERICAN CHAMBER OF COMMERCE. (2009), "Emerging Egypt 2010.Available at: http://www.amcham.org.eg/publications/emergingegypt/emerging.asp [Accessed in 1th Feb 2010].

AMERICAN CHAMBER IN EGYPT. (2014). The Egypt country report 2013. Avaialble at http://www.amcham.org.eg/resources_publications/publications/emerging_egypt/ [Accessed in 1st Feb 2014].

AMSTERDAMSKA, O. (1990). Surely, You Must be Joking, Monsieur Latour!.*Science, Technology and Human Values*, 15: 495-504.

ANDREASEN, A. R. (1996). Profits for nonprofits: find a corporate partner. *Harvard Business Review*, 74**,** 47.

ANONG, S. T. & KUNOVSKAYA, I. (2013). M-finance and consumer redress for the unbanked in South Africa. *International Journal of Consumer Studies***,** n/a-n/a.

ANSARI, S., MUNIR, K., & GREGG, T. (2012). Impact at the 'bottom of the pyramid': the role of social capital in capability development and community empowerment. *Journal of Management Studies*, *49*(4), 813-842.

ARGYRIS, C. (1991). Teaching Smart People How to Learn", *Harvard Business Review*.

ARGYRIS, C. (1992). *On organizational learning*. Oxford: Blackwell.

ARGYRIS, C. (2003). A life full of learning. *Organization Studies*, *24*(7), 1178–1192.

ARGYRIS, C., & SCHON, D. (1974) Theory in Practice. Jossey-Bass, San Francisco.

ARGYRIS, C. & SCHO¨N, D. A. (1978) *Organizational Learning: A Theory of Action Perspective*, Reading, Addison-Wesley.

ARNOLD, D. P. (2013). Systems Theory—A Secret History of the Twentieth Century. In *Traditions of Systems Theory: Major Figures and Contemporary Developments*, 10, Routledge.

ARORA, S., & ROMIJN, H. A. (2009). *Innovation for the base of the pyramid: Critical perspectives from development studies on heterogeneity and participation* (Vol. 36). UNU-MERIT, Maastricht Economic and Social Research and Training Centre on Innovation and Technology.

ARORA, S., & ROMIJN, H. (2012). The empty rhetoric of poverty reduction at the base of the pyramid. *Organization*, *19*(4), 481-505.

ASHBY, W. R. (1940). Adaptiveness and equilibrium. *The British Journal of Psychiatry*, *86*(362), 478-483.

ASHBY, W. R. (1956). *An introduction to cybernetics* (Vol. 2). London: Chapman & Hall.

ASHBY, W. R. (1960). Design for a brain, New York: J.

ASHTA, A. (ED.). (2011). *Advanced technologies for microfinance*. IGI Global.

ASHTA, A. (2012). Co-creation for impact investment in microfinance. *Strategic Change*, *21*(1-2), 71-81.

ASHTA, A., & PATEL, J. (2013). Software as a service: An opportunity for disruptive innovation in the microfinance software market?. *Journal of Innovation Economics & Management*, (1), 55-82.

AU, Y. A., & KAUFFMAN, R. J. (2008). The economics of mobile payments: Understanding stakeholder issues for an emerging financial technology application. *Electronic Commerce Research and Applications*, *7*(2), 141-164.

AVGEROU, C. (2008). Information systems in developing countries: a critical research review. *Journal of information Technology*, *23*(3), 133-146.

AVISON, D. (1990). A contingency framework for information system analysis. A PhD thesis, The University of Aston in Birmingham.

AVISON, D. (2012a). From espoused values to action: a commentary on 'Are we making a better world with ICTs & quest;'. *Journal of Information Technology*,*27*(2), 104-105.

AVISON, D. (2012b). Reflections On Information Systems, Qualitative Research And Business Intelligence. *Journal of Advanced Social Research*.

AVISON, D. MALAURENT, J. (2014). Is theory king?: questioning the theory fetish in information systems. *Journal of Information Technology*, 1–10.

AVISON, D., & WOOD-HARPER A. T. (1990)."*Multiview – An Exploration in Information Systems Development*", Blackwell Scientific Publications, London.

AVISON, D. E., & WOOD-HARPER, A. T. (1991). Information systems development research: An exploration of ideas in practice. *The Computer Journal*, *34*(2), 98-112.

AVISON, D. E., WOOD-HARPER, A. T., VIDGEN, R. T., & WOOD, J. R. G. (1998). A further exploration into information systems development: the evolution of Multiview2. *Information Technology & People*, *11*(2), 124-139.

AVISON, D., & FITZGERALD, G. (2011). Approaches to Developing Information Systems.In *Emerging Themes in Information Systems and Organization Studies* (pp. 81-96).Physica-Verlag HD

AVISON, D., & FITZGERALD, G. (2006). *Information systems development: methodologies, techniques and tools*. McGraw Hill.

AVISON, D. E., FITZGERALD, G., & WOOD-HARPER, A. T. (1988). Information Systems Development: A tool kit is not enough. *The Computer Journal*, *31*(4), 379-380.

AVISON DE, WOOD-HARPER AT, VIDGEN RT AND WOOD J.R. (1998). "A further exploration into information systems development: the evolution of Multiview2". Information, Technology & People, 11 ; 2 : (124-139).

AVISON, D. E., SHAH, H. U., & GOLDER, P. A. (1993). Tools for SSM: a justification–a reply to 'critique of two contributions to soft systems methodology'. *European Journal of Information Systems*, *2*(4), 312-313.

AYUBI, N. (2004). *Political Islam: religion and politics in the Arab world*. Routledge.

BADEWI, A. MOHAMAD, M. SHEHAB, E. WOOD-HARPER, T (FORTHCOMING 2015). Business Innovation in ERP Orchestration Theory: Multicasts from the west and East. Journal of Strategic Information System.

BAGUMA, R. (2013). Mobile money services in Uganda: design gaps and recommendations. In *Human-Computer Interaction. Users and Contexts of Use* (249-258). Springer Berlin Heidelberg.

BAGUMA, R., & EILU, E. (2015). Using Mobile Phones in Elections in Developing Countries: Opportunities and Challenges. In *Computing in Research and Development in Africa* (pp. 251-265). Springer International Publishing.

BAKER, E.H. (31ST MARCH 2014). Looking Outward with Big Data: A Q&A with Tom Davenport. *Strategy & Business*.

BALE, L. S. (1995). Gregory Bateson, cybernetics, and the social/behavioral sciences. *Cybernetics & Human Knowing*, *3*(1), 27-45.

BAN KI-MOON. (31th Oct 2014). Latest Statements -Secretary-General's remarks at i-Hub/Ushahidi. Available at: http://www.un.org/sg/statements/index.asp?nid=8150 [Accessed in 10th Nov 2014].

BANKER, R. D., GANJU, K. K., & PAVLOU, P. A. (2013). Can Information and Communication Technology lead to Well-Being? An Empirical Analysis. Thirty Fourth International Conference on Information Systems, Milan. Available at:

http://aisel.aisnet.org/cgi/viewcontent.cgi?article=1194&context=icis2013 [Accessed in 1st Sep 2014].

BARNES, J.A. (1954), Class and committees in a Norwegian parish, *Human Relations* 7, 39-58

BARNETT, M. L. (2007) Stakeholder influence capacity and the variability of financial returns to corporate social responsibility.*Academy of Management Review* 32**,** 794-816.

BARON, MARCIA W., PHILIP PETTIT, AND MICHAEL SLOTE. (1997). *Three Methods of Ethics*. Malden and Oxford: Blackwell Publishers.

BASDEN, A. & WOOD-HARPER, A. T. (2006). A philosophical discussion of the root definition in soft systems thinking: an enrichment of CATWOE. Systems Research and Behavioural Science, 23, 61-87.

BASKERVILLE, R., & PRIES-HEJE, J. (2014). Diffusing Best Practices: A Design Science Study Using the Theory of Planned Behavior. In *Creating Value for All Through IT* (pp. 35-48). Springer Berlin Heidelberg.

BASKERVILLE, R., BUNKER, D., OLAISEN, J., PRIES-HEJE, J., LARSEN, T. J., & SWANSON, E. B. (2014). Diffusion and Innovation Theory: Past, Present, and Future Contributions to Academia and Practice. In *Creating Value for All Through IT* (pp. 295-300). Springer Berlin Heidelberg.

BASKERVILLE, R., & WOOD-HARPER, A. T. (1998). Diversity in information systems action research methods. *European Journal of Information Systems*, *7*(2), 90-107.

BASKERVILLE, R., DE MARCO, M., & SPAGNOLETTI, P. (2013). Designing Organizational Systems. Springer.

BATESON, G. (1972). *Steps to an ecology of mind: Collected essays in anthropology, psychiatry, evolution, and epistemology*. University of Chicago Press.

BATESON, G. (2014). Gregory Bateson. *Information Theory*, 104.

BATTILANA, J., & DORADO, S. (2010). Building sustainable hybrid organizations: The case of commercial microfinance organizations. *Academy of Management Journal*, *53*(6), 1419-1440.

BAXTER, G., & SOMMERVILLE, I. (2011). Socio-technical systems: From design methods to systems engineering. *Interacting with Computers*, *23*(1), 4-17.

BAZELEY, P., & JACKSON, K. (EDS.). (2013). *Qualitative data analysis with NVivo*. Sage Publications Limited.

BEATH, C. M., & ORLIKOWSKI, W. J. (1994). The contradictory structure of systems development methodologies: deconstructing the IS-user relationship in information engineering. *Information Systems Research*, *5*(4), 350-377.

BEAUCHAMP, T. L., & CHILDRESS, J. F. (2001). *Principles of biomedical ethics*. Oxford university press.

BEHL, A. (2013). Critical analysis of management information system of selected Indian Microfinance Institutions. *International Journal of Information Technology & Computer Sciences Perspectives*, *2*(3), 680-686.

BEHL, A., & SINGH, M. (2014). Critical Analysis of Management Information System of Selected Indian Microfinance Institutions. *Procedia-Social and Behavioral Sciences*, *133*, 20-27.

BELL, S., & WOOD-HARPER, T. (2003). *How to Set Up Information Systems: a non-specialist's guide to the Multiview approach*. Earthscan.

BELL, S., & WOOD-HARPER, T. (2014A). The Innovation of Multiview3. *Innovation,24*(1).

BELL, S., & WOOD-HARPER, T. (2014B). The Innovation of Multiview3 for Development Professionals. *The Electronic Journal of Information Systems in Developing Countries*, *63*.

BENBASAT, I., GOLDSTEIN, D. K., & MEAD, M. (1987). The case research strategy in studies of information systems. *MIS quarterly*, 369-386.

BENNETTS, P. D., WOOD-HARPER, A. T., & MILLS, S. (2000). An holistic approach to the management of information systems development—a view using a soft systems approach and multiple viewpoints. *Systemic practice and action research*, *13*(2), 189-205.

BENTHAM, J. (1948). A Fragment on Government and an Introduction to the Principles of Morals and Legislation.

BERG, B. L., LUNE, H., & LUNE, H. (2004). *Qualitative research methods for the social sciences* (Vol. 5). Boston, MA: Pearson.

BERGVALL-KÅREBORN, B., HOLST, M., & STÅHLBRÖST, A. (2008). Creating a new leverage point for information systems development. *Designing Information and Organizations with a Positive Lens*, *2*, 75.

BEATTYA, R. C., SHIMB, J. P., & JONES, M. C. (2001). Factors influencing corporateweb site adoption: A time-based assessment. *Information & Management*, 38(6): 337-354.

BELL, S (1996). 'Approaches to participatory monitoring and evaluation in Dir District, North West Frontier Province, Pakistan.' *Systems Practice,* Vol 9, No 2, pp129–150.

BELL, E., & BRYMAN, A. (2007). The ethics of management research: an exploratory content analysis. *British Journal of Management*, *18*(1), 63-77.

BELL, S & MORSE (2013). Rich pictures: a means to explore the 'sustainable mind'?. *Sustainable Development*, *21*(1), 30-47.

BELL, S., & WOOD-HARPER, T. (2003). *How to Set Up Information Systems: a non-specialist's guide to the Multiview approach*. Routledge.

BELL, S., & WOOD-HARPER, A. T. (2007). Applying the multiview analysis and design methodology in a non-governmental organisation in Bangladesh. *Journal of Global information and Technology Management*, *10*(2), 7-33.

BELL, S., & WOOD-HARPER, T. (2014a). The Innovation of Multiview3. *Innovation,24*(1).

BELL, S., & WOOD-HARPER, T. (2014b). The Innovation of Multiview3 for Development Professionals. *The Electronic Journal of Information Systems in Developing Countries*, *63*.

BENNETTS, P. D. C., WOOD-HARPER, A. T. & MILLS, S. (2000) An holistic approach to the management of information systems development: a view using a soft systems approach and multiple viewpoints. *Systemic Practice and Action Research,* 13**,** 189-205.

BENYON, D., & SKIDMORE, S. (1987). Towards a tool kit for the systems analyst. *The Computer Journal*, *30*(1), 2-7

BENYON, D., TURNER, P., & TURNER, S. (2005). *Designing interactive systems: People, activities, contexts, technologies*. Pearson Education.

BERG, T., & POOLEY, R. (2013). Contemporary iconography for rich picture construction. *Systems Research and Behavioral Science*, *30*(1), 31-42.

BERGVALL-KÅREBORN, B., MIRIJAMDOTTER, A., & BASDEN, A. (2004). Basic principles of SSM modeling: An examination of CATWOE from a soft perspective. *Systemic Practice and Action Research*, *17*(2), 55-73.

BERTALANFFY, L.V.(1929). Vorschlag zweier sehr allgemeiner biologischer Gesetze – Studien uber theoretische Biologie, III. Biologisches Zentralblatt. 49:83–111.

BERTALANFFY, L. V. (1972). The History and Status of General Systems Theory. *Academy of Management Journal*, *15*(4), 407-426.

BESLEY, T., & COATE, S. (1995). Group lending, repayment incentives and social collateral. *Journal of development economics*, *46*(1), 1-18.

BHATTACHERJEE, A. (2012), "Social science research: principles, methods, and practices". University of South Florida.

BIEL, B., GRILL, T., & GRUHN, V. (2010). Exploring the benefits of the combination of a software architecture analysis and a usability evaluation of a mobile application. *Journal of Systems and Software*, *83*(11), 2031-2044.

BIJKER, W. E., HUGHES, T. P., PINCH, T., & DOUGLAS, D. G. (2012). *The social construction of technological systems: New directions in the sociology and history of technology*. MIT press.

BILL, C., HERB, K. & NEIL, I. (1988). A field study of the software design process for large systems. *Commun. ACM, 31,* 1268-1287.

BJØRNER, DINES, AND MARTIN C. HENSON, EDS. (**2008).***Logics of Specification Languages*.Springer.

BLOWFIELD, M. (2005) Corporate Social Responsibility: reinventing the meaning of development?*International Affairs,* 81**,** 515-524.

BLOOMFIELD, B. P., COOMBS, R., COOPER, D. J. & REA, D. (1992). Machines and Manoeuvres: Responsibility Accounting and the Construction of Hospital Information Systems. *Accounting, Management and Information Technology,* 2(4)**,** 197-219.

BOARDMAN, J., & SAUSER, B. (2008). *Systems thinking: Coping with 21st century problems*. CRC Press.

BOOCH, G., MAKSIMCHUK, R. A., ENGLE, M. W., YOUNG, B. J., CONNALLEN, J., & HOUSTON, K. A. (2008). Object-oriented analysis and design with applications.*ACM SIGSOFT software engineering notes*, *33*(5), 11

BORGATTI, S. P., & LI, X. (2009). On social network analysis in a supply chain context*. *Journal of Supply Chain Management*, *45*(2), 5-22.

BOSTROM, R. P., & HEINEN, J. S. (1977). MIS Problems and failures: a sociotechnical perspective part I: the cause. *MIS quarterly*, *1*(3), 17-32.

BOULDING, K (1956). General Systems Theory-The Skeleton of Science, Management Science , Vol.2(3), pp.197-208.

BRAA, K., & VIDGEN, R. (1999). Interpretation, intervention, and reduction in the organizational laboratory: a framework for in-context information system research. *Accounting, Management and Information Technologies*, *9*(1), 25-47.

BRAA, J., MONTEIRO, E., & SAHAY, S. (2004). Networks of action: sustainable health information systems across developing countries. *Mis Quarterly*, 337-362.

BRAMMER, S. & PAVELIN, S. (2005) Corporate reputation and an insurance motivation for corporate social investment. *The Journal of Corporate Citizenship*, 20**,** 39-51.

BRANDSMA, J., & CHAOUALI, R. (1998). *Making Microfinance Work in the Middle East and North Africa*.Private and Financial Sector Development Group [and] Human Development Group, Middle East and North Africa Region, World Bank.

BRETT, E. A. (2003) Participation and accountability in development management.*Journal of Development Studies,* 40**,** 1 - 29.

BRINGER, J. D., JOHNSTON, L. H., & BRACKENRIDGE, C. H. (2004). Maximizing transparency in a doctoral thesis1: The complexities of writing about the use of QSR* NVIVO within a grounded theory study. *Qualitative Research*, *4*(2), 247-265.

BRINKKEMPER, S. (1996). Method engineering: engineering of information systems development methods and tools. *Information and software technology*,*38*(4), 275-280.

BROCKLESBY, J., & CUMMINGS, S. (1996). Foucault plays Habermas: An alternative philosophical underpinning for critical systems thinking. *Journal of the Operational Research Society*, 741-754.

BROOKS, L., FITZGERALD, G. & ATKINSON, C. (2008) Using Actor Network Theory to Interpret the Introduction of Information Systems within the London Ambulance Service.*14th Americas Conference on Information Systems.*14-17 August, Toronto, Canada.

BROWN, S. L., & EISENHARDT, K. M. (1997). The art of continuous change: Linking complexity theory and time-paced evolution in relentlessly shifting organizations. *Administrative science quarterly*, 1-34.

BRYMAN, A., & BELL, E. (2011). Business Research Methods 3e. Oxford university press.

BRYANT, J. W. (1989). *Problem management: a guide for producers and players*. Chichester: Wiley.

BRYNJOLFSSON, E., & MCAFEE, A. (2012). *Race against the machine: How the digital revolution is accelerating innovation, driving productivity, and irreversibly transforming employment and the economy*. MIT Sloan Management.

BRYNJOLFSSON, E., & MCAFEE, A. (2014). *The second machine age: Work, progress, and prosperity in a time of brilliant technologies*. WW Norton & Company.

BUI-THANH, T., GHATTAS, O., MARTIN, J., & STADLER, G. (2013). A computational framework for infinite-dimensional Bayesian inverse problems Part I: The linearized case, with application to global seismic inversion. *SIAM Journal on Scientific Computing*, *35*(6), A2494-A2523.

BURRELL, G. AND MORGAN, G. (1979) Sociological Paradigms and Organizational Analysis. Heinemann, London.

BURTON-JONES, A., & GRANGE, C. (2012). From use to effective use: A representation theory perspective. *Information Systems Research*, *24*(3), 632-658.

BUSINESSGHANA. (14TH APRIL, 2014). Airtel Money available at Ghana Post Offices nationwide. Available at: http://www.businessghana.com/portal/news/index.php?op=getNews&id=197607 [Accessed in 10th Nov 2014].

CARUGATI, A., & ROSSIGNOLI, C. (EDS.). (2011). *Emerging themes in information systems and organization studies*. Springer.

CALISKAN , KAN, K. AND CALLON, M. (2010). Economization, part 2: a research programme for the study of markets. Economy and Society, 39(1), pp. 1–32.

CALLON, M. (1986). Some elements of a sociology of translation: domestication of the scallops and the fishermen of St Brieuc Bay. IN LAW, J. (Ed.) *Power, action and belief: a new sociology of knowledge?* London, Routledge.

CALLON, M. & LAW, J. (1982). On interests and their transformation: enrolment and counter enrolment. *Social Studies of Science,* 12**,** 615-625.

CAMPBELL, D. E., WELLS, J. D., & VALACICH, J. S. (2013). Breaking the Ice in B2C Relationships: Understanding Pre-Adoption E-Commerce Attraction.*Information Systems Research*, *24*(2), 219-238.

CARLO, J.L, LYYTINEN, K AND BOLAND, R. (2012). Dialectics of Collective Minding: Contrary Appropriations of Information Technology in a High-Risk Project, MISQ. Vol 36, No 4.

CARR, N. G. (2003). IT doesn't matter. *Educause Review*, *38*, 24-38.

CARROLL, A. B. (1999). Corporate Social Responsibility. *Business & Society,* 38**,** 268-295.

CASTELLS, M. (1996). The Rise of the Network Society, Volume I of The Information Age: Economy, Society and Culture. *Massachusetts: Blackwell Publishing*.

CASTELLS, M. (2011a). *The power of identity: The information age: Economy, society, and culture* (Vol. 2). John Wiley & Sons.

CASTELLS, M. (2011b). *The rise of the network society: The information age: Economy, society, and culture* (Vol. 1). Wiley.

CASTELLS, M., & HIMANEN, P. (EDS.). (2014). *Reconceptualizing Development in the Global Information Age*. Oxford University Press.

CASTELLS, M., FERNANDEZ-ARDEVOL, M., QIU, J. L., & SEY, A. (2009). *Mobile communication and society: A global perspective*. Mit Press.

CASTELLS, M., HUTTON, W., & GIDDENS, A. (2000). Global capitalism. *Economic strategy (May*, (3), 17.

CASTELL, A., GREGORY, A., HINDLE, G., JAMES, M., RAGSDELL, G. & ZHU, Z. (2002). Towards Synergy in the Search for Multi-Perspective Systems Approaches.*Synergy Matters.*Springer US.

CECCHINI, S., & SCOTT, C. (2003). Can information and communications technology applications contribute to poverty reduction? Lessons from rural India. *Information Technology for Development*, *10*(2), 73-84.

CECEZ-KECMANOVIC, D., GALLIERS, R. D., HENFRIDSSON, O., NEWELL, S., & VIDGEN, R. (2014). The sociomateriality of information systems: current status, future directions. *MIS Quarterly*, *38*(3), 809-830.

CECEZ-KECMANOVIC, D., KAUTZ, K., & ABRAHALL, R. (2014). Reframing Success and Failure of Information Systems: A Performative Perspective. *MISQ,38*(2), 561-588.

CECI, F., & IUBATTI, D. (2012). Personal relationships and innovation diffusion in SME networks: A content analysis approach. *Research Policy*, *41*(3), 565-579.

CENTRAL BANK OF EGYPT. (2009). Regulations Governing Provision of Payment Orders through Mobile Phones. Available at: http://www.cbe.org.eg/NR/rdonlyres/989C90C0-9940-439A-B2A2-9908A4F22FD1/1516/MobilePayments.pdf [Accessed in 1st Feb 2015].

CENTRAL BANK OF EGYPT. (JAN 2015). Indicators: Financial & Monetary Sector. Annual Report. Available at: http://cbe.org.eg/CBE_Bulletin/2015/Bulletin_2015_1_Jan/05_Indicator(Financial_and_Monetary_Sector).pdf [Accessible 1st March 2015].

CHAMBERS, R. (1983). *Rural Development: Putting the Last First,* London, Longman.

CHARMAZ, K. (2011). Grounded theory methods in social justice research. *The Sage handbook of qualitative research*, *4*, 359-380.

CHARMAZ, K. (2014). Constructing Grounded Theory. Sage.

CHATTERJEE, S. (2010). *Design research in information systems: theory and practice* (Vol. 22). Springer.

CHECKLAND, P. (1988). Information systems and systems thinking: time to unite?. *International Journal of Information Management*, *8*(4), 239-248.

CHECKLAND, P. (1994). Systems theory and management thinking. *American Behavioral Scientist*, *38*(1), 75-91.

CHECKLAND, P. (1995). Model validation in soft systems practice. *Systems Research*, *12*(1), 47-54.

CHECKLAND, P. (1999). Systems Thinking, Systems Practice: Includes a 30-year retrospective. John Willy Publishing.

CHECKLAND, P. (2010). Researching real-life: Reflections on 30 years of action research. *Systems Research and Behavioral Science*, *27*(2), 129-132.

CHECKLAND, P. (2012). Four conditions for serious systems thinking and action. *Systems Research and Behavioral Science*, *29*(5), 465-469.

CHECKLAND, P., & POULTER, J. (2010). Soft systems methodology. In *Systems approaches to managing change: A practical guide* (pp. 191-242). Springer London.

CHECKLAND, P., & SCHOLES, J. (1990). Soft systems methodology in practice. *J Wiley Chichester UK*.

CHECKLAND, K., HARRISON, S., SNOW, S., MCDERMOTT, I., & COLEMAN, A. (2012). Commissioning in the English National Health Service: what's the problem. *Journal of Social Policy*, *41*(03), 533-550.

CHEN, C. (2013). Perceived Risk, Usage Frequency of Mobile Banking Services. *Managing Service Quality*, *23*(5), 3-3.

CHENOU, J. M. (2014). From Cyber-Libertarianism to Neoliberalism: Internet Exceptionalism, Multi-stakeholderism, and the Institutionalisation of Internet Governance in the 1990s. *Globalizations*, *11*(2), 205-223.

CHESBROUGH, H. & ROSENBLOOM, R. S. (2002). The role of the business model in capturing value from innovation: evidence from Xerox Corporation's technology spin-off companies. *Industrial and corporate change,* 11**,** 529-555.

CERNEV, A. K., DINIZ, E. H., & DE ALBUQUERQUE, J. P. (2012). Typology of Mobile Money Systems. *This volume*.

CHRISTIANSEN, E. (2014). "From "ethics of the eye" to "ethics of the hand" by collaborative prototyping", Journal of Information, Communication and Ethics in Society, Vol. 12 Iss: 1, pp.3 – 9.

CHRISTENSEN, C., CRAIG, T., & HART, S. (2001). The great disruption. *Foreign Affairs,* 80-95.

CHURCHMAN, C. W (1971).*The Design of Inquiring Systems*. Basic Books: New York.

CHURCHMAN, C. W. (1977). A philosophy for planning. In *Futures Research: New Directions*. Addison-Wesley Publishing Company Reading, MA.

COAKES, E. & ELLIMAN, T. (1999). *Focus issue on legacy information systems and business process engineering: the role of stakeholders in managing change*, Communications of the AIS, Volume 2, Issue 1es (July 1999), Article No. 4.

COLEMAN, J. S. (1986). Social theory, social research, and a theory of action.*American journal of Sociology,* 1309-1335.

CONNOLLY, T. M. (2005). *Database systems: a practical approach to design, implementation, and management*. Pearson Education.

CONRY, E. J. (1995). A Critique of Social Contracts for Business.*Business Ethics Quarterly,* 5**,** 187-212.

COOKSON, M. J. (1983). Taxonomic Studies on Current Approaches to Systems Analysis. *The Computer Journal*, *26*(3), 283-284.

CRESWELL, J. (2003).*Research Design: Qualitative, Quantitative and Mixed Method Approaches.* Thousand Oaks: CA: Sage.

CUDD, A. E. (2013). Truly humanitarian intervention: considering just causes and methods in a feminist cosmopolitan frame. *Journal of Global Ethics*, *9*(3), 359-375.

CUNLIFFE, A. L. (2010). Crafting qualitative research: Morgan and Smircich 30 years on. *Organizational Research Methods*.

DAHLBERG, T., MALLAT, N., ONDRUS, J. & ZMIJEWSKA, A. (2008) Past, present and future of mobile payments research: A literature review. *Electronic Commerce Research and Applications, 7, 165-181.*

DAVENPORT, T. H. (2013). *Process innovation: reengineering work through information technology*. Harvard Business Press.

DAVENPORT, T. (2014). *Big Data at Work: Dispelling the Myths, Uncovering the Opportunities*. Harvard Business Review Press.

DAVIS, G. B. (1974). Management Information Systems: Conceptual Foundations, Structure and Development. New York: McGraw-Hill Book Company.

DAVIS, G. B. (2000). Information systems conceptual foundations: looking backward and forward. In *Organizational and social perspectives on information technology*. Springer US, 61-82.

DEARDEN, J. (1972). MIS is a mirage. *Harvard Business Review*, *50*(1), 90-99.

DE GEUS, A. P. (1988). Planning as learning. *Harvard Business Review*.66 (2), 70-74.

DEMARCO, T. (2002). Structured analysis: beginnings of a new discipline. In *Software pioneers* (pp. 520-527). Springer Berlin Heidelberg.

DE MARCO, M. & IMPERATORI, B., (2008). ICT and changing working relationships: rational or normative fashion?.In *Interdisciplinary Aspects of Information Systems Studies* (pp. 105-114).Physica-Verlag HD.

DE MARCO, A., CAGLIANO, A. C., NERVO, M. L., & RAFELE, C. (2012). Using System Dynamics to assess the impact of RFID technology on retail operations. *International journal of production economics*, *135*(1), 333-344.

DENARDIS, L. (2013). Multi-stakeholderism: the Internet governance challenge to democracy. *Harvard International Review*, *34*(4), 40.

DENZIN, N. K., & LINCOLN, Y. S. (EDS.). (2011). *The SAGE handbook of qualitative research*. Sage.

DERMISH, A., KNEIDING, C., LEISHMAN, P. & MAS, I. (2011). Branchless and mobile banking solutions for the poor: A survey of the literature. *Innovations: Technology, Governance, Globalization*, 6**,** 81-98.

DE VAUJANY, F.X, FOMIN, V & LYYTINEN, K. (2013). Sociomaterial regulation in organizations:The case of information technology. *Working Paper*, Cass Business School - City University London.

DI GREGARIO, S, (2000). "Using NVivo for your Literature Review", Strategies in qualitative Research: Issues and Results from Analysis Using QSR NVivo and NUD*IST Conference at the institute of Education, London 29-30 September.

DHUMALE, R., SAPCANIN, A., & TUCKER, W. (2000). *Commercial Banking and Microfinance in Egypt: National Bank for Development: Case Study*. Regional Bureau for Arab States, United Nations Development Programme.

DINIZ, E. H., DE ALBUQUERQUE, J. P., & CERNEV, A. K. (2011) Mobile Money and Payment: a literature review based on academic and practitioner-oriented publications (2001-2011). Proceedings of SIG GlobDev Fourth Annual Workshop, Shanghai, China December 03, 2011.

DONNER, J. (2008). Research approaches to mobile use in the developing world: A review of the literature. *The information society*, *24*(3), 140-159.

DONNER, J., & TELLEZ, C. A. (2008). Mobile banking and economic development: Linking adoption, impact, and use. *Asian Journal of Communication*, *18*(4), 318-332.

DONOVAN, K. P. (2012a). Mobile money for financial inclusion. *Information and communication for development*, 61-74.

DONOVAN, K. P. (2012b). Mobile Money, More Freedom? The Impact of M-PESA's Network Power on Development as Freedom. *International Journal of Communication*, 6**,** 2647-2669.

DRACH-ZAHAVY, A. (2011). Interorganizational teams as boundary spanners: The role of team diversity, boundedness, and extrateam links. *European Journal of Work and Organizational Psychology*, *20*(1), 89-118.

DUNCOMBE, R. (2011). Researching impact of mobile phones for development: concepts, methods and lessons for practice. *Information Technology for Development*, *17*(4), 268-288.

DUNCOMBE, R. (2012). An evidence-based framework for assessing the potential of mobile finance in sub-Saharan Africa. *The Journal of Modern African Studies*,*50*(03), 369-395.

DUNCOMBE, R., & BOATENG, R. (2009). Mobile phones and financial services in developing countries: A review of concepts, methods, issues, evidence and future research directions. *Third World Quarterly*, *30*(7), 1237-1258.

DURMUSOGLU, S. S., & BARCZAK, G. (2011). "The Use of Information Technology Tools in New Product Development Phases: Analysis of Effects on New Product Innovativeness, Quality, and Market Performance," *Industrial Marketing Management* (40), pp. 321-330.

DUSERICK, F. G., ENKE, E. L., RUMMEL, A., & RUMMEL, R. (2014). Participatory Systems Analysis. *Developments in Business Simulation and Experiential Learning*, *21*.

EASON, K. (2011). Before the Internet: The Relevance of Socio-Technical.*Knowledge Development and Social Change Through Technology: Emerging Studies*, 85.

EASON, K., DENT, M., WATERSON, P., TUTT, D., & THORNETT, A. (2012). Bottom-up and middle-out approaches to electronic patient information systems: a focus on healthcare pathways. *Informatics in primary care*, *20*(1), 51-56.

EDER, L. NGUYEN, T; PHAM, T & LO, J, (2012). "Collaborative Microcredit Project Moves To The Cloud" (2012). *PACIS 2012 Proceedings.* Paper 141

***EFSA*. (2010).**Microfinance Industry Overview 2010. Available at: http://www.efsa.gov.eg/content/efsa_en/reports_micro_en/rep_micro_en.htm [Accessed in 1st June 2014].

***EFSA*. (2011a).** What is the legislative framework that regulates the Egyptian financial supervisory Authorities work. Available at: http://www.efsa.gov.eg/content/EFSA_EN/faq_EFSA_en/faq_EFSA_en.htm#2 [Accessed in 22nd February 2014].

***EFSA*. (2011b).** Size of Microfinance industry in Egypt 2010. Available: http://www.efsa.gov.eg/content/efsa_en/micro_pages_en/main_micro_page_en.htm

***EGYPT FINANCE*. (14TH OCTOBER 2010).** Masary dominates the Egyptian mobile money market.

EGYPT STATE INFORMATION SERVICE. (2014). Economic & Social Indicators Bulletin of the Arab Republic of Egypt. http://www.sis.gov.eg/Newvr/pdf/econmey/english-feb.%202014.pdf [Accessed in July 1, 2014].

ELBANNA, A., & NEWMAN, M. (2013). The rise and decline of the ETHICS methodology of systems implementation: lessons for IS research. *Journal of Information Technology*, *28*(2), 124-136.

ELBELTAGI, I. (2007). E-commerce and globalization: an exploratory study of Egypt. *Cross Cultural Management: An International Journal*, *14*(3), 196-201.

ELDREDGE,N & GOULD. S. J. (1972). *Punctuated equilibria: A n alternative to phyletic gradualism*. T. J. M. Schopf, ed. Models in Paleobiology. Freeman, San Francisco, CA. 82-115.

ELLIOT, S., & MULLER, J. (2005). Applicability of an Integrated Adoption Model.In *Mobile Information Systems* (pp. 275-291).Springer US.

EL SAWY, O. A. (1985). Implementation by cultural infusion: an approach for managing the introduction of information technologies. *MIS Quarterly*, 131-140.

ELYACHAR, J. (2005). *Markets of dispossession: NGOs, economic development, and the state in Cairo*. Duke University Press Books.

ELYACHAR, J. (2006). Best practices: Research, finance, and NGOs in Cairo. *American ethnologist*, *33*(3), 413-426.

ELYACHAR, J. (2012a). Before (and After) Neoliberalism: Tacit Knowledge, Secrets of the Trade, and the Public Sector in Egypt. *Cultural Anthropology*, *27*(1), 76-96.

ELYACHAR, J. (2012b). Next practices: Knowledge, infrastructure, and public goods at the bottom of the pyramid. *Public Culture*, *24*(1 66), 109-129.

EL-ZOGHBI, M. (24TH FEB 2015). Costs and Sustainability of Sharia-Compliant Microfinance. *CGAP*. Available at: http://www.cgap.org/publications/costs-and-sustainability-sharia-compliant-microfinance [Accessed in 5th March 2015].

EISENHARDT, K. M. (1989) Agency Theory: An Assessment and Review. *The Academy of Management Review*, 14**,** 57-74.

EMERY, F. E., & TRIST, E. L. (1973). Towards a social ecology. New York: Plenum.

ERIKSSON, H. E., & PENKER, M. (2000). *Business modeling with UML*.Chichester: Wiley.

FANG, E. S. (2014). Islamic finance in global markets: Materialism, ideas and the construction of financial knowledge. *Review of International Political Economy*, *21*(6), 1170-1202.

FARAZI, S., ARVAI, Z., & ROCHA, R. R. (2011). *Financial access and stability: a road map for the Middle East and North Africa*. World Bank. Available at: http://siteresources.worldbank.org/INTMENA/Resources/Financial_Flagship_Report_Middle_East_North_Africa_2011_Full_Report.pdf [Accessed in 4th August, 2013].

FERRARI, A. (2008). *Increasing access to rural finance in Bangladesh: the forgotten" missing middle"*. World Bank Publications.

FICHMAN, R. G., DOS SANTOS, B. L., & ZHENG, Z. E. (2014). Digital Innovation as a Fundamental and Powerful Concept in the Information Systems Curriculum.*Mis Quarterly*, *38*(2), 329-353.

FINK, A. (2005). *Conducting Research Literature Reviews: From the Internet to Paper* (2nd ed.). Thousand Oaks, California: Sage Publications.

FIRPO, J. EL SAYED, C, AND BREUL, P. (2011). IFC Mobile Money Scoping Country Report: Egypt. Available at: http://www1.ifc.org/wps/wcm/connect/451998804a052ab38ad5ffdd29332b51/Mobile%2BMoney%2BScoping%2BReport%2B-%2BEgypt.pdf?MOD=AJPERES [Accessed in 1st June 2013].

FITZGERALD, G., PANAGIOTOPOULOS, P., AL-DEBEI, M. M., & ELLIMAN, T. (2012). A business model perspective for ICTs in public engagement. *Government Information Quarterly*, *29*(2), 192-202.

FLICK, U. (2008). *Designing qualitative research* (Vol. 1). SAGE Publications Limited.

FOUCAULT. M. (1980). Power/Knowledge. Harvester Press, Brighton.

FOK, L. M., KUMAR, K., & WOOD-HARPER, A. T. (1987, December). Methodologies for socio-technical systems (STS) development: a comparative review. In *Proceedings of the Eighth International Conference on Information Systems, Pittsburgh* (pp. 319-334).

FOTH, M. (2006). Network action research. *Action Research*, *4*(2), 205-226.

FOWLER, M. (2004). *UML distilled: a brief guide to the standard object modeling language*. Addison-Wesley Professional.

FRANK, A. G. (1977). "Dependence is dead, long live dependence and the class struggle: An answer to critics." *World Development***5**(4): 355-370.

FREEMAN, E., & LIEDTKA, J. (1997). Stakeholder capitalism and the value chain.*European Management Journal*, *15*(3), 286-296.

FRENCH, S. (2008). Cynefin: repeatability, science and values. *Newsletter of the European Working Group "Multi-Criteria Aid for Decisions"*, *3*(17), 1-5.

FRENCH, S. (2012). Cynefin, statistics and decision analysis. *Journal of the Operational Research Society*, *64*(4), 547-561.

FRIEDMAN, M. (1970) "The social responsibility of business is to increase its profits." *New York Times Magazine.*

FRIEDMAN, T. L. (2012). Average is over. *The New York Times*, *24*.

FRIEDMAN, B., KAHN JR, P. H., BORNING, A., & HULDTGREN, A. (2013). Value sensitive design and information systems. In *Early engagement and new technologies: Opening up the laboratory* (pp. 55-95). Springer Netherlands.

FRITZ, H., & LANG, G. (2012). *Microcredit, Human Capital, and Personal Income Distribution: Empirical Evidence from Greater Cairo* (No. 30).

FROUD, J., JOHAL, S., LEAVER, A., PHILLIPS, R. & WILLIAMS, K. (2009). Stressed by choice: A business model analysis of the BBC.*British Journal of Management,* 20**,** 252-264.

GRBICH, C. (2012). *Qualitative data analysis: An introduction*. Sage.

GALLIERS, R. D., & LAND, F. F. (1987). Viewpoint: choosing appropriate information systems research methodologies. *Communications of the ACM*,*30*(11), 901-902.

GANE, C. P. & SARSON, T. (1979).*Structured systems analysis: tools and techniques*, Prentice Hall Professional Technical Reference.

GASKIN,J. BERENTE, N. LYYTINEN, K AND YOOYOUNGJIN (FORTHCOMING 2013). Toward Generalizable Sociomaterial Inquiry: A Computational Approach for Zooming In and Out of Sociomaterial Routines. *MISQ Special Issue on Sociomateriality of Information Systems and Organizing.*

GHATAK, M. (1999). Group lending, local information and peer selection. *Journal of development Economics*, *60*(1), 27-50.

GAO, P., LEE, H., LYYTINEN, K., & WANG, K. (2014). Special issue on information technology in China. *Journal of Information Technology*, *29*(3), 206-207.

GARY, J. (2013). The future by Al Gore – review. *The Guardian*. Available at: http://www.theguardian.com/books/2013/jan/31/the-future-al-gore-review [Accessed in 2nd March 2015].

GEELS, F. W. (2002). Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. *Research policy,* 31**,** 1257-1274.

GEELS, F. W. (2010). Ontologies, socio-technical transitions (to sustainability), and the multi-level perspective. *Research Policy*, *39*(4), 495-510.

GEORGE, G., MCGAHAN, A. M. & PRABHU, J. (2012) Innovation for Inclusive Growth: Towards a Theoretical Framework and a Research Agenda. *Journal of Management Studies*, 49**,** 661-683.

GHARAJEDAGHI, J. (2011). *Systems thinking: Managing chaos and complexity: A platform for designing business architecture*. Elsevier.

GHOSHAL, S. (2005). Bad management theories are destroying good management practices. *Academy of Management learning & education*, *4*(1), 75-91.

GIBBS, W. W. (1994). Software's chronic crisis. *Sci Am* September, 72–81.

GIDDENS, A. (1991). Structuration theory. *Past, Present and Future. In: Bryant, C. and Jary, D.(eds.). Giddens' Theory of Structuration. A Critical Appreciation. London: Routledge*.

GILBERT, L. S. (2002). Going the distance:'closeness' in qualitative data analysis software. *International journal of social research methodology*, *5*(3), 215-228.

GLASER, B., & STRAUSS, A. (1967). The discovery of grounded theory. 1967.*Weidenfield & Nicolson, London*.

GODOE, H., & HANSEN, T. B. (2009). Technological regimes in m-commerce: Convergence as a barrier to diffusion and entrepreneurship?.*Telecommunications Policy*, *33*(1), 19-28.

GOODMAN, JAMES AND VED WALIA.(2007). "Airtime transfer services in Egypt." In: *The Transformational Potential of M-transactions,* Vodafone Policy Paper Series, No.6. Available at: http://www.vodaphone.com/mtransactions [Accessed in 1st June 2013].

GOLDKUHL, G. (2012). Pragmatism vs interpretivism in qualitative information systems research. *European Journal of Information Systems*, *21*(2), 135-146.

GRANOVETTER, M. (1983). The strength of weak ties: A network theory revisited.*Sociological theory*, *1*(1), 201-233.

GRANT, G. & TAN, F. (2013). Governing IT in inter-organizational relationships: Issues and future research.European Journal of Information Systems, 22, 493–497.

GSMA (2010). Mobile Commerce: The Role of the Trusted Service Manager in Mobile Commerce. White Paper. Available at: http://www.gsma.com/digitalcommerce/wp-content/uploads/2013/12/GSMA-TSM-White-Paper-FINAL-DEC-2013.pdf [Accessed in 1st Nov 2014].

***GSMA*. (2012).** Mobile NFC: The Mobile Wallet. White Paper. Available at: http://www.gsma.com/digitalcommerce/wp-content/uploads/2012/10/GSMA-Mobile-Wallet-White-Paper-Version-1-0.pdf [Accessed in 1st Nov 2014].

GUESALAGA, R., & MARSHALL, P. (2008). Purchasing power at the bottom of the pyramid: differences across geographic regions and income tiers. *Journal of Consumer Marketing*, *25*(7), 413-418.

GUO, J., CHOW, A., & WIGAND, R. T. (2011). Virtual wealth protection through virtual money exchange. *Electronic Commerce Research and Applications*, *10*(3), 313-330.

GUYER, P. (2006). *Kant and Modern Philosophy*. Routledge.

HABERMAS, J. (1991). *The structural transformation of the public sphere: An inquiry into a category of bourgeois society*. MIT press.

HABERMAS, J., LENNOX, S., & LENNOX, F. (1974). The public sphere: An encyclopedia article (1964). *New German Critique*, (3), 49-55.

HABERMAS, J., LENNOX, S., & LENNOX, F. (2010). The Public Sphere: An Encyclopedia Article (1964). *The Idea of the Public Sphere: A Reader*, 114.

HALECKER, B., & HARTMANN, M. (2013). Contribution of systems thinking to business model research and business model innovation. *International Journal of Technology Intelligence and Planning*, *9*(4), 251-270.

HANDA, R., MAHESHWARI, K., & SARAF, M. (2011). *Google Wallet-A Glimpse into the future of mobile payments*. GRIN Verlag.

HAMILTON, S., & CHERVANY, N. L. (1981). Evaluating information system effectiveness-Part I: Comparing evaluation approaches. *MIS quarterly*, 55-69.

HOLMES, O. W. (2007). *Ralph Waldo Emerson*. Reprint Services Corporation.

HAMMOND, A. L., & PRAHALAD, C. K. (2004). Selling to the poor. *Foreign Policy*, 30-37.

HAMMOND AL, KRAMER WJ, KATZ RS, TRAN JT, WALKER C. (2007).*The Next Four Billion: Market Size and Business Strategy at the Base of the Pyramid* .World Resources Institute and International Finance Corp, Washington, DC.

HANSETH, O. & BRAA, K. (1998) Technology as traitor: emergent sap infrastructure in a global organization. *International Conference on Information Systems.*Helsinki, Finland, Association for Information Systems, 188-196.

HANSETH, O., AANESTAD, M. & BERG, M. (2004) Actor-network theory and information systems. What's so special? *Information Technology and People*, 17(2)**,** 116-123.

HARROP,N. GILLIES, A. AND A. T. WOOD-HARPER. (2012). "Viewpoints-'Actors' and "Clients': why systems dynamics needs help from soft systems thinking and unbounded systems thinking." *Journal of the Operational Research Society* 63, no. 12(2).

HART, S. (2011a). Taking the green leap to the base of the pyramid. *Next generation business strategies for the base of the pyramid: New approaches for building mutual value*, 79-102.

HART, S., (2011b). The Third-Generation Corporation. In Bansal, P., & Hoffman, A. Oxford Handbook of Business and the Environmennt.

HART, S. L. & MILSTEIN, M. B. (2003). "Creating Sustainable Value [and Executive Commentary]." *The Academy of Management Executive*. 17(2): 56-69.

HART, S & PRAHALAD CK. (1999). Strategies for the bottom of the pyramid: creating sustainable development, P4.

HASSAN, S. A., WEN, T. C., & RAJADORAI, K. P. (2013). An Analysis Framework for Identifying Usability Requirements in Mobile Application Development.*Journal of Next Generation Information Technology*, *4*(4).

HAYES, N., & WESTRUP, C. (2012). Context and the processes of ICT for development. *Information and organization*, *22*(1), 23-36.

HAYES, N., & WESTRUP, C. (2012). Power/knowledge and impact assessment: creating new spaces for expertise in international development. *New Technology, Work and Employment*, *27*(1), 9-22.

HEEKS, R. (2002). Information systems and developing countries: Failure, success, and local improvisations. *The information society*, *18*(2), 101-112.

HEEKS, R. (2012). Deriving an ICT4D research agenda: a commentary on 'Information and communication technologies for development (ICT4D): solutions seeking problems?'. *Journal of Information Technology*, *27*(4), 339-341.

HEGEL, G. W. (1910). The Phenomenology of Mind (1807). *Trans. JB Baillie*.

HELMER, O. (1966). *Social technology* (Vol. 9). New York: Basic Books.

HENDERSON-SELLERS, B., & EDWARDS, J. M. (1990). The object-oriented systems life cycle. *Communications of the ACM*, *33*(9), 142-159.

HENS, L. (2012). Overcoming institutional distance: Expansion to base-of-the-pyramid markets. *Journal of Business Research*, *65*(12), 1692-1699.

HERMES, N., & LENSINK, R. (2007). The empirics of microfinance: what do we know?. *The Economic Journal*, *117*(517), F1-F10.

HIRSCHHEIM, R. (1985). Information systems epistemology: An historical perspective. In *Research Methods in Information Systems*. E. Mumford, R. Hirschheim, R. Fitzberald et al., Eds. North-Holland, Amsterdam, 13-38.

HIRSCHHEIM, R. & KLEIN, H. K. (1989). Four paradigms of information systems development.*Commun. ACM*, 32, 1199-1216.

HIRSCHHEIM, R. U. D. Y., & KLEIN, H. K. (2011). Tracing the history of the information systems field. *The Oxford handbook of management information systems: Critical perspectives and new directions*, 16-61.

HIRSCHHEIM, R., & KLEIN, H. K. (2012). A glorious and not-so-short history of the information systems field. *Journal of the Association for Information Systems*,*13*(4), 188-235.

HIRSCHHEIM, R., & HEINZ, K. (2010).A short and glorious history of the information systems field. *Journal of the Association of Information Systems*.

HIRSCHHEIM, R., & KLEIN, H. K. (2012). A glorious and not-so-short history of the information systems field. *Journal of the Association for Information Systems*,*13*(4), 188-235.

HIRSCHHEIM, R., KLEIN, H. K., & LYYTINEN, K. (1995). *Information systems development and data modeling: conceptual and philosophical foundations* (Vol. 9). Cambridge University Press.

HIRSCHHEIM, R., & KLEIN, H. (2007). A comparison of five alternative approaches to information systems development. *Australasian Journal of Information Systems*, *5*(1).

HIRSCHHEIM, R., & KLEIN, H. K. (2012).A glorious and not-so-short history of the information systems field.*Journal of the Association for Information Systems*,*13*(4), 5.

HODGSON, J. (1990) Grazing Management, Science into Practice. Longmans Scientific & Technical, New York.

HOFFMAN, T. L. (2003). *U.S. Patent No. 6,622,017*. Washington, DC: U.S. Patent and Trademark Office.

HONGRATANA-UTHAI, N. (2011). *Diagnosing organisational culture and critical success factors for an airline: the case of Thai Airways International in Star Alliance,PhD Thesis*, University of Manchester.

HORTON, K., DAVENPORT, E., & WOOD-HARPER, T. (2005). Exploring sociotechnical interaction with Rob Kling: five "big" ideas. *Information Technology & People*,*18*(1), 50-67.

HOWE, D. R. (2001). *Data analysis for database design*. Butterworth-Heinemann.

HUANG, Z & BENYOUCEF, M. (2012)."From e-commerce to social commerce: A close look at design features." *Electronic Commerce Research and Applications*.

HUGHES, N., & LONIE, S. (2007). M-PESA: mobile money for the "unbanked" turning cellphones into 24-hour tellers in Kenya. *Innovations*, *2*(1-2), 63-81.

HUISMAN, M., & IIVARI, J. (2006). Deployment of systems development methodologies: Perceptual congruence between IS managers and systems developers. *Information & Management*, *43*(1), 29-49.

HULME, D. (2000). Impact assessment methodologies for microfinance: Theory, experience and better practice. *World development*, *28*(1), 79-98.

HULME, D., & MOSLEY, P. (EDS.). (1996). *Finance against poverty* (Vol. 2). Psychology Press.

HURSTHOUSE, R. (1999). *On virtue ethics*. Oxford University Press.

HUSSERL, E. (2012). *Ideas: General introduction to pure phenomenology*. Routledge.

IIVARI, J., HIRSCHHEIM, R. & KLEIN, H. K. (2004). Towards a distinctive body of knowledge for Information Systems experts: coding ISD process knowledge in two IS journls. *Information Systems Journal*, 14**,** 313-342.

***INTERNATIONAL FINANCE CORPORATION IFC* (May 2013).** Ready for Growth: Solutions to Increase Access to Finance for Women-Owned Business in the Middle East and North Africa. Available at: http://www1.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/publications/publications_report_vv-sme [Accessed in 1st June 2013].

İYIGÜN, N. Ö. (2014). Corporate Social Responsibility and Ethics in Management in Light of Sustainable Development. *Handbook of Research on Developing Sustainable Value in Economics, Finance, and Marketing*, 239.

IQBAL, Z., & MIRAKHOR, A. (2011). *An introduction to Islamic finance: Theory and practice* (Vol. 687). John Wiley & Sons.

JACKSON, M. C. (2000). *Systems approaches to management*. Springer.

JACKSON, M. C. (2007). *Systems thinking: Creative holism for managers*. Wiley.

JACKSON, A. Y., & MAZZEI, L. A. (2011). *Thinking with theory in qualitative research: Viewing data across multiple perspectives*. Routledge

JAGTAP, S., & LARSSON, A. (2013). Design of Product Service Systems at the Base of The Pyramid. In *ICoRD'13* (pp. 581-592). Springer India.

JÄRVINEN, P. (2011).A New Taxonomy for Developing and Testing Theories.In *Emerging Themes in Information Systems and Organization Studies* (pp. 21-32).Physica-Verlag HD.

JARZYNSKI, C. (2011). Equalities and inequalities: irreversibility and the second law of thermodynamics at the nanoscale. *Annu. Rev. Condens. Matter Phys.*,*2*(1), 329-351

JASPERS, F., & VAN DEN ENDE, J. (2013). Making business sense of cross-industry innovation. *RSM insight*, *13*(1), 10-12.

JENKINS, R. (2005) Globalization, Corporate Social Responsibility and poverty.*International Affairs,* 81**,** 525-540.

JENKINS, B. (2008). Developing mobile money ecosystems. *Washington, DC: International Finance Corporation and Harvard Kennedy School*.

JENSEN, T., & SANDSTRÖM, J. (2013). In defence of stakeholder pragmatism.*Journal of business ethics*, *114*(2), 225-237.

KALLINIKOS, J. (2006). Information out of information: on the self-referential dynamics of information growth. *Information Technology & People*, *19*(1), 98-115.

KANDACHAR, P., & HALME, M. (EDS.). (2008). *Sustainability challenges and solutions at the base of the pyramid: Business, technology and the poor*. London: Greenleaf.

KANDJANI, H., & BERNUS, P. (2011). Capability Maturity Model for Collaborative Networks Based on Extended Axiomatic Design Theory. In *Adaptation and Value Creating Collaborative Networks* (pp. 421-427). Springer Berlin Heidelberg.

KANT, I. (1991). *The metaphysics of morals* (p. 191). Cambridge: Cambridge University Press.

KANTER, J. & WALSH, J. J. (2004)."Toward More Successful Project Management," *Information Systems Management (21:2),* 16-21.

KAPLAN, B., & MAXWELL, J. A. (2005). Qualitative research methods for evaluating computer information systems. In *Evaluating the Organizational Impact of Healthcare Information Systems* (pp. 30-55). Springer New York.

KAPOOR, K., DWIVEDI, Y. K., & WILLIAMS, M. D. (2013). Role of Innovation Attributes in Explaining the Adoption Intention for the Interbank Mobile Payment Service in an Indian Context. In *Grand Successes and Failures in IT:Public and Private Sectors* (pp. 203-220). Springer Berlin Heidelberg.

KARNANI, A. (2009). The bottom of the pyramid strategy for reducing poverty: A failed promise.DESA Working Paper, Economics & Social Affairs group, University of Michigan.

KAUFFMAN, S. (1995). *At home in the universe: The search for the laws of self-organization and complexity*. London: Penguin.

KAUFFMAN, S. A. (2010). *Reinventing the sacred: A new view of science, reason, and religion*. Basic Books.

KAWALEK, P., & WOOD-HARPER, T. (2002). The finding of thorns: user participation in enterprise system implementation. *ACM SIGMIS Database*, *33*(1), 13-22.

KELLY, M. (2009) Not Just for Profit. *Strategy & Business*, 10**,** 9-19.

KENT, J. (2012) Dominant mobile payment approaches and leading mobile payment solution providers: A review. *Journal of Payments Strategy & Systems,* 6**,** 315-324.

KENT, W. (1978). *Data and reality: Basic assumptions in data processing reconsidered*. Elsevier Science Inc.

KHAN, S. R. (1987). *Profit and loss sharing: An Islamic experiment in finance and banking*. Oxford University Press, USA.

KHANDKER, S. R. (2012). Grameen bank lending: does group liability matter?.*World Bank Policy Research Working Paper*, (6204).

KHAVUL, S. (2010). "Microfinance: Creating Opportunities for the Poor?" *The Academy of Management Perspectives*24(3): 58 - 72.

KIEN, S. S., SOH, C., & MARKUS, M. L. (2013). A New IT Organizational form for Multinational Enterprises. Proceedings of the Pacific Asia Conference on Information Systems. Available at: http://aisel.aisnet.org/pacis2013/ [Accessed in 15th March 2015].

KIM, D. H. (1998). The link between individual and organizational learning. *The strategic management of intellectual capital*, 41-62.

KIM, C. & MAUBORGNE, R. (2004) Creating New Market Space.*Harvard Business Review*, 77**,** 83-93.

KING, N. (2004). Using templates in the thematic analysis of texts. *Essential guide to qualitative methods in organizational research*, 256-270.

KISTRUCK, G. M., BEAMISH, P. W., QURESHI, I., & SUTTER, C. J. (2013). Social Intermediation in Base-of-the-Pyramid Markets. *Journal of Management Studies*, *50*(1), 31-66.

KLECUŃ, E. (2004). Conducting critical research in information systems: Can actor-network theory help?. *Information systems research*, 259-274.

KLEIN, H. K., & MYERS, M. D. (1999). A set of principles for conducting and evaluating interpretive field studies in information systems. *MIS quarterly*, 67-93.

KLING, R. (2007). What is social informatics and why does it matter?. *The Information Society*, *23*(4), 205-220.

KLING, R. & SCACCHI, W. (1982). The Web of Computing: Computer Technology as Social Organization. , in M.C. Yovits (ed.), Advances in Computers, 21, 1-90.

KOCK, N. (2003). Action research: Lessons learned from a multi-iteration study of computer-mediated communication in groups. *Professional Communication, IEEE Transactions on*, *46*(2), 105-128.

KOCK, N., GALLIVAN, M. J., & DELUCA, D. (2008). Furthering information systems action research: a post-positivist synthesis of four dialectics. *Journal of the Association for Information Systems*, *9*(2), 4.

KOLB, D. A. (2014). *Experiential learning: Experience as the source of learning and development*. FT Press.

KOLK, A., RIVERA-SANTOS, M., & RUFÍN, C. (2012). Reviewing a Decade of Research on the Base/Bottom of the Pyramid (BOP) Concept. *Business & Society*, *Forthcoming, doi*, *10*, 0007650312474928.

KROGSTIE, J., LYYTINEN, K., OPDAHL, A. L., PERNICI, B., SIAU, K., & SMOLANDER, K. (2004). Research areas and challenges for mobile information systems.*International Journal of Mobile Communications*, *2*(3), 220-234.

KROGSTIE, J., LYYTINEN, K., OPDAHL, A. L., PERNICI, B., SIAU, K., & SMOLANDER, K. (2004). Research areas and challenges for mobile information systems.*International Journal of Mobile Communications*, *2*(3), 220-234.

KRUCHTEN, P. (2004). *The rational unified process: an introduction*. Addison-Wesley Professional.

KRUEGER, R. A. (2009). *Focus groups: A practical guide for applied research*. Sage.

KUHN, T. S. (1970). *The Structure of Scientific Revolutions*. University of Chicago Press,Chicago, Second edition.

LAND, F. (2010). The use of history in IS research: an opportunity missed & quest. *Journal of Information Technology*, *25*(4), 385-394.

LANKHORST, M. (2013). *Enterprise architecture at work: Modelling, communication and analysis*. Springer.

LAPWORTH, P., DESMOND, B., & SILLS, C. (2012). *An Introduction to Gestalt*.

Sage.

LATOUR, B. (1999). Pandora's Hope: Essays on the Reality of Science Studies, Cambridge, MA: Harvard University Press.

LATOUR, B. (2005). Reassembling the social-an introduction to actor-network-theory. *Reassembling the Social-An Introduction to Actor-Network-Theory, by Bruno Latour, pp. 316.Foreword by Bruno Latour.Oxford University Press.*

LATOUR, B. & WOOLGAR, S. (1979). *Laboratory life: The Social Construction of Scientific Facts*. Beverly Hills, CA: Sage.

LAUDON, K. C. (1995). Ethical concepts and information technology.*Communications of the ACM*, *38*(12), 33-39.

LAUDON, K. C., & LAUDON, J. P. (2006). *Management information systems: managing the digital firm*. Upper Saddle River, NJ: Pearson/Prentice Hall.

LAVALLE, S., LESSER, E., SHOCKLEY, R., HOPKINS, M. S., & KRUSCHWITZ, N. (2013). Big data, analytics and the path from insights to value. *MIT Sloan Management Review*, *21*.

LEAVITT, H. J. (1964).*Managerial Psychology*, Chicago: University of Chicago Press.

LEE J., AND BERENTE, N. (2012). "Digital Innovation and the Division of Innovative Labor: Digital Controls in the Automobile Industry," *Organization Science* (23:5), pp. 1428-1447.

LEE, C.S. & HO, J. C. (2013). A MULTIPLE PERSPECTIVES ANALYSIS OF CULTURE AND TECHNOLOGY MANAGEMENT: A KOREAN CASE. *International Journal of Innovation and Technology Management,* 10**.**

LEEPER, R. V. (1996). Moral objectivity, Jurgen Habermas's discourse ethics, and public relation

LEONARDI, P. M. (2013). The Emergence of Materiality Within Formal Organizations. In P.R. Carlile, D. Nicolini, A. Langley, & H. Tsoukas (Eds.) ***How Matter Matters: Objects, Artifacts and Materiality in Organization Studies*** (pp. 142-170). Oxford: Oxford University Press.

LEONARDI, P. M., & KALLINIKOS, J. (EDS.). (2012). *Materiality and organizing: Social interaction in a technological world*. Oxford University Press.

LEVINA, N. & VAAST, E. (2005) The emergence of boundary spanning competence in practice: implications for implementation and use of information systems. *MIS quarterly***,** 335-363.

LEVINE, R. (2002). Bank-based or market-based financial systems: Which is better?. *Journal of financial intermediation*, *11*(4), 398-428.

LEVY, Y. & ELLIS, T. J. (2006). A systems approach to conduct an effective literature review in support of information systems research.*Informing Science: International Journal of an Emerging Transdiscipline,* 9**,** 181-212.

LEWIN, K. (1951). *Field theory in social science*. New York: Harper & Row.

LEWIN, K. (1946) "Action Research and Minority Problems," *Journal of Social Issues* **2**, pp. 34–36. Reproduced with permission of Blackwell Publishing Ltd.

LEWIN, R. (1999). *Complexity: Life at the edge of chaos* (2nd edition). Chicago: University of Chicago Press.

LI, Y., ZHU, Z., & GERARD, C. M. (2012). Learning from conflict resolution: An opportunity to systems thinking. *Systems Research and Behavioral Science*,*29*(2), 209-220.

LIÉBANA-CABANILLAS, F., SÁNCHEZ-FERNÁNDEZ, J., & MUÑOZ-LEIVA, F. (2014). Antecedents of the adoption of the new mobile payment systems: The moderating effect of age. *Computers in Human Behavior*, *35*, 464-478.

LIN, W. S., & WANG, C. H. (2012). Antecedences to continued intentions of adopting e-learning system in blended learning instruction: A contingency framework based on models of information system success and task-technology fit. *Computers & Education*, *58*(1), 88-99.

LINDEN, L. P., KUHN JR, J. R., PARRISH JR, J. L., RICHARDSON, S. M., ADAMS, L. A., ELGARAH, W., & COURTNEY, J. F. (2007). Churchman's

inquiring systems: Kernel theories for knowledge management. *Communications of the Association for Information Systems*, *20*(1), 52.

LINSTONE, H. A. (1989). Multiple perspectives: concept, applications, and user guidelines. *Systems Practice*, *2*(3), 307-331.

LINSTONE, H. A. (1999). *Decision making for technology executives: using multiple perspectives to improved performance* (p. 315). Boston, MA: Artech House.

LINSTONE, H. A. (2010). Multiple perspectives redux. *Technological Forecasting and Social Change*, *77*(4), 696-698.

LINSTONE, H. A., & DEVEZAS, T. (2012). Technological innovation and the long wave theory revisited. *Technological Forecasting and Social Change*, *79*(2), 414-416.

LINSTONE, H. A., & MELTSNER, A. J. (1984). *Multiple perspectives for decision making: bridging the gap between analysis and action*. New York: North-Holland.

LINSTONE, H. A., & ZHU, Z. (2000). Towards synergy in multiperspective management: An American–Chinese case. *Human Systems Management*,*19*(1), 25-37.

LOCH, C. H., & HUBERMAN, B. A. (1999). A punctuated-equilibrium model of technology diffusion. *Management Science*, *45*(2), 160-177.

LONDON, T. (2009). Making better investments at the base of the pyramid.*Harvard Business Review*.87:106–113.

LONDON, T., & HART, S. L. (2011). Creating a fortune with the base of the pyramid. *Next generation business strategies for the base of the pyramid*, 1-18.

LONDON, T., & ANUPINDI, R. (2012). Using the base-of-the-pyramid perspective to catalyze interdependence-based collaborations. *Proceedings of the National Academy of Sciences*, *109*(31), 12338-12343.

LONDON, T.ANUPINDI, R.SHETHDON, S.ANUPINDI, R.SHETH, S. (2010). Creating mutual value: Lessons learned from ventures serving base of the pyramid producers. *Journal of Business Research , 63*, 582–594.

LOVELOCK, J. (2002). What is Gaia? *Resurgence*, *211*, 6–8.

LOVELOCK, J. (2006). *The revenge of Gaia: Why the earth is fighting back – and how we can still save humanity*. London: Allen Lane.

LU, Y., & RAMAMURTHY, K. R. (2011). Understanding the Link Between Information Technology Capability and Organizational Agility: An Empirical Examination. *Mis Quarterly*, *35*(4).

LYON, D. (2013). *The Electronic Eye: The Rise of Surveillance Society-Computers and Social Control in Context*. John Wiley & Sons.

LYYTINEN, K. (1987) "Different Perspectives on Information Systems: Problems and Solutions," CM *Computing Surveys* (19:1), 5-44.

LYYTINEN, K. (2001). Mobile commerce: a new frontier for E-business. In *Proceedings of the 34th Annual Hawaii International Conference on System Sciences (HICSS-34)-Volume 9-Volume 9* (p. 9012). IEEE Computer Society.

LYYTINEN, K., & DAMSGAARD, J. (2011). Inter-organizational information systems adoption–a configuration analysis approach. *European journal of information systems*, *20*(5), 496-509.

LYYTINEN, K., & GOODMAN, S. (1999). Finland: The unknown soldier on the IT front. *Communications of the ACM*, *42*(3), 13-17.

LYYTINEN, K., & HIRSCHHEIM, R. (1987). Information systems failures: a survey and classification of the empirical literature. *Oxford surveys in information technology*, *4*(1), 257-309.

LYYTINEN, K., & NEWMAN, M. (2008). Explaining information systems change: a punctuated socio-technical change model. *European Journal of Information Systems*, *17*(6), 589-613.

LYYTINEN, K., & NEWMAN, M. (2014). A tale of two coalitions–marginalising the users while successfully implementing an enterprise resource planning system.*Information Systems Journal*.25(2), 71-101.

LYYTINEN, K., NEWMAN, M., & AL-MUHARFI, A. R. A. (2009). Institutionalizing enterprise resource planning in the Saudi steel industry: a punctuated socio-technical analysis. *Journal of Information Technology*, *24*(4), 286-304.

MACHIAVELLI, N. (1910). *The prince* (Vol. 36). PF Collier.

MADON, S., REINHARD, N., ROODE, D., & WALSHAM, G. (2009). Digital inclusion projects in developing countries: Processes of institutionalization. *Information Technology for Development*, *15*(2), 95-107.

MAGRETTA, J. (2002) Why Business Models Matter. *Harvard Business Review*, 80**,** 86-92.

MAHROUM, S., BELL, S., & YASSIN, N. (2013). Innovation in Multi-stakeholder Engagement. Working Paper No.113, Insead.

MAKING FINANCE WORK FOR AFRICA. (2010). Egypt poised for mobile banking growth. Available at: http://www.mfw4a.org/news/news-details/select_category/51/article//egypt-poised-for-mobile-banking-growth.html [Accessed in 25th Feb 2015].

MALLAT, N., ROSSI, M., & TUUNAINEN, V. K. (2004). Mobile banking services.*Communications of the ACM*, *47*(5), 42-46.

MAHESHWARI, M., KUMAR, U., & KUMAR, V. (2012). Alignment between social and technical capability in software development teams: An empirical study. *Team Performance Management*, *18*(1/2), 7-26.

MAHMOOD, M. A., SIPONEN, M., LÓPEZ, F. J., & VANCE, A. (2012). Measuring Electronic Commerce Technology–Enabled Business Value: An

Empirical Investigation. *Journal of Organizational Computing and Electronic Commerce*,*22*(3), 256-279.

MARCUSE, P. (2002). Depoliticizing Globalization: From Neo-Marxism to the Network Society of Manuel Castells1. *Understanding the City: Contemporary and Future Perspectives*, 131-158.

MARCUSE, P., IMBROSCIO, D., PARKER, S., DAVIES, J. S., & MAGNUSSON, W. (2014). Critical Urban Theory versus Critical Urban Studies: A Review Debate. *International Journal of Urban and Regional Research*, *38*(5), 1904-1917.

MARGOLIS, J. D. & WALSH, J. P. (2003). Misery Loves Companies: Rethinking Social Initiatives by Business. ***Administrative Science Quarterly***, 48, 268-305.

MARKUS, M. L., & MENTZER, K. (2014). Foresight for a responsible future with ICT. *Information Systems Frontiers*, 1-16.

MARTIN, J. (1985) Fourth Generation Languages, vol. 1, Principles, Prentice-Hall Inc., Englewood Cliffs, New Jersey.

MARTIN, J. (1990). *Information engineering, planning & analysis: book 2*. Prentice-Hall, Inc.

MARTIN, J., & ODELL, J. J. (1994). *Object-oriented methods*. Prentice hall PTR.

MARX, K. (2012). *Economic and philosophic manuscripts of 1844*. Courier Corporation.

MARX, K. (1973). *Karl Marx on Society and Social Change: With Selections by Friedrich Engels*. University of Chicago Press.

MARX, K. (1967). *The Communist Manifesto*. Harmondsworth, Middlesex, U.K.,Penguin Books.

MAS, I. (2009). The economics of branchless banking. *Innovations: Technology, Governance, Globalization*, 4**,** 57-75.

MAS, I. (2nd Oct, 2013). Founding Myths of Mobile Money.Institute for Money Technology & Financial Inclusion. Available at: http://blog.imtfi.uci.edu/2013/10/founding-myths-of-mobile-money.html [Accessed in 22nd Oct 2013].

MAS, I., & MORAWCZYNSKI, O. (2009). Designing mobile money services lessons from M-PESA. *Innovations*, *4*(2), 77-91.

MAS, I., & RADCLIFFE, D. (2011). Scaling mobile money. *Journal of Payments Strategy & Systems*, *5*(3), 298-315.

MASARY (2010). Masary Microfinance Services. Available at: http://www.e-masary.com/index.php/en/ct-menu-item-5 [Accessed in 10th Dec 2014].

MASON, R. O., & MITROFF, I. I. (1973). A program for research on management information systems. *Management science*, *19*(5), 475-487.

MASON, R. O., & MITROFF, I. I. (2015). Charles West Churchman—Philosopher of Management An Interview With Richard O. Mason Conducted by Ian I. Mitroff. *Journal of Management Inquiry*, *24*(1), 37-46.

MASON, C., & SIMMONS, J. (2014). Embedding corporate social responsibility in corporate governance: A stakeholder systems approach. *Journal of business ethics*, *119*(1), 77-86

MATHIASSEN, L., & NIELSEN, P. A. (2008). Engaged scholarship in IS research.*Scandinavian Journal of Information Systems*, *20*(2), 1.

MAVOR, A. S., & PEW, R. W. (EDS.). (2007). *Human-System Integration in the System Development Process:: A New Look*. National Academies Press.

MAURER, B. (2012). Mobile money: Communication, consumption and change in the payments space. *Journal of Development Studies*, *48*(5), 589-604.

MAXWELL, J. A. (2012). *Qualitative research design: An interactive approach: An interactive approach* (Vol. 41). Sage.

MCCAIN, L. (2002). Informing technology policy decisions: the US Human Genome Project's ethical, legal, and social implications programs as a critical case. *Technology in Society*, *24*(1), 111-132

MCMILLAN, E. (2004). *Complexity, organizations and change*. London: Routledge.

MEADOWS, D. H. (2008). *Thinking in systems: A primer*. Chelsea Green Publishing.

MEADOWS, D. H., MEADOWS, D. L., & RANDERS, J. (1992). *Beyond the limits: global collapse or a sustainable future*. Earthscan Publications Ltd.

MCAFEE, A. P. (2006). Enterprise 2.0: The dawn of emergent collaboration. *MIT Sloan management review*, *47*(3), 21-28.

MCLAUGHLIN, J. A. & JORDAN, G. B. (1999). Logic models: a tool for telling your programs performance story. *Evaluation and Program Planning*, 22**,** 65-72.

MCWILLIAMS, A. & SIEGEL, D. (2000). Corporate social responsibility and financial performance: correlation or misspecification? *Strategic Management Journal*, 21**,** 603-609.

MERRITT, C. (2011). Mobile money transfer services: The next phase in the evolution of person-to-person payments. *Journal of Payments Strategy & Systems*, *5*(2), 143-160.

MERTON, R. K. (1976). *The ambivalence of organizational leaders." In Sociological Ambivalence and Other Essays,* New York, Free Press.

MERNIK, M., HEERING, J., & SLOANE, A. M. (2005). When and how to develop domain-specific languages. *ACM computing surveys (CSUR)*, *37*(4), 316-344.

MICROFINANCE GATEWAY. (2009). Evaluating the Impact of Egyptian Social Fund for Development Programs. Available at:

http://www.microfinancegateway.org/library/evaluating-impact-egyptian-social-fund-development-programs [Accessed in 25th Feb 2015].

MIDGLEY, G. (1992).*The Sacred and Profane in Critical Systems Thinking*, Systems Practice, (5)1, 5-16.

MILES, M. B., HUBERMAN, A. M., & SALDAÑA, J. (2013). *Qualitative data analysis: A methods sourcebook*. SAGE Publications, Incorporated.

MILES, I., & NUGROHO, Y. (2013). Microfinance and Innovation. *Innovation Policy Challenges for the 21st Century*, *27*, 155.

MILL, J. S. (2002 orig 1861). *Utilitarianism*, New York: Hackett Publishing Co.

MINGERS, J. (2001). Combining IS research methods: towards a pluralist methodology. *Information systems research*, *12*(3), 240-259.

MINGERS, J., & WALSHAM, G. (2010). Toward ethical information systems: the contribution of discourse ethics. *MIS Quarterly*, *34*(4), 833-854.

MITEV, N., & HOWCROFT, D. (2011). POST-STRUCTURALISM, SOCIAL SHAPING OF TECHNOLOGY, AND ACTOR-NETWORK THEORY: WHAT CAN THEY. *The Oxford Handbook of Management Information Systems: Critical Perspectives and New Directions*, 292.

MITROFF, I. I. (1983). Archetypal social systems analysis: On the deeper structure of human systems. *Academy of Management Review*, *8*(3), 387-397.

MITROFF, I. (2011). The Rise and the Fall of Business Schools: An Autobiography. *World Futures*, *67*(4-5), 244-252.

MITROFF, I. I., & LINSTONE, H. A. (1993). *The unbounded mind: Breaking the chains of traditional business thinking*. Oxford University Press: New York.

MITROFF,I.I. & SILVERS, A. (2010). *Dirty Rotten Strategies: How We Trick Ourselves and Others into Solving the Wrong Problems Precisely*, Stanford University Press, Stanford, CA.

MITROFF, I. I., ALPASLAN, C. M., MASON, R. O. (2013). The Messy Business of Management. *Image*.

MITROFF, I. I., ALPASLAN, C. M., & O'CONNOR, E. S. (2014). *Everybody's Business: Reclaiming True Management Skills in Business Higher Education*. Palgrave Macmillan.

MITROFF, I. I., HILL, L. B., & ALPASLAN, C. M. (2013). *Rethinking the Education Mess: A Systems Approach to Education Reform*. Palgrave Macmillan.

MOHAMAD, M. (2010). Non-Bank Microfinance at the Bottom of the Pyramid: case study of "My Village" by Vodafone Egypt. Manchester Finance Conference. Manchester business School, UK.

MOHAMAD, M. (2011). Mobile Microfinance and empowerment: the case of e-Masary for financial inclusion in Egypt, *Strategic foresight*, Vol: 2, Issue No: 11, Pp 11-16.

MOHAMAD, M. (MAY 2011). Exploring Accountability and Enterprise at Mobile Microfinance Initiatives, *Proceedings of the 4th Annual Information Studies Postgraduate Symposium*, Manchester Metropolitan University-UK.

MOHAMAD, M. (DECEMBER 2011). Exploring Accountability and Enterprises at the Bottom of the Pyramid: Case Study for Mobile Microfinance in Egypt. *Proceedings of the 2nd International Conference on Entrepreneurial Networking and Learning within Regional Economies*; Waterford, Ireland, UK.

MOHAMAD, M. (2012). Base of the Pyramid Value Chain As Lens For Cross-sector Collaboration in Mobile Financial Services, Proceedings of the AOM Meeting 2012, Boston, USA.

MOHAMAD, M. EL ALAMOUDY, S. ALNUWAIRAN, M, WOOD-HARPER, T. (FORTHCOMING 2015). How Mobile-Based Visuals Operate as Messages of Information for Different Cultures? Action case in the pilgrimage in Saudi Arabia. Action Research Journale. Special Issue for Action Researchers Engaging with New Technologies and Communicational Forms.

MOHAMAD, M. & WOOD-HARPER, A.T (JULY 2013). Using The Base Of The Pyramid Strategy As Lens For Cross-Sector Collaboration In Financial Inclusion: Case Of E-Masary For Mobile Financial Services, *Proceedings of the 8th International conference of Critical Management Studies; Technology-Based Classification Processes in the Global Context*. Manchester, UK. Available at: https://www.escholar.manchester.ac.uk/jrul/item/?pid=uk-ac-man-scw:203571 [Accessed in 13th July 2013].

MOHAMAD, M.R & WOOD-HARPER, A.T (AUGUST 2013). Multiperspectives of Mobile Money Systems Development: Case of e-Masary in Egypt. *Proceedings of the AOM Meeting 2013*, Orlando FL, USA.

MOHAMAD. M, WOOD-HARPER, T & RAMLOGAN, R, R. (AUGUST 2014). Embedded Innovation in Mobile Financial services at the Base of the Pyramid: An Action case to reveal enablers and mechanisms. *Proceedings of the AOM Meeting 2014*, Philadelphia, Pennsylvania, USA.

MOHAMAD. M, WOOD-HARPER, T. RAMLOGAN, R, R. (SEP 2014). Multiview of Virtual Currency Adoption and Systemic Risks: An Action Research on Service Businesses in the UK. Working paper for funding, The Cryptocurrency, The SWIFT Institute London, UK.

MOHAMAD, M.R. WOOD-HARPER, A.T & RAMLOGAN, R.R. (2014a). *Mobile Financial Services at the Base of the Pyramid: A Systemic view for Cross-Sector Governance and Embedded Innovation*. In Zhao, J. De Pablos, P. &Tennyson, R. Organizational Innovation and IT Governance in Emerging Economies. IGI Global.

MOHAMAD, M.R. WOOD-HARPER, A.T & RAMLOGAN, R.R. (2014b). *Multiview of Mobile Money System Development at the Base of the Pyramid: Case of e-Masary in Egypt after the Revolution*. In Zhao, J. De Pablos, P. &Tennyson, R. Organizational Innovation and IT Governance in Emerging Economies. IGI Global.

MOHAMAD. M, WOOD-HARPER, T. RAMLOGAN, R, R. (2015). Multiview of Mobile Money System Development at the Base of the Pyramid: Case of e-Masary in Egypt after the Revolution. In Graham, C, Strategic Management and Leadership for Systems Development in Virtual Spaces. IGI Global.

MOHAN, G. (2007) Participatory Development: From Epistemological Reversals to Active Citizenship. *Geography Compass*, 1**,** 779-796.

MOHAN, L. POTNIS, D. ALTER, S. (2013). Information Systems to Support "Door-step Banking": Enabling Scalability of Microfinance to Serve More of the Poor at the Bottom of the Pyramid, Communications of the Association for Information Systems, Vol 33, No. 25, pp. 423-442.

MONOD E & BOLAND RJ (2007). "Special issue on philosophy and epistemology : a 'Peter Pan syndrome'?". *Information Systems Journal*, 17 :133-141.

MORAWCZYNSKI, O. (2009). Exploring the usage and impact of "transformational" mobile financial services: the case of M-PESA in Kenya. *Journal of Eastern African Studies*, *3*(3), 509-525.

MORECROFT, J. (2010). System Dynamics. In In Reynolds, M., & Holwell, S. (2010). *Systems approaches to managing change: a practical guide*. London: Springer.

MORGAN, G. (1986). *Images of Organization*. London: Sage.

MOROZOV, E. (13th Oct 2014). The Planning Machine Project Cybersyn and the origins of the Big Data nation. *The New Yorker*. Available at: http://www.newyorker.com/magazine/2014/10/13/planning-machine [Accessed in 1st Dec 2014].

MYERS, M. D. (2013). *Qualitative research in business and management*. Sage.

MYERS, M. D., & AVISON, D. (1997). Qualitative research in information systems. *Management Information Systems Quarterly*, *21*, 241-242.

MYERS, M. D., & KLEIN, H. K. (2011). A Set of Principles for Conducting Critical Research in Information Systems. *Mis Quarterly*, *35*(1), 17-36.

MYERS, M. D., & NEWMAN, M. (2007). The qualitative interview in IS research: Examining the craft. *Information and organization*, *17*(1), 2-26.

MUMFORD, E. (1981). Participative Systems Design: Structure and Method. *Sys. Objectives, Solutions.*, 1**,** 5-19.

MUMFORD , E. (1985). Defining System Requirements to meet Business Needs: A case study example, The Computer Journal 28(2): 97–104.

MUMFORD, E. (1991). Job satisfaction: a method of analysis. *Personnel Review*,*20*(3), 11-19.

MUMFORD, E. (2006). The story of socio-technical design: reflections on its successes, failures and potential. *Information Systems Journal*, *16*(4), 317-342.

MUMFORD, E., & WARD, T. B. (1968). *Computers: Planning for people*. Batsford.

MUNIESA, F., MILLO, Y. AND CALLON, M. (2007). An introduction to market devices.*The Sociological Review*, 55(2), 1–12.

MWANGI, P.G. (13 MARCH 2013). *How replicable is M-PESA? Interview recording at Think M-PESA.Com*. Available at: http://www.thinkm-pesa.com/p/about.html [Accessed in 12th Feb 2015].

MYERS, M. D. (1995). Dialectical hermeneutics: a theoretical framework for the implementation of information systems. *Information Systems Journal*, *5*(1), 51-70.

NAKAMOTO, S. (2008). Bitcoin: A peer-to-peer electronic cash system.*Consulted*, *1*(2012), 28.

NASR, S. (2010). Enhancing Access to Finance for Micro and Small Enterprises in Egypt.*Proceeding of the 10th Global Conference on Business and Economics***,** Rome, Italy.

NATIONAL TELECOMMUNICATION REGULATORY AUTHORITY.(2013). Mobile Operators Benchmarking in Egypt..

NELSON, W. B. (2005). *Applied life data analysis* (Vol. 577). John Wiley & Sons.

NEWMAN, M., & ROBEY, D. (1992). A social process model of user-analyst relationships. *Mis Quarterly*, 249-266.

NEWMAN, M. & ZHU, S. (2007). Process Modeling Information Systems Development. *In:* McMaster, T., Wastell, D., Ferneley, E. & DeGross, J. (eds.) *Organizational Dynamics of Technology-Based Innovation: Diversifying the Research Agenda.* Springer US.

NICKERSON, R. C., VARSHNEY, U., & MUNTERMANN, J. (2013). A method for taxonomy development and its application in information systems. *European Journal of Information Systems*, *22*(3), 336-359.

NIEDERMAN, F., BRANCHEAU, J. C. & WETHERBE, J. C. (1991). Information Systems Management Issues for the 1990s. *MIS Quarterly*, 15(4)**,** 475-500.

NICHOLSON, B., & SAHAY, S. (2009). Deinstitutionalization in the context of software exports policymaking in Costa Rica. *Journal of Information Technology*, *24*(4), 332-342.

NICKERSON, R. C., VARSHNEY, U., & MUNTERMANN, J. (2012).A method for taxonomy development and its application in information systems. *European Journal of Information Systems*.

NICOLIS, G., & PRIGOGINE, I. (1977). *Self-organization in nonequilibrium systems*(Vol. 191977). Wiley, New York.

NIELSEN, P., & HERSTAD, J. (2005). Providing premium SMS services for mobile phones. In *Mobile Information Systems* (pp. 293-301).Springer US.

NJIHIA, M. (24TH APRIL, 2014).Trojan horses in the Safaricom stable. Available at: http://www.mbuguanjihia.com/business/trojan-horses-safaricom-stable.html [Accessed in 10th March 2015].

NOBLE, F. (1991). Seven ways to develop office systems: a managerial comparison of office system development methodologies. *The Computer Journal*, *34*(2), 113-121.

NONAKA, I. (1991). The knowledge-creating company. *Harvard business review*,*69*(6), 96-104.

NOZICK, R. (1974). *Anarchy, state, and utopia* (Vol. 5038). Basic books

OATES, B. J. (2006). *Researching information systems and computing*, Oxford, UK, Sage Publications Ltd.

O'HEOCHA, C., WANG, X., & CONBOY, K. (2012). The use of focus groups in complex and pressurised IS studies and evaluation using Klein & Myers principles for interpretive research. *Information Systems Journal*, *22*(3), 235-256.

OKOLI, C., SCHABRAM, K. (2010). "A Guide to Conducting a Systematic Literature Review of Information Systems Research,". Sprouts: Working Papers on Information Systems, 10(26). http://sprouts.aisnet.org/10-26

ONDRUS, J., & LYYTINEN, K. (2011). Mobile Payments Market: Towards Another Clash of the Titans?. In 10th *Mobile Business International Conference (ICMB), on* (pp. 166-172). IEEE.

ONDRUS, J., LYYTINEN, K., & PIGNEUR, Y. (2009). Why mobile payments fail? Towards a dynamic and multi-perspective explanation. In *System Sciences, 2009. HICSS'09. 42nd Hawaii International Conference on* (pp. 1-10). IEEE.

ONDRUS, J., & LYYTINEN, K. (2011, JUNE). Mobile Payments Market: Towards Another Clash of the Titans?.In *Mobile Business (ICMB), 2011 Tenth International Conference on IEEE*, 166-172.

ONDRUS, J., & PIGNEUR, Y. (2007, JULY). An assessment of NFC for future mobile payment systems. In *Management of Mobile Business, 2007. ICMB 2007. International Conference on the* (pp. 43-43). IEEE.

ONDRUS, J. & PIGNEUR, Y. (2006). "Towards A Holistic Analysis of Mobile Payments: A Multiple Perspectives Approach", Electronic Commerce Research and Applications, 5(3), 246-257.

OREKU, G. S. (2013). Mobile technology interaction to e-Commerce in promising of u-Commerce. *African Journal of Business Management*, *7*(2), 85-95.

ORNA, E (1999). *Practical Information Policies. Second Edition*. Gower, London.

ORLIKOWSKI, W. J. (2007). Sociomaterial practices: Exploring technology at work. *Organization studies*, *28*(9), 1435-1448.

ORLIKOWSKI, W. J. (2010). The sociomateriality of organisational life: considering technology in management research. *Cambridge Journal of Economics*, *34*(1), 125-141.

ORLIKOWSKI, W. J., & SCOTT, S. V. (2008). Sociomateriality: Challenging the Separation of Technology, Work and Organization.

ORLITZKY, M., SCHMIDT, F. L. & RYNES, S. L. (2003) Corporate social and financial performance: a meta-analysis. *Organization Studies,* 24**,** 403-441.

OSTERWALDER, A., & PIGNEUR, Y. (2010). *Business model generation: a handbook for visionaries, game changers, and challengers*. John Wiley & Sons

PAGE, S. E. (2008). *The Difference: How the Power of Diversity Creates Better Groups, Firms, Schools, and Societies (New Edition)*. Princeton University Press.

PAN, S. L., PAN, G. S., NEWMAN, M., & FLYNN, D. (2006). Escalation and de-escalation of commitment to information systems projects: Insights from a project evaluation model. *European Journal of Operational Research*, *173*(3), 1139-1160.

PARIKH, T. S., & LAZOWSKA, E. D. (2006, MAY). Designing an architecture for delivering mobile information services to the rural developing world. In *Proceedings of the 15th international conference on World Wide Web* (pp. 791-800). ACM.

PARRISH JR, J. L., & COURTNEY, J. F. (2012). Inquiring Systems: Theoretical Foundations for Current and Future Information Systems. In *Information Systems Theory* (pp. 387-396). Springer New York.

PAVA, C. (1983). *Managing New Office Technology: An Organizational Strategy*. The Free Press, New York.

PAVA, C. (1986). Redesigning sociotechnical systems design: concepts and methods for the 1990s. *The journal of applied behavioral science*, *22*(3), 201-221.

PAVLOU, P. A. (2003). Consumer acceptance of electronic commerce: integrating trust and risk with the technology acceptance model. *International journal of electronic commerce*, *7*(3), 101-134.

PEPPARD, J. & RYLANDER, A. (2006). From Value Chain to Value Network:: Insights for Mobile Operators. *European Management Journal,* 24(2–3)**,** 128-141.

PERNICI, B. (2006). Mobile Information Systems. Springer, Berlin.

PERROT, F. (2013). Organizational Challenges of Multinational Corporations at the Base of the Pyramid: An Action-research Inquiry. *Working Paper,* Cahier De Recherché.

PETTIGREW, A. M. (2013). The conduct of qualitative research in organizational settings. *Corporate Governance: An International Review*, *21*(2), 123-126.

PETTIGREW, A. M. (2012). Context and Action in the Transformation of the Firm: A Reprise. *Journal of Management Studies*, *49*(7), 1304-1328.

PETTIGREW, A., & WHIPP, R. (1991). *Managing Change for Competitive Success.* Oxford: Blackwell.

PHAM, L., CAO, N. Y., NGUYEN, T. D., & TRAN, P. T. (2013). Structural models for e-banking adoption in Vietnam. *International Journal of Enterprise Information Systems (IJEIS)*, *9*(1), 31-48.

PICKERING, A. (1995). The mangle of practice: Time, agency, & science. Chicago, The University of Chicago Press.

PICKERING, A. (2005). A gallery of monsters: cybernetics and self-organisation, 1940-1970. *Mechanical bodies, computational minds: Artificial intelligence from automata to cyborgs*, 229-45.

PICKERING, A. (2011). Brains, selves and spirituality in the history of cybernetics. Working Paper in Sociology & Philosophy, University of Exeter.

***PLANET FINANCE*. (2008).** National Impact Survey of Microfinance in Egypt. Available at: http://admin.planetfinancegroup.org/upload/medias/fr/mf_impact_report_egypt_2008.pdf [Accessed in 29th April 2014].

POLAK, P., & WARWICK, M. (2013). *The Business Solution to Poverty: Designing Products and Services for Three Billion New Customers*. Berrett-Koehler Publis.

POPPER, K., (1972). Objective Knowledge, Oxford University Press: Oxford.

PORTER, M. E. (1979). How competitive forces shape strategy. Harvard Business Review **57**(2): 137–145.

PORTER, M. E. (2011). *Competitive advantage of nations: creating and sustaining superior performance*. Simon and Schuster.

POUSTTCHI, K., SCHIESSLER, M., & WIEDEMANN, D. G. (2009). Proposing a comprehensive framework for analysis and engineering of mobile payment business models. *Information Systems and E-Business Management*, *7*(3), 363-393.

POWELL, W. W., KOPUT, K. W., & SMITH-DOERR, L. (1996). Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology.*Administrative science quarterly*, 116-145.

PRAHALAD, C. K. (2009). *The Fortune at the Bottom of the Pyramid*.Pearson Education India.

PRAHALAD, C. K., & BETTIS, R. A. (1986). The dominant logic: A new linkage between diversity and performance. *Strategic Management Journal*, *7*(6), 485-501.

PRAHALAD, C. K., & HAMMOND, A. (2002A). Serving the world's poor, profitably.*Harvard business review*, *80*(9), 48-59.

PRAHALAD, C. K. & A. HAMMOND. (2002B). "What Works: Serving the Poor Profitably." *World Resources Institute*.

PRAHALAD, C. K., & HART, S. L. (1999). Strategies for the bottom of the pyramid: creating sustainable development. *Ann Arbor*, *1001*, 48109.

PRAHALAD, C.K & HART S.L. (2002). The fortune at the bottom of the pyramid.*Strategy & Business* 26:2–14.

QIU, J. L., CASTELLS, M., & CARTIER, C. (2009). *Working-class network society: Communication technology and the information have-less in urban China*. MIT Press.

RAHMAN, A. (1999). Women and microcredit in rural Bangladesh.An anthropological study of Grameen Bank lending. Boulder: Westview Press.

RAMADA-SARASOLA, M. (2012). "Can Mobile Money Systems have a measurable impact on Local Development?" *Research Report for the International Development Research Centre (IDRC).*Innovation & Research Multiplier and Social Trade Organization (STRO). May 17, 2012.

RAMAGE, M & KAREN SHIPP. (2009). *Systems thinkers*. Springer.

REASON, P., & BRADBURY, H. (EDS.). (2013). *The SAGE handbook of action research: Participative inquiry and practice*. Sage.

REMUS, W. (1986) Graduate students as surrogates for managers in experiments on business decision making.*Journal of Business Research,* 14**,** 19-25.

REYNOLDS, M., & HOLWELL, S. (2010). *Systems approaches to managing change: a practical guide*. London: Springer.

RHYNE, E. (2009). *Microfinance for Bankers and Investors: Understanding the Opportunities and Challenges of the Market at the Bottom of the Pyramid*. McGraw-Hill.

RIDLEY, D. (2012). *The literature review: A step-by-step guide for students*. Sage.

ROCHET, J. C., & TIROLE, J. (2003). Platform competition in two-sided markets.*Journal of the European Economic Association*, *1*(4), 990-1029.

ROCK-EVANS, R. (1981).*Data analysis*, IPC.

ROGERS, E. M. (1983). Diffusion of innovations. *New York*.

ROGERS, E. M. (2002). Diffusion of preventive innovations. *Addictive behaviors*,*27*(6), 989-993.

ROGERS, E. M. (2004).A prospective and retrospective look at the diffusion model. *Journal of Health Communication*, *9*(S1), 13-19.

ROGERS, E. M. (2010). *Diffusion of innovations*.Simon and Schuster.

ROPOHL, G. (1999). Philosophy of socio-technical systems. *Society for Philosophy and Technology*, 3(4) Available at: http://scholar.lib.vt.edu/ejournals/SPT/v4_n3html/ROPOHL.html [Accessed in 15th July 2014].

ROSS, D. T., & SCHOMAN JR, K. E. (1977). Structured analysis for requirements definition. *Software Engineering, IEEE Transactions on*, (1), 6-15.

RUMBAUGH, J., JACOBSON, I., & BOOCH, G. (2004). *Unified Modeling Language Reference Manual, The*. Pearson Higher Education.

PRIGOGINE , I. (1989)."The Philosophy of Instability", Futures, Elsevier.

RUBIN, J. S. (2001) Community Development Venture Capital: A Double-Bottom Line Approach to Poverty Alleviation. *Federal Reserve System research conference.*Washington, DC, Federal Reserve System.

SAHIN, I. (2006). Detailed review of Rogers' diffusion of innovations theory and educational technology-related studies based on Rogers' theory. *The Turkish Online Journal of Educational Technology*, *5*(2), 14-23.

SALINESI, C. & ROLLAND, C. (2003). Fitting Business Models to System Functionality Exploring the Fitness Relationship. *In:* Eder, J. & Missikoff, M. (eds.) *Advanced Information Systems Engineering.* Springer Berlin Heidelberg.

SÁNCHEZ, C. M., & SCHMID, A. S. (2013). Base of the Pyramid success: A relational view. *South Asian Journal of Global Business Research*, *2*(1), 5-5.

SAMUEL, A. (2014). *Work Smarter with Twitter and HootSuite*. Harvard Business Press.

SANABEL. (2011). Annual Data-2011 Q4. Available at: http://www.sanabelnetwork.org/membership/showQReport.aspx?cid=160 [Accessed in 1st March 2015].

SAUNDERS, M. N., SAUNDERS, M., LEWIS, P., & THORNHILL, A. (2011). *Research methods for business students, 5/e*. Pearson Education India.

SCHWITTAY, A. (2008). "A Living Lab: Delivery of ICTs in Rural India." *Science, Technology & Society* 12(3): 175-209.

SEN, A. (1976). Poverty: an ordinal approach to measurement. *Econometrica: Journal of the Econometric Society*, 219-231.

SEN, A. (1999). *Development as freedom.* Oxford, UK: Oxford University Press.

SENGE, P. M. (2014). *The fifth discipline fieldbook: Strategies and tools for building a learning organization*. Crown Business.

SARKER, S., CHATTERJEE, S., & XIAO, X. (2013). How "sociotechnical" is our IS research? an assessment and possible ways forward.Association of Information System.

SCHAFFER, J. (2010). Monism: The priority of the whole. *Philosophical Review*,*119*(1), 31-76.

SCHEIN, E. H. (1996). Culture: The missing concept in organization studies.*Administrative science quarterly*, 229-240.

SCHIERZ, P. G., SCHILKE, O., & WIRTZ, B. W. (2010). Understanding consumer acceptance of mobile payment services: An empirical analysis. *Electronic Commerce Research and Applications*, *9*(3), 209-216.

SCHWARZ, A., CHIN, W. W., HIRSCHHEIM, R., & SCHWARZ, C. (2014). Toward a process-based view of information technology acceptance. *Journal of Information Technology*, *29*(1), 73-96.

SCOTT, J., & CARRINGTON, P. J. (EDS.).(2011). *The SAGE handbook of social network analysis*.SAGE publications.

SEARLE, J. R. (1969). *Speech acts: An essay in the philosophy of language* (Vol. 626). Cambridge university press.

SEELOS, C. & MAIR, J. (2007). Profitable business models and market creation in the context of deep poverty: A strategic view. *Academy of Management Perspectives,* 21, 49-63.

SEIN, M. K., & FURUHOLT, B. (2012). Intermediaries: bridges across the digital divide. *Information Technology for Development*, *18*(4), 332-344.

SELINGER, E. (2008) Does Microcredit "Empower"? Reflections on the Grameen Bank Debate.*Human Studies,* 31**,** 27-41.

SENGE, P. M., & SUZUKI, J. (1994). *The fifth discipline: The art and practice of the learning organization* (p. 14). New York: Currency Doubleday.

SHEFFIELD, J., SANKARAN, S., & HASLETT, T. (2012). Systems thinking: taming complexity in project management. *On the Horizon*, *20*(2), 126-136.

SIAU, K., & ROSSI, M. (2011). Evaluation techniques for systems analysis and design modelling methods–a review and comparative analysis. *Information Systems Journal*, *21*(3), 249-268.

SILVERMAN, D. (2011). *Interpreting qualitative data: A guide to the principles of qualitative research*. Los Angeles, CA: Sage.

SILVERMAN, D. (2013). *Doing qualitative research: A practical handbook*. SAGE Publications Limited.

SIMANIS, E., & HART, S. (2009A). Innovation from the inside out. *MIT Sloan management review*, *50*(4), 77-86.

SIMANIS, E. & HART, S. (2009B). Innovation From the Inside Out. *Sustainability & Innovation***,** 77-86.

SIMSION, G. (2007). *Data modeling: theory and practice*. Technics Publications.

SINGH, R., & WOOD-HARPER, T. (2010). The Socio-technical Balanced Scorecard for Assessing a Public University. *E-Strategies for Resource Management Systems: Planning and Implementation*, 47.

SINGH, R., & WOOD-HARPER, T. WOOD, B. (2008). Designing Socio-Technical Systems for Ubiquitous Information Environments. Scientific Inquiry, vol. 9, No. 1, June, 2008, pp. 37 – 46.

SINGH, G., SHARMA, M., ARORA, A., & KAUR, P. (2012). A Comparative Study of Static Object Oriented Metrics. *International Journal of Advancements in Technology*, *3*(1), 25-34.

SKINNER, J. S. (ED.). (2005). *Exercise testing and exercise prescription for special cases: theoretical basis and clinical application*. Lippincott Williams & Wilkins.

SKYTTNER, L. (2005). *General systems theory: Problems, perspectives, practice*. World Scientific.

SMITH, N. (2008). *Uneven development: Nature, capital, and the production of space*. University of Georgia Press.

SMITH, H. J., & HASNAS, J. (1999). Ethics and information systems: the corporate domain. *Mis Quarterly*, 109-127.

SNODGRASS, D & WOLLER, G. (2006). PROFIT Zambia Impact Assessment: Baseline Research Design. *USAID.*

SNOWDEN, D. (2002). Complex acts of knowing: paradox and descriptive self-awareness. *Journal of knowledge management*, *6*(2), 100-111.

SOLÉE, R. V., VALVERDE, S., CASALS, M. R., KAUFFMAN, S. A., FARMER, D., & ELDREDGE, N. (2013). The evolutionary ecology of technological innovations.*Complexity*, *18*(4), 15-27.

SOONHWA, L.-K., PEDRO, S. & TREVOR, W.-H. (2010). A requirements elicitation framework and tool for sourcing business-IT aligned e-services. *Proceedings of the 2010 ACM Symposium on Applied Computing.* Sierre, Switzerland: ACM.

STALDER, F. (2006). *Manuel Castells: the theory of the network society*. Cambridge: Polity.

STAHL, B. C. (2007). ETHICS, morality and critique: An essay on Enid Mumford's socio-technical approach. *Journal for the Association of Information Systems*, *8*(9), 479-490.

STAHL, B. C. (2012). Morality, Ethics and Reflection: A categorisation of Normative IS Research. *Journal of the Association for Information System*, 13(8).

STAHL, B. C. (2013). Interpretive accounts and fairy tales: a critical polemic against the empiricist bias in interpretive IS research. *European Journal of Information Systems*.

STAHL, B. C. (2014). Participatory design as ethical practice–concepts, reality and conditions. *Journal of Information, Communication and Ethics in Society*,*12*(1), 10-13.

STEPHANIDIS, C. (ED.). (2014). *The universal access handbook*. CRC Press.

STEPHANIDIS, C., & SAVIDIS, A. (2001). Universal access in the information society: methods, tools, and interaction technologies. *Universal Access in the Information Society*, *1*(1), 40-55.

STRAUB, D. W. (2009). Editor's comments: why top journals accept your paper.*Management Information Systems Quarterly*, *33*(3), 2.

STRAUSS, A. L. (1987). *Qualitative analysis for social scientists*.Cambridge University Press.

STRAUSS, A., & CORBIN, J. M. (1990). *Basics of qualitative research: Grounded theory procedures and techniques*. Sage Publications, Inc.

SUMNER, M. (1999, APRIL). Critical success factors in enterprise wide information management systems projects. In *Proceedings of the 1999 ACM SIGCPR conference on Computer personnel research*: 297-303. ACM.

SULAIMAN, S. J. (1999). The Shura Principle in Islam. *Al-Hewar center, Inc*, 2.

SURISETTI, J., SARKAR, M., & JAIN, N. (2012). Management Education in India: A Perspective on Existing Challenges and Roadmaps. In *Ninth AIMS International Conference on management.Jan1-4/2012, pg* (pp. 701-709).

SVEJNAR, J. (1982) On the Theory of a Participatory Firm. *Jounral of economic theory* 27**,** 313-330.

TAN, B; PAN, S L.; LU, X & HUANG, L, (2009)."Leveraging Digital Business Ecosystems for Enterprise Agility: The Tri-Logic Development Strategy of Alibaba.com".*ICIS 2009 Proceedings.* Paper 171.

TAPSCOTT, D. (2010). Grown up digital: how the net generation is changing your world. *International Journal of Market Research*, *52*(1), 139.

TAPSCOTT, D., & WILLIAMS, A. AD (2008). Wikinomics: How Mass Collaboration Changes Everything. Penguin Group, New York.

TATNALL, A. (2003). Actor-Network Theory as a Socio-Technical Approach to Information Systems Research.IN CLARKE, S., COAKES, E., HUNTER, M. G. & WENN, A. (Eds.) *Socio-Technical and Human Cognition Elements of Information Systems.*Hershey, PA, Idea Group Inc.

TARAFDAR, M., ANEKAL, P., & SINGH, R. (2012). Market development at the bottom of the pyramid: examining the role of information and communication technologies. *Information Technology for Development*, *18*(4), 311-331.

TERLOUW, L. I., & ALBANI, A. (2013). An Enterprise Ontology-Based Approach to Service Specification. *Services Computing, IEEE Transactions on*, *6*(1), 89-101.

THAPA, D. SÆBØ, Ø (2013). Exploring the Link between ICT and Development in the Context of Developing Countries: A Literature Review. *The Electronic Journal of Information Systems in Developing Countries*.

***THE INDEPENDENT*. (29TH OCT 2013).** Islamic investment: David Cameron moves to make London a Mecca for Middle East wealth. Available at: http://www.independent.co.uk/news/uk/politics/islamic-investment-david-cameron-moves-to-make-london-a-mecca-for-middle-east-wealth-8909570.html [Accessed in 18th August 2014].

THE ECONOMIST. (OCT 8TH 2014). Why Islamic financial products are catching on outside the Muslim world. Available at: http://www.economist.com/blogs/economist-explains/2014/10/economistexplains0?fsrc=scn%2Ffb%2Fwl%2Fbl%2Fee%2Fwhyislamicfinancialproductsarecatching [Accessed in 25th Feb 2015].

***THE NEW YORK TIME*. (18TH SEP 2014).** Rush to Invest in Alibaba, but Concerns Linger About Company's Future. Available at: http://dealbook.nytimes.com/2014/09/18/rush-to-invest-in-alibaba-but-concerns-linger-about-the-companys-future/?module=Search&mabReward=relbias%3As%2C%7B%222%22%3A%22RI%3A15%22%7D [Accessed in 20th Sep 2014].

***THE TELEGRAPH*. (10TH JAN 2014).** Ten places where you can spend your bitcoins in the UK Available at: http://www.telegraph.co.uk/technology/news/10558191/Ten-places-where-you-can-spend-your-bitcoins-in-the-UK.html [Accessed in 19th August 2014].

THOMPSON, J. D. & MACMILLAN, I. C. (2010) Business Models: Creating New Markets and Societal Wealth. *Long Range Planning*, 43**,** 291-307.

TICHY, N. M., TUSHMAN, M. L., & FOMBRUN, C. (1979). Social network analysis for organizations. *Academy of management review*, *4*(4), 507-519.

***TIMES HIGHER EDUCATION*. (21ST 2014).** Bitcoin to be accepted by university for fee payment. Available at: http://www.timeshighereducation.co.uk/news/bitcoin-to-be-accepted-by-university-for-fee-payment/2010698.article [Accessed in 19th August 2014].

TRIST, E. (1981a) "The Evolution of Socio-Technical Systems", *Perspectives on Organizational Design and Behavior*, Van de Ven, A. H and Joyce, W. F. (eds.), New York: John Wiley.

TRIST, E. (1981b). The evolution of socio-technical systems. *Occasional paper*, *2*, 1981.

TRIST, E. L., HIGGIN, G. W., MURRAY, H., & POLLOCK, A. B. (2013). *Organizational choice*. Routledge.

TUSHMAN, M. L., & ANDERSON, P. (1986). Technological discontinuities and organizational environments. *Administrative science quarterly*, 439-465.

ULRICH, P. (2008). *Integrative economic ethics: Foundations of a civilized market economy*. Cambridge University Press.

***UNCTAD*. (2011).** Information Economy Report 2011. ICTs Enabler for Private Sector Development. Geneva: UNCTAD. Available at: http://unctad.org/en/PublicationsLibrary/ier2011_en.pdf [Accessed in 6th April 2014].

UNDP. (2011). Egypt's Progress Towards Achieving the millennium Development Goals 2010. Available at: http://www.eg.undp.org/content/dam/egypt/docs/Publications/Docs%20MDGs/04_Egy_2010%20MDG%20Report_English_R5.pdf [Accessed in 20th Sep 2014].

***UK TRADE & INVESTMENT* (2013).** UK Excellence in Islamic Finance. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/253141/UKTI_UK_Excellence_in_Islamic_Finance.pdf [Accessed in 19th August 2014].

***USAID*. (2010).** PROFIT Zambia Impact Assessment. USAID. Available at: http://pdf.usaid.gov/pdf_docs/PDACR843.pdf [Accessed in 2nd May 2014].

***USAID*. (2011).** The legal and regulatory environment for microfinance in Egypt: diagnostic study with focus on NGO-MFI transformation issues. Available at: http://www.microfinancegateway.org/p/site/m//template.rc/1.9.42307 [Accessed in 1st May 2014].

***USAID*. *(2012)*.** Economic growth program. Overview. Available at: http://www.usaid.gov/egypt/economic-growth-and-trade [Accessed in 6th April 2014].

VALENTE, T. W. (1995). *Network models of the diffusion of innovations* (Vol. 2, No. 2). Cresskill, NJ: Hampton Press.

VALIRIS, G., & GLYKAS, M. (1999). Critical review of existing BPR methodologies: the need for a holistic approach. *Business process management journal*, *5*(1), 65-86.

VAN DE VEN, A. H. (2007a). *Engaged Scholarship: A Guide for Organizational and Social Research: A Guide for Organizational and Social Research*. Oxford University Press.

VAN DE VEN, A. H. (2007b). Engaged scholarship: Creating knowledge for science and practice. *Oxford University Press, Oxford*.

VAN ROOYEN, C., R. STEWART, ET AL. (2012). "The Impact of Microfinance in Sub-Saharan Africa: A Systematic Review of the Evidence." *World Development***40**(11): 2249-2262.

VICKERS, G.(1983). *Human systems are different*. London: Harper & Row.

VICO, G. (1984). *The new science of Giambattista Vico*. Cornell University Press.

VIDGEN, R. (2002) Constructing a web information system development methodology.*Information Systems Journal,* 12**,** 247-261.

VIDGEN, R., & BRAA, K. (1997). Balancing interpretation and intervention in information system research: the action case approach. In *Information systems and qualitative research* (pp. 524-541). Springer US.

VIDGEN R. T., AVISON D. E., WOOD J. R. G. & WOOD-HARPER A. T., (2002). Developing Web Information Systems, Butterworth-Heinemann.

VILBERGSDOTTIR, S. G., HVANNBERG, E. T., & LAW, E. L. C. (2014). Assessing the reliability, validity and acceptance of a classification scheme of usability problems (CUP). *Journal of Systems and Software*, *87*, 18-37.

VITALARI, N. P. (1984). *Critical assessment of structured analysis methods: a psychological perspective'*. North-Holland.

VON FOERSTER, H. (2003). Cybernetics of cybernetics. In *Understanding Understanding* (pp. 283-286). Springer New York.

VONG, J., FANG, J., & INSU, S. (2012). Delivering financial services through mobile phone technology: a pilot study on impact of mobile money service on micro-entrepreneurs in rural Cambodia. *International Journal of Information Systems and Change Management*, *6*(2), 177-186.

WALKER, G. H., STANTON, N. A., SALMON, P. M., & JENKINS, D. P. (2008). A review of sociotechnical systems theory: a classic concept for new command and control paradigms. *Theoretical Issues in Ergonomics Science*, *9*(6), 479-499.

WALSH, J.P., KRESS, J.C., BEYERCHEN, K.W. (2005). Book review essay: Promises and perils at the Bottom of the Pyramid: "The Fortune at the Bottom of the Pyramid: Eradicating Poverty through Profits" by C. K. Prahalad. *Administrative Science Quarterly*, 50 (3): 473-482.

WALSHAM, G. (1995). The emergence of interpretivism in IS research. *Information Systems Research* 6(4), 376–394

WALSHAM, D. G. (1997). Actor-network theory and IS research: current status and future prospects. *Proceedings of the IFIP TC8 WG 8.2 international conference on Information systems and qualitative research.*Philadelphia, Pennsylvania, United States, Chapman & Hall, Ltd.

WALSHAM, G. (2006). Doing interpretive research. *European journal of information systems*, *15*(3), 320-330

WALSHAM, G. (2012).A better world with ICTs & quest; Response to the commentaries. *Journal of Information Technology*, *27*(3), 255-257.

WALSHAM, G. (2013). Development informatics in a changing world: Reflections from ICTD2010/2012. *Information Technologies & International Development*,*9*(1), pp-49.

WALSHAM, G. (2014). Empiricism in interpretive IS research: a response to Stahl. *European Journal of Information Systems*, *23*(1), 12-16.

WALSHAM, G., ROBEY, D., & SAHAY, S. (2007). Foreword: special issue on information systems in developing countries. *Management Information Systems Quarterly*, *31*(2), 6.

WASTELL, D. G. (1996). The fetish of technique: methodology as a social defence. *Information systems journal*, *6*(1), 25-40.

WASTELL, D., & WHITE, S. (2014). Making sense of complex electronic records: Socio-technical design in social care. *Applied ergonomics*, *45*(2), 143-149.

WATSON, H., & WOOD‐HARPER, T. (1995). Methodology as metaphor: the practical basis for multiview methodology (a reply to MC Jackson). *Information Systems Journal*, *5*(3), 225-231.

WATZLAWICK, P., BAVELAS, J. B., & JACKSON, D. D. (2011). *Pragmatics of human communication: A study of interactional patterns, pathologies and paradoxes*. WW Norton & Company.

WEAVER, M. (2013). Managing Complex Change Collaboratively. *Collaboration in Libraries and Learning Environments*, 69-85.

WEBER, M. (1949). Objectivity. *Social Science and Social Policy." The Methodology of the Social Sciences. New York: Free Press, 1949a*, 49-112.

WEBER, D. M., & KAUFFMAN, R. J. (2011). What drives global ICT adoption? Analysis and research directions. *Electronic commerce research and applications*, *10*(6), 683-701.

WEBER, M., SHILS, E., FINCH, H. A., & ANTONIO, R. J. (2011). *Methodology of Social Sciences*. Transaction Pub.

WEBSTER, F. (2014). *Theories of the information society*. Routledge.

WEBSTER, F. (1995). Information and the idea of an information society*: Theories of the information society. London: Routtedge*, 6-51.

WEBSTER, J., & WATSON, R. T. (2002). Analyzing the past to prepare for the future: Writing a literature review. *MIS Quarterly*, *26*(2), 13-23.

WENDY, C & GALLIERS, R EDS. (1999). *Rethinking management information systems: An interdisciplinary perspective*. Oxford University Press.

WHITE, B., CASTLEDEN, H., & GRUZD, A. (2014). Talking to Twitter users: Motivations behind Twitter use on the Alberta oil sands and the Northern Gateway Pipeline. *First Monday*, *20*(1).

WHITLEY, E. & POULOUDI, A. (2001). Studying the Translations of NHSnet.*Journal of End User Computing,* 13(3)**,** 30-40.

WIENER, N. (1948). *Cybernetics* (p. 112). Paris: Hermann.

WILSON, B. (1990). Systems: concepts, methodologies and applications. John Wiley & Sons, Inc.

WILSON, B. (2008). *Soft systems methodology: Conceptual model building and its contribution*. Wiley.com.

WING, J. M. (2006). Computational thinking. *Communications of the ACM*,*49*(3), 33-35.

WOHLIN, C., RUNESON, P., HÖST, M., OHLSSON, M. C., REGNELL, B., & WESSLÉN, A. (2012). *Experimentation in software engineering*. Springer Science & Business Media.

WOMACK, J. & JONES, D. (1990).*The Machine that Changed the World: the Future of the Automobile,* New York, Rawson.

WOOD-HARPER, T. (1985). Research methods in information systems: using action research. *Research methods in information systems.* Amsterdam: North-Holland.

WOOD-HARPER, T. (1989). Comparison of Inforation System Definition Methodologies: An Action Research, Mutliview Perspective**.** *PhD Dissertation,* University of East Anglia.

WOOD-HARPER, A. T., & AVISON, D. E. (2003). Bringing social and organisational issues into information systems development: the story of Multiview. *Socio-technical and human cognition elements of information systems*, 5-21.

WOOD-HARPER, A. T., & FITZGERALD, G. (1982). A taxonomy of current approaches to systems analysis. *The Computer Journal*, *25*(1), 12-16.

WOOD-HARPER, A & WOOD, B (2005) "Multiview as social informatics in action: past, present and future", Information Technology & People, Vol. 18 Iss: 1, pp.26 – 32.

WOOD-HARPER, A. T., ANTILL, L. & AVISON, D. E. (1985).*Information systems definition: the Multiview approach,* Blackwell Scientific Publications.

WYNN JR, D., & WILLIAMS, C. K. (2012). Principles for conducting critical realist case study research in information systems. *Mis Quarterly*, *36*(3), 787-810.

XIA, W., & LEE, G. (2003). Complexity of information systems development projects: conceptualization and measurement development. *Journal of Management Information Systems*, *22*(1), 45-83.

YAKUB, J. O., & IA, H. A. (2013). Mobile Money Services in Nigeria: An inquiry of existing Models. *Management*, *2*(9), 94-105.

YERMACK, D. (2013). *Is Bitcoin a Real Currency*? , National Bureau of Economic Research.

YILE, G. & CHASKAR, H. (2002). Class-based quality of service over air interfaces in 4G mobile networks. *Communications Magazine, IEEE*, 40(3)**,** 132-137.

YIN, R. K. (2013). *Case study research: Design and methods*. Sage publications.

YOO, Y., HENFRIDSSON, O., & LYYTINEN, K. (2010). Research commentary-The new organizing logic of digital innovation: An agenda for information systems research. *Information Systems Research, 21*(4), 724-735.

YOON, Y. (2010). Optimal strategies for the development of microfinance in Korea and the impact of microfinance. *Economics.*University of Illinois at Urbana-Champaign.

YUNUS, M. (1998). Alleviating poverty through technology. *Science, 282*(5388), 409-410.

YUNUS, M. (2003). *Banker to the poor,* New York, Public Affairs.

YUNUS, M., MOINGEON, B. & LEHMANN-ORTEGA, L. (2010). Building social business models: lessons from the Grameen experience.*Long range planning,* 43**,** 308-325.

ZADAK, S. (2004)."Path to Corporate Responsibility."*Harvard Business Review*82(12): 125-132.

ZENDLER, A., SPANNAGEL, C., & KLAUDT, D. (2008). Process as content in computer science education: empirical determination of central processes.*Computer Science Education, 18*(4), 231-245.

ZHAO, J., WANG, S., & HUANG, W. V. (2008). A study of B2B e-market in China: E-commerce process perspective. *Information & Management, 45*(4), 242-248.

ZARVIĆ, N., STOLZE, C., BOEHM, M., & THOMAS, O. (2012). Dependency-based IT governance practices in inter-organisational collaborations: A graph-driven elaboration. *International Journal of Information Management, 32*(6), 541-549.

ZHANG, P., & BENJAMIN, R. I. (2007). Understanding information related fields: A conceptual framework. *Journal of the American Society for Information Science and Technology, 58*(13), 1934-1947.

ZHOU, T. (2012). Examining mobile banking user adoption from the perspectives of trust and flow experience. *Information Technology and Management, 13*(1), 27-37.

ZIKOPOULOS, P., & EATON, C. (2011). *Understanding big data: Analytics for enterprise class hadoop and streaming data*. McGraw-Hill Osborne Media.

ZIMMERLI, W. C., RICHTER, K. & HOLZINGER, M. (2007).*Corporate ethics and corporate governance,* Springer.

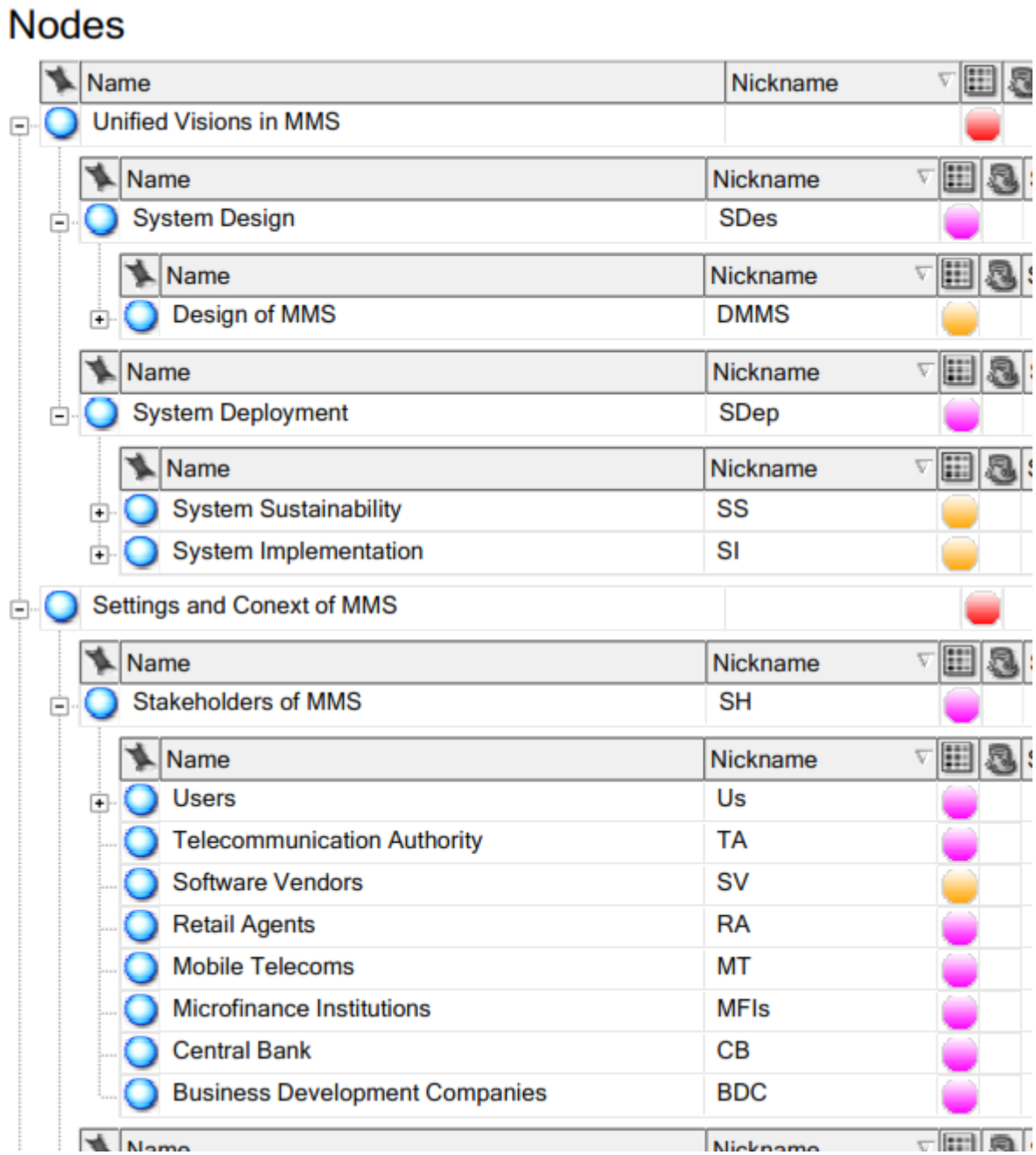
APPENDIXES

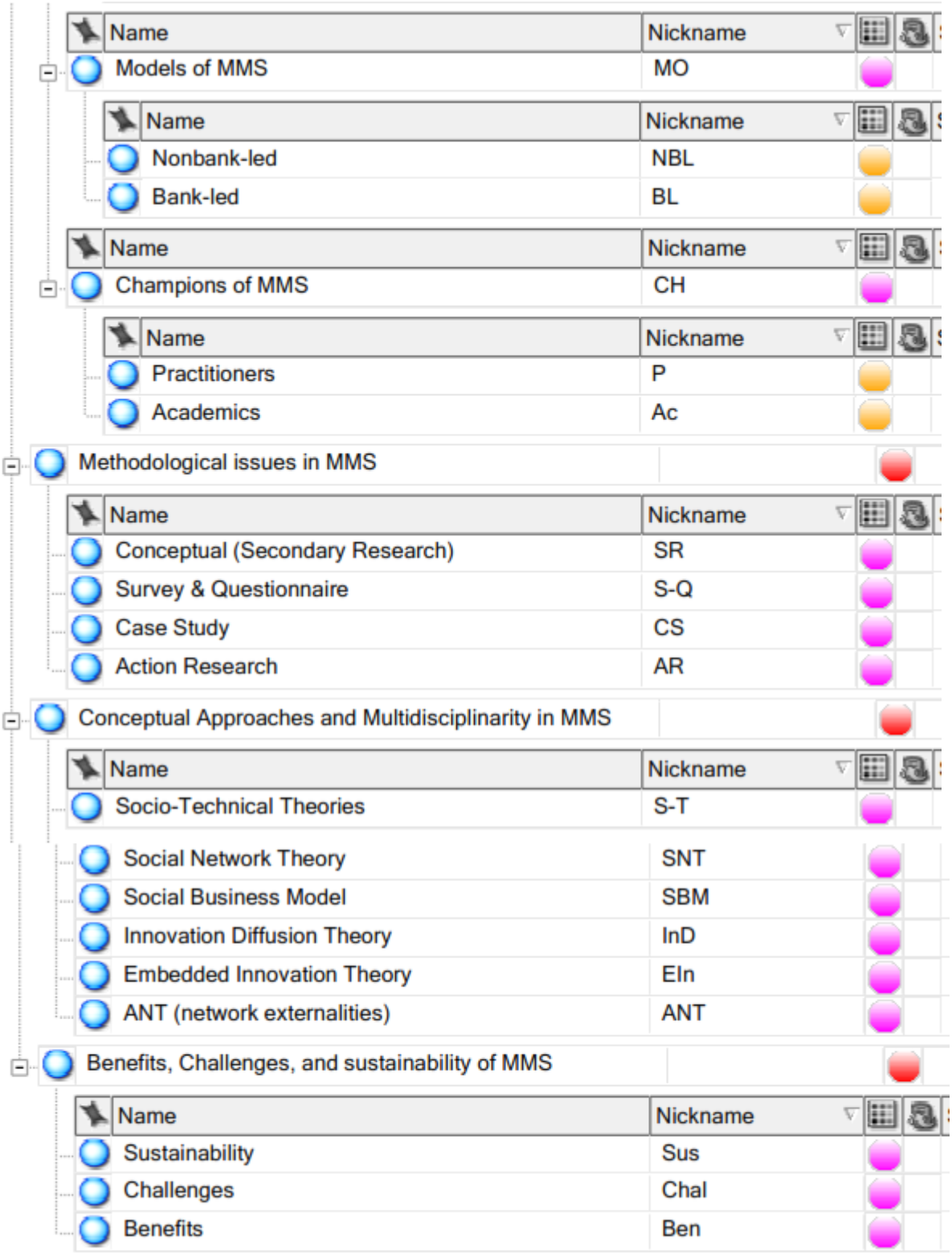
Appendix 1 a: Initial Coding of the unified visions of MMS development

Nodes

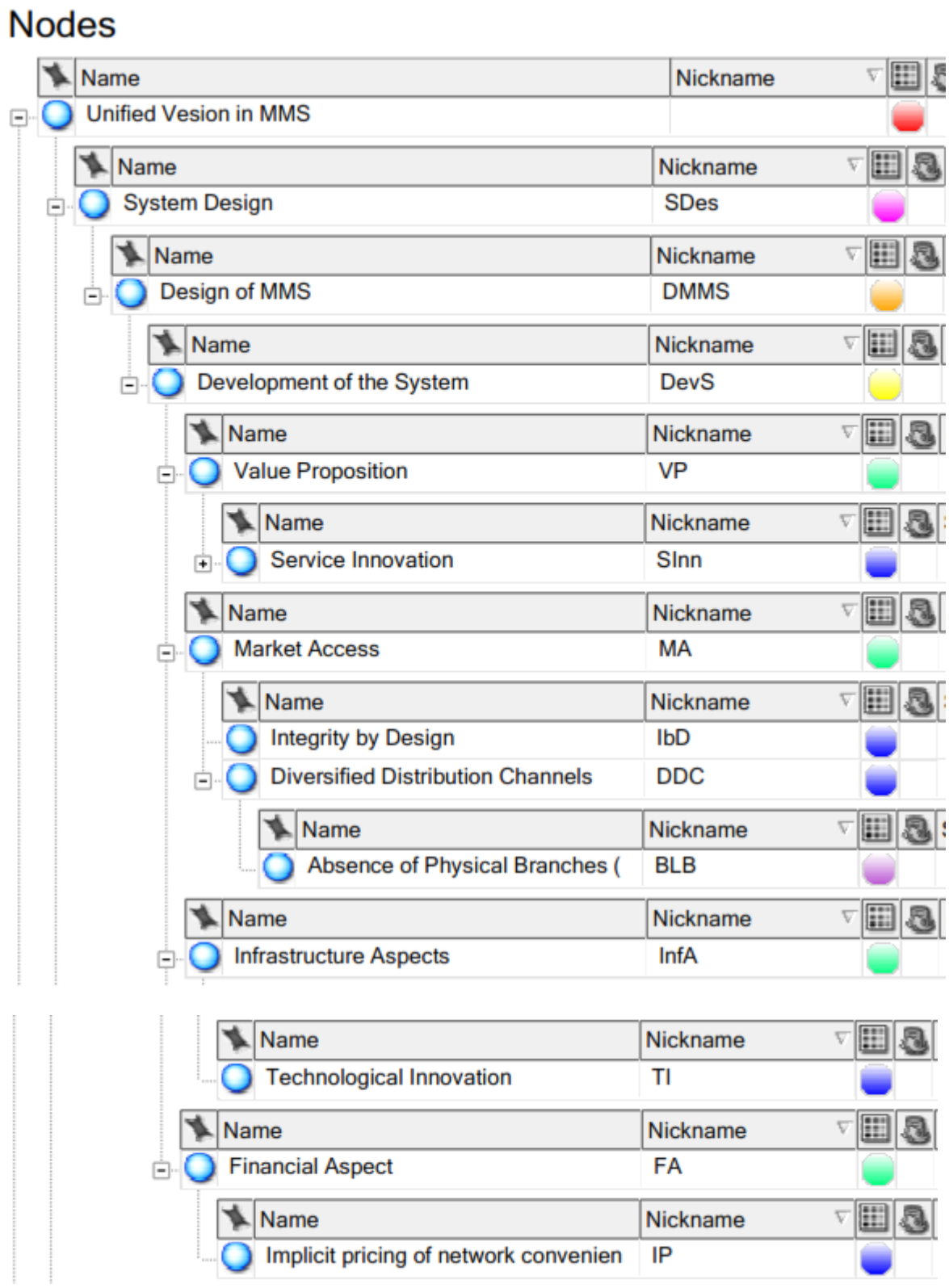
Name	Nickname
Unified Visions in MMS	
System Design	SDes
System Deployment	SDep
Settings and Conext of MMS	
Stakeholders of MMS	SH
Models of MMS	MO
Champions of MMS	CH
Methodological issues in MMS	
Conceptual (Secondary Research)	SR
Survey & Questionnaire	S-Q
Case Study	CS
Action Research	AR
Conceptual Approaches and Multidisciplinarity in MMS	
Socio-Technical Theories	S-T
Social Network Theory	SNT
Social Business Model	SBM
Innovation Diffusion Theory	InD
Embedded Innovation Theory	EIn
ANT (network externalities)	ANT
Benefits, Challenges, and sustainability of MMS	
Sustainability	Sus
Challenges	Chal
Benefits	Ben

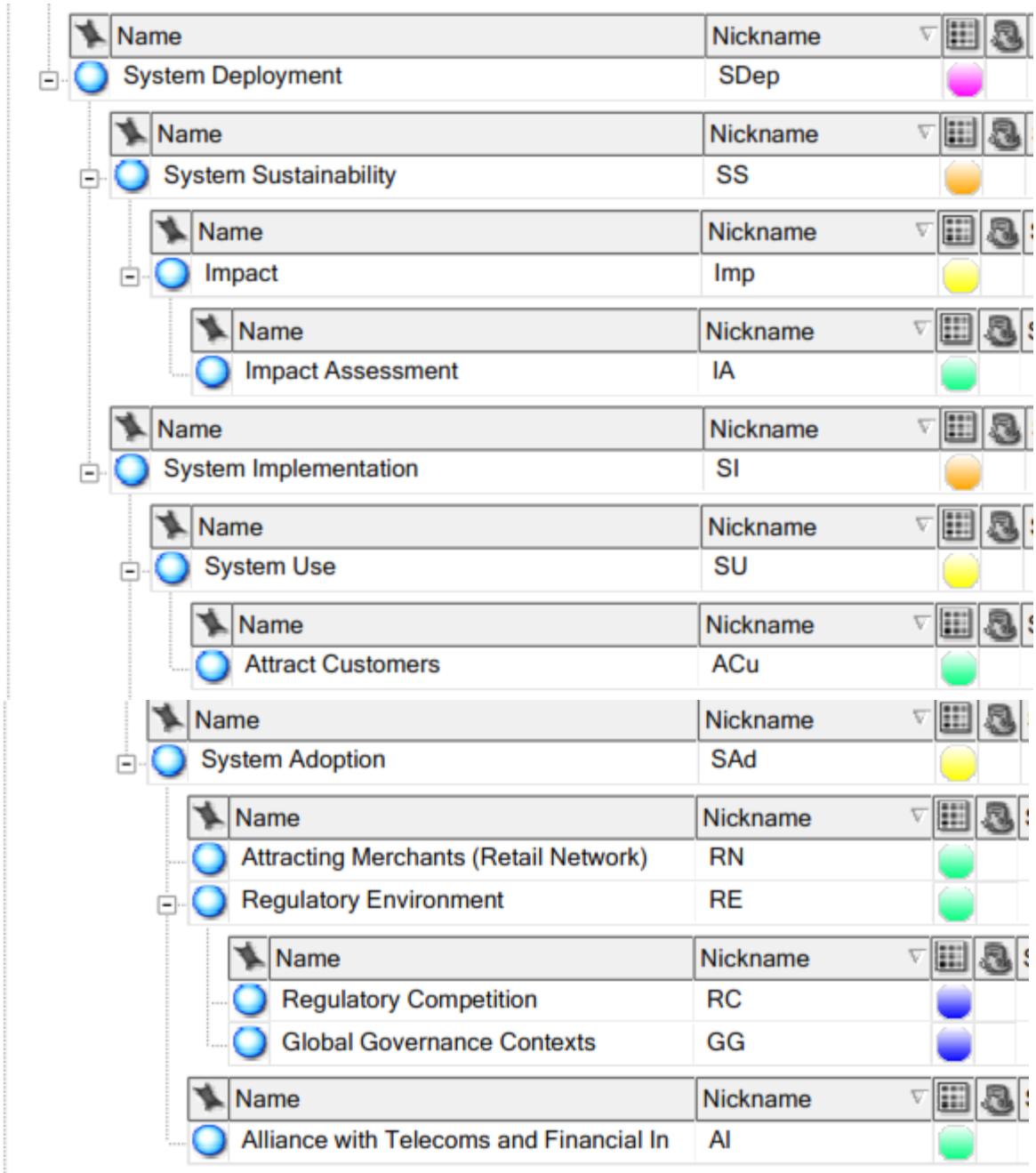
Appendix 1b: Advanced Coding of the unified visions of MMS development

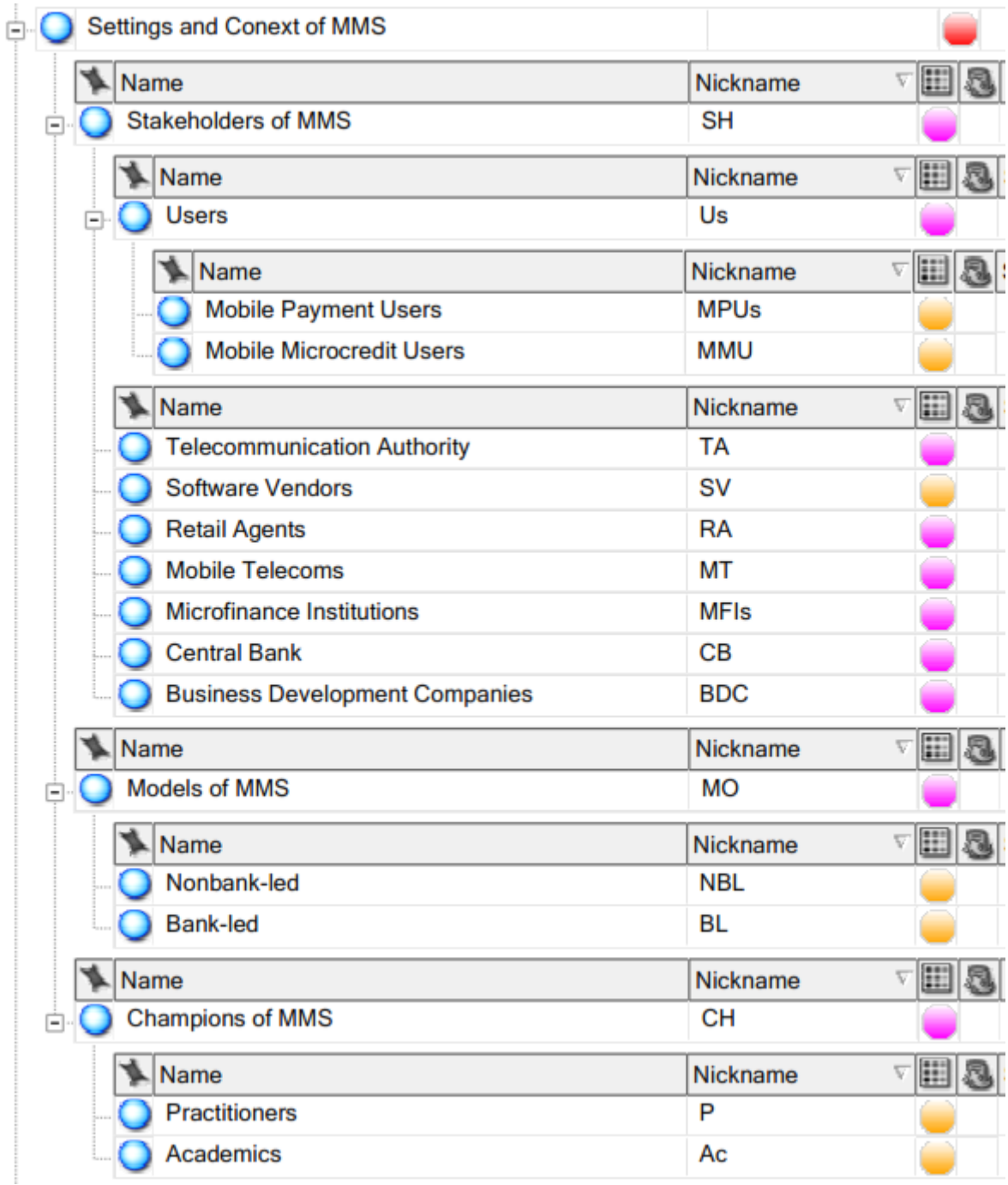


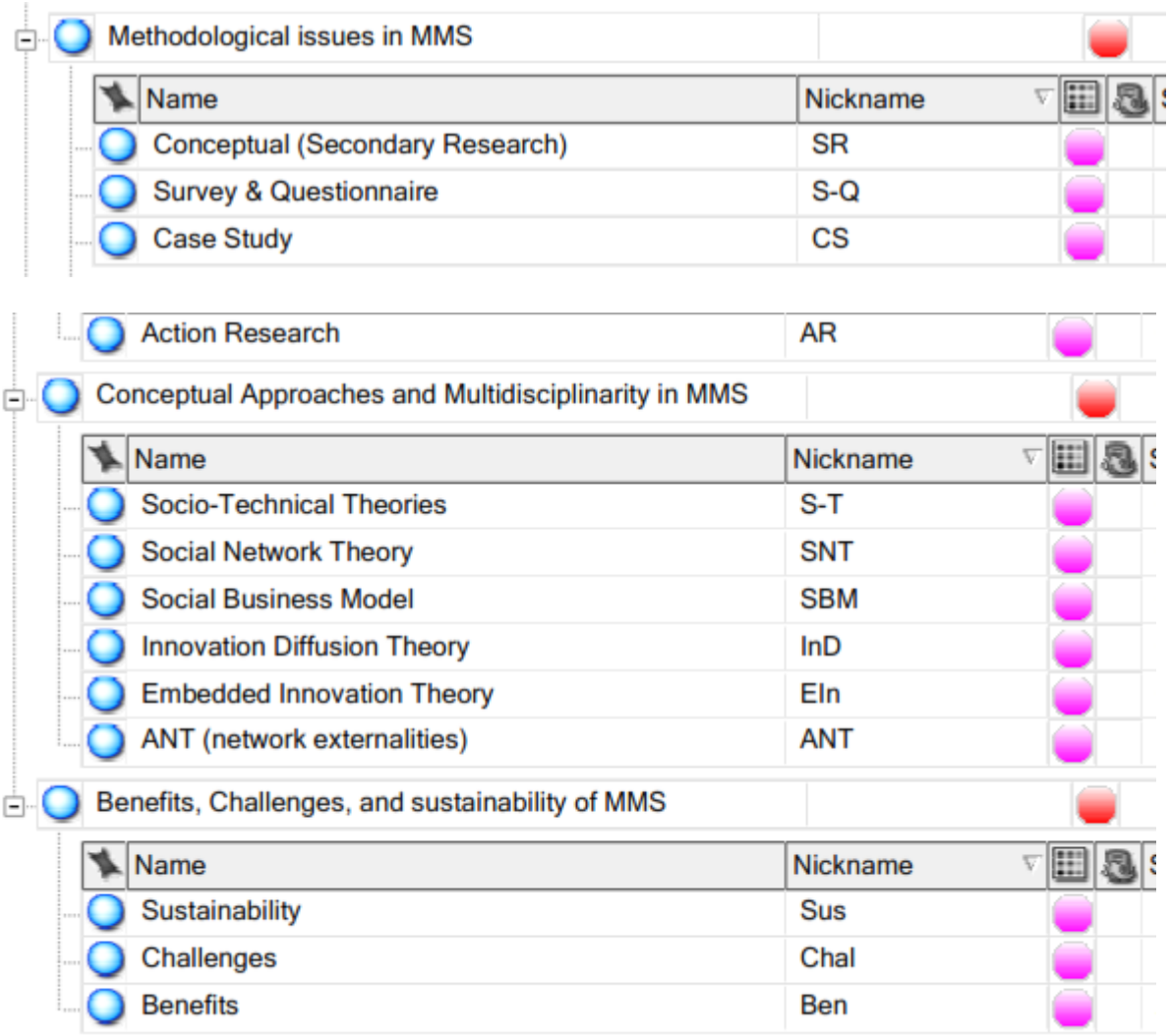

Name
Nickname
Models of MMS
MO
Name
Nickname
Nonbank-led
NBL
Bank-led
BL
Name
Nickname
Champions of MMS
CH
Name
Nickname
Practitioners
P
Academics
Ac
Methodological issues in MMS
Name
Nickname
Conceptual (Secondary Research)
SR
Survey & Questionnaire
S-Q
Case Study
CS
Action Research
AR
Conceptual Approaches and Multidisciplinarity in MMS
Name
Nickname
Socio-Technical Theories
S-T
Social Network Theory
SNT
Social Business Model
SBM
Innovation Diffusion Theory
InD
Embedded Innovation Theory
EIn
ANT (network externalities)
ANT
Benefits, Challenges, and sustainability of MMS
Name
Nickname
Sustainability
Sus
Challenges
Chal
Benefits
Ben

Appendix 1c: Final Tree coding of the unified visions of MMS development




Name
Nickname
System Deployment
SDep
Name
Nickname
System Sustainability
SS
Name
Nickname
Impact
Imp
Name
Nickname
Impact Assessment
IA
Name
Nickname
System Implementation
SI
Name
Nickname
System Use
SU
Name
Nickname
Attract Customers
ACu
Name
Nickname
System Adoption
SAd
Name
Nickname
Attracting Merchants (Retail Network)
RN
Regulatory Environment
RE
Name
Nickname
Regulatory Competition
RC
Global Governance Contexts
GG
Name
Nickname
Alliance with Telecoms and Financial In
AI


Settings and Conext of MMS
Name
Nickname
Stakeholders of MMS
SH
Name
Nickname
Users
Us
Name
Nickname
Mobile Payment Users
MPUs
Mobile Microcredit Users
MMU
Name
Nickname
Telecommunication Authority
TA
Software Vendors
SV
Retail Agents
RA
Mobile Telecoms
MT
Microfinance Institutions
MFIs
Central Bank
CB
Business Development Companies
BDC
Name
Nickname
Models of MMS
MO
Name
Nickname
Nonbank-led
NBL
Bank-led
BL
Name
Nickname
Champions of MMS
CH
Name
Nickname
Practitioners
P
Academics
Ac


Methodological issues in MMS
Name
Nickname
Conceptual (Secondary Research)
SR
Survey & Questionnaire
S-Q
Case Study
CS
Action Research
AR
Conceptual Approaches and Multidisciplinarity in MMS
Name
Nickname
Socio-Technical Theories
S-T
Social Network Theory
SNT
Social Business Model
SBM
Innovation Diffusion Theory
InD
Embedded Innovation Theory
EIn
ANT (network externalities)
ANT
Benefits, Challenges, and sustainability of MMS
Name
Nickname
Sustainability
Sus
Challenges
Chal
Benefits
Ben

Appendix 2a Champions and Boundary Spanners in Mobile Money Literature based on Abbott et al. (2013):

Professionals/ Reporters	Organization	Academics	Journal/Publisher
Bills, Steve Johnson, Andrew Wade, Will Wolfe, Daniel	American Banker	Bill Maurer	The Institute for Money Technology and Financial Inclusion.
Kapoor, Sanjay	Business Today	Diniz, Eduardo	Electronic Commerce Research and Applications
Kite, Shane	Bank Technology News	Donner, Jonathan	Microsoft Research India
Kendall, Jake	Gates Foundation	Duncombe, Richard	The Journal of Modern African Studies
Hughes, Nick	Vodafone Group	Gencer, Menekse	Innovations: Technology, Governance, Globalization
Kapoor, Sanjay	Business Today	Groppa, Octavio	Erasmus
Tanner, John	Telecom Asia	Jack, William	American Economic Review
		Lyytinen, Kalle	Communications of the ACM. Hawaii International Conference. IEEE Computer Society. International Journal of Mobile Communications. Information Systems Research.
		Mas, Ignacio	Innovations: Technology, Governance, Globalization Journal of Payments Strategy & Systems Consultative Group to Assist the Poor (CGAP)
		Morawczynski, Olga	Internationalization, design and global development
		Pickens, David	Consultative Group to Assist the Poor (CGAP)
		Ramada, Sarasola	Organization
		Gencer, Menekse	Innovations: Technology, Governance, Globalization

Source: The author's literature review

Appendix 2b: Review of the Peer-reviewed Papers and Book Chapters: Key Focus Themes

Context	Papers/Book Chapters	%
Consumer Adoption	56	36%
Market Analysis	44	28%
MM for the BoP	24	15%
Technical Frameworks/Approaches	17	11%
Agents Adoptions	8	5%
Analysis of Failures	4	3%
Technological Factors	3	2%

Appendix 2c: Review of Book chapters & Peer-reviewed papers: methodology

Methodology	Paper/Book Chapters	%
Case Study: Empirical Research	23	15%
Case Study: Based on Secondary Data	22	14%
Essay	40	26%
Experiment	2	1%
Focus Groups	4	3%
Research Design: Development of new Technology /Processes	6	4%
Review of Existing Research	10	6%
Survey	49	31%

Methodology	USA/ Europe/ Japan	Africa	Latin America	China/ India	Asia/ Oceania
Case Study: Empirical Research	7	6	10	5	15
Case Study: Based on Secondary Data	14	4	0	1	12
Essay	12	4	0	11	2
Experiment	0	0	0	0	1
Focus Groups	2	0	0	0	1
Research Design: Development of new Technology /Processes	0	0	5	1	0
Review of Existing Research	0	2	1	1	2
Survey	16	3	0	8	10

Appendix 2d: Review of Book chapters, Peer-reviewed papers & Trade Publication: Key study factors

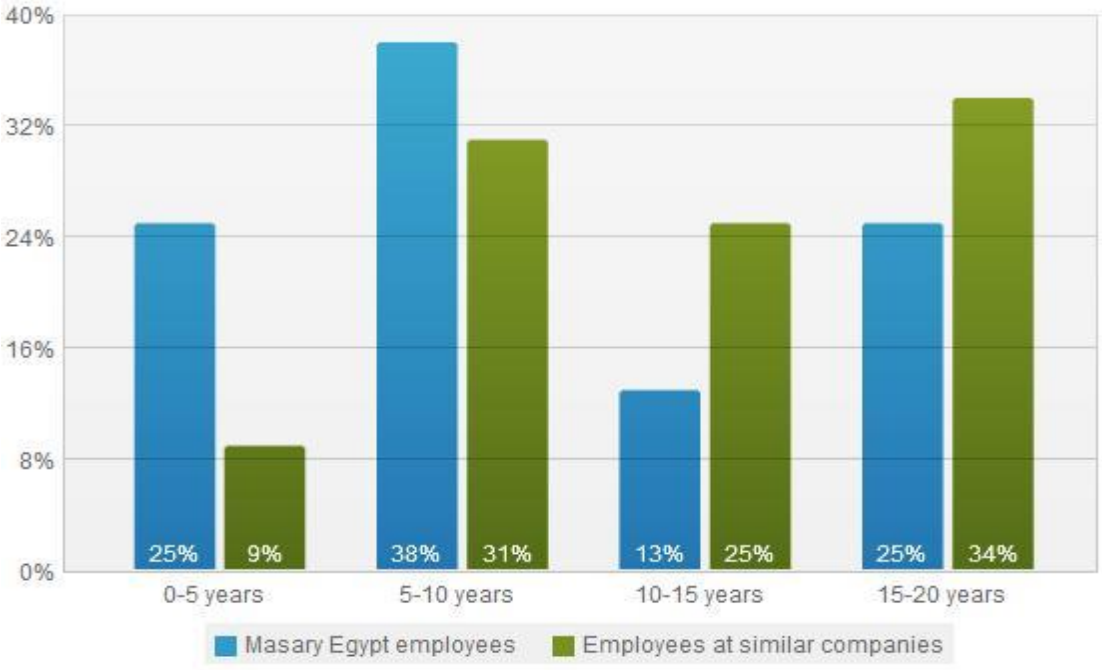
	USA/ Europe/ Japan	Africa	Latin America	China/ India	Asia/ Oceania
Technological/Security/ user interface limitations	12	4	6	3	7
Lack of Infrastructure (electricity, mobile coverage etc.)	2	4	4	0	2
Unwillingness of consumers and merchants to adapt/ Lack of trust	9	6	6	1	9
Regulations/ Legal framework	5	6	0	2	3
Problems of Scale / Network Effect	1	3	2	1	2

Appendix 3: Semi-Structured Interviews – Participant List (37 Interviews)

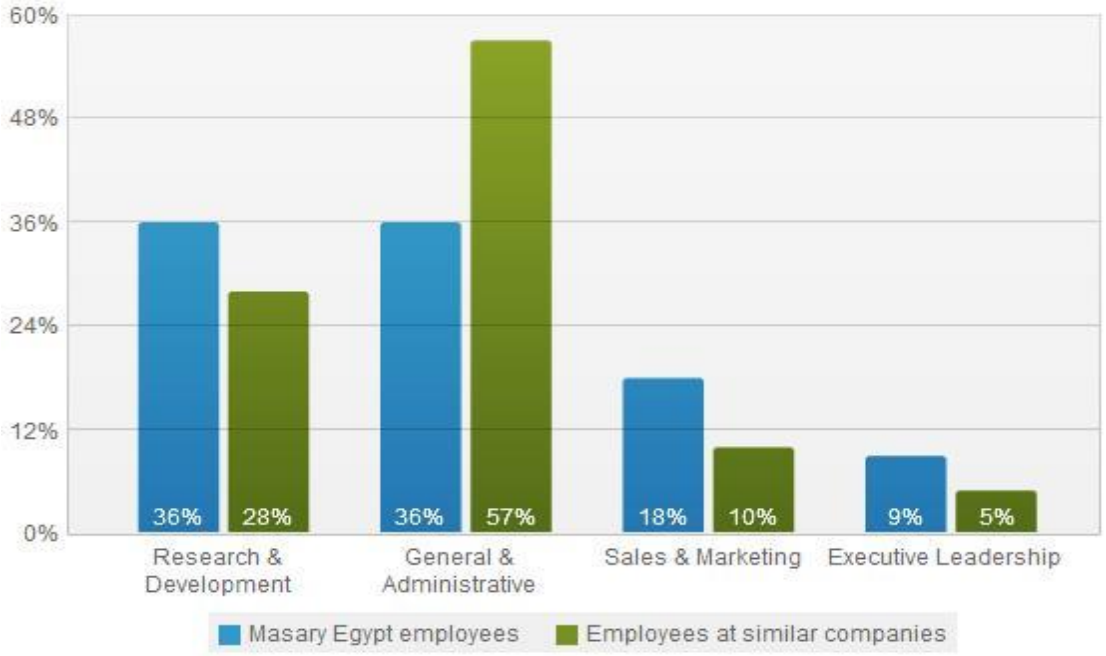
	Stakeholder group	Name/Position
Regulators	The Central Bank of Egypt (CBE)	• ***Ahmed A. Faragallah.*** Head of Payment Systems Department.
	National Telecom Regulatory Authority (NTRA)	• ***Mahmoud El-Gouainy.*** Vice President.
	The Egyptian Financial Supervisory Authority (EFSA)	• ***Mohaammed Susa*** - Head of Public Relations.
	Social Fund for Development (SFD)	• ***Magdy Moussa*** - Head of the Microfinance sector. • ***Eshrak El Sisi*** – MIS Manager at the Microfinance Sector.
Mobile Telecoms	Vodafone	• ***Mohamad khery*** – Senior Financial Manager and head of credit planning. • ***Mohamed Wahba*** - Mobile Payments Marketing Senior Manager. • ***Ashraf Imam*** - Business development manager of Vodafone cash and money transfer. ***Omr Mansor*** - e-payment and top-up manager at Vodafone.
	Mobinil	• ***Asmaa Hosny*** - Senior Manager Business Development -> Corporate Strategy & Business Development.
	Etisalat	• ***Khaled Sayed*** – Head of Mobile Payment & e-commerce applications. • ***Amr Refaee*** – Senior System Analyst.
MASARY	Board of directors	• ***Amr Elsanhowry*** – Masary's CEO and Owner. • ***Moatasem Osam*** — Masary's COO & Partner
	Senior Managers	• ***Tarek Fath Allah*** - Masary's Head of IT. • ***Ayman Ahmed*** - Massary's operation manager. • ***Nashwa salah*** - Masary's HR manager • ***Mohamad Mostafa*** - Masary's financial manager. • ***Hossam Abd Elazez*** - Masary's business development manager. • ***Wesal Refaat*** - Head of Masary's microlending. • ***Ayman Fowzy*** - Massary's Marketing manager • ***Hossam Abd Elazez*** - Massary's Business Development Manager.
	Lower level Managers	• ***Millad Raouf*** - Senior IT officer • ***Mechail emeel*** - Masary's IT officer.
	Mobile Operators/fieldwork agents	• ***Alaa Sayed*** – Team leader for Upper Egypt region. • ***Emaad Aseem*** – Mobile Operator in Assuit City.
Alternative Software Vendors / Software Vendor	RAZY Tech	• ***Moatasem Osam*** - Managing Director of Razy Technologies.
	Delta software	• ***Hala Ali*** - head of itadamon Association and founder of Delta Tech.
	Elmohasel Software	• ***Moner Nakhlah*** - CEO for mashro3y "my project" and developer of "elmohasel".
MFIs	REDIC – Beni-Suef in City (Focuses on Individual Lending)	• ***Ismaiel Shafiey*** – Managing Director. • ***Abeer Yassen*** - MIS Managers
	Assuit Businesswomen Association (Individual, group lending for women)	• ***Mohamed Ibrahim*** – President • **Violet Farag Micheail** - Head of Microfinance • ***Rania rayet*** - MIS Manager • ***Ahmed Mohey El-dien*** - Head of Accounting
	MWADA Association in (Focuses on Islamic Finance for Retail Agents of MASARY)	• ***Hany Zbedah*** – Managing Director. • ***Mohamed Essam*** - MIS Manager. • ***Sameh Ismail*** - Credit Manager.

Appendix 4: Masary profile at the early stages of system development:

a: Employees experience at Masary versus other telecommunication and IT solution companies



b: Composition of workforce skills at Masary



Appendix 5: Available products and services of e-MASARY

<table>
<tr><th colspan="2">1. MFI Services Bundle</th></tr>
<tr><td>a- MFI Mobiliser hosted service

This is the first service in the bundle which targets the Microfinance Institutions - MFIs with an advanced system for money collection monitoring by a Java mobile client and a backend program for reporting and analysis proposes, this is the first step towards the complete loaning process - funding and payment - through MASARY's store value account which can be accessed and controlled via mobile or the Internet.</td><td>b- MFI micro-entrepreneurship program

This is the second service in the bundle by which we target the MFIs Customers to help them starting their own Small Business, we offer the idea of profitable projects and the essential supports to start it for new small entrepreneurs, and try to facilitate the funding from the MFIs in the form of electronic loans. This also followed by customer monitoring via automatics call survey after each financial transaction.</td></tr>
<tr><th colspan="2">2. MASARY eTop-up (Hawa) Service</th></tr>
<tr><td colspan="2">MASARY is an eTopup agent, through their non-traditional merchants in rural areas. They are specialized in the distribution of Airtime and eTopup. Further, they equip their non-traditional merchants with all the tools enabling them to get better profits and enhancing their capabilities with time.</td></tr>
<tr><th colspan="2">3. MASARY Branchless Banking services</th></tr>
<tr><td colspan="2">MASARY tackles the banking sector need for rendering selective parts of their financial services in rural and far areas. MASARY use some selected and certified outlets of its distribution network to serve the bank customers of these areas offering simple banking services such as micro-loans as the first step of introducing "Branchless Banking" concept in Egypt.

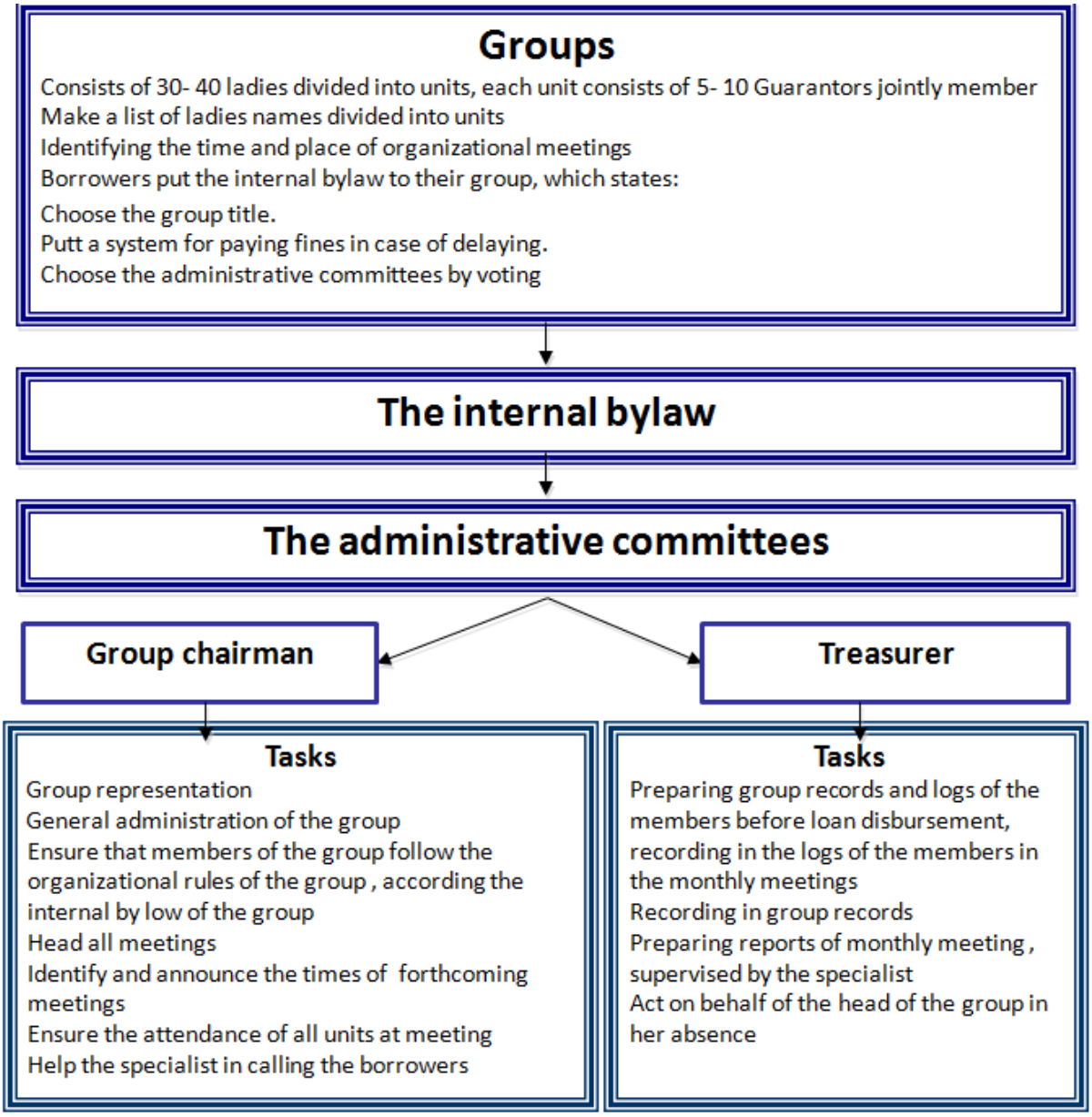
Note: this is to be completed by Jan 2012.</td></tr>
<tr><th colspan="2">4. MASARY Cash Collection Services</th></tr>
<tr><td colspan="2">Utilizing their presence and distribution networks, they offer collection services on behalf of other Service Providers using the state of the art electronic and mobile solutions of real-time collection and monitoring. Their IT solutions can carry out these services efficiently with less cost.</td></tr>
</table>

The authors' fieldwork at Masary Headquarter

Appendix 6: e-Masary Microfinance packages

A. Platinum finance	
Duration	10 months
Monthly instalment	50 L.E
Times of monthly turnover to cover the loan instalments	3.3
Times of credit turnover/day	0.1
The minimum amount of daily disbursed airtime to cover the monthly instalment	55.60 L.E
Targeted borrowers	Borrowers where there is low demand for airtime and top-up card in his area.
B. Golden Finance	
Duration	6 months
Monthly instalment	83.3 L.E
Times of monthly turnover to cover the loan instalments	5.6
Times of credit turnover/day	0.2
The minimum amount of daily disbursed airtime to cover the monthly instalment	92.60 L.E
Targeted borrowers	Where there is intermediate level of demand for airtime and top-up card in his area.
C. Silver Finance	
Duration	3 months
Monthly instalment	166.7 L.E
Times of monthly turnover to cover the loan instalments	11.1
Times of credit turnover/day	0.4
The minimum amount of daily disbursed airtime to cover the monthly instalment	185.20 L.E
Targeted borrowers	Where there is high level of demand for airtime and top-up card in his area.
D. Bronze Finance	
Duration	1 months
Monthly instalment	500 L.E
Times of monthly turnover to cover the loan instalments	33.3
Times of credit turnover/day	1.1
The minimum amount of daily disbursed airtime to cover the monthly instalment	555.60 L.E
Targeted borrowers	Where there is high level of demand for airtime and top-up card in his area.

Appendix 8: Procedures for building a lending group



Appendix 9: Comparison between key theories of Information Society

	Habermas	Manuell Castells	Frank Webster	Albert AlGore	Mitroff & Linstone
What is the Information Society?	-It is a ***public sphere, which*** is an arena the exist independently of the government and partisan economic forces (Habermas, 1991; Habermas, Lennox & Lennox, 2010).	-It is a ***space of flows*** that presents the society's expressions in place-less virtual location or "space of space" *Castells, 2000 & 2014).*	-It is a ***character of information*** that transforms the way we live and satisfy our needs (Webster, 2014).	-It is a flow of information and communication technologies that breaks the tradition (hard) and turn it into ***irreversible revolutionary butlers of information*** that lead to ***self-organisation of unlimited innovative*** business systems.	-It is the S-T interaction between ICT and the multistakeholders society that lead to different forms of economic production, social interaction, innovative processes of production or whatever.
Ontological Assumptions	-Critical approach that examines the relationship between the ***information society and the public/private interactions*** of its inhabitants. ***-Information as being tainted*** because of user interference through which they manage' its presentation, or 'package' it to 'persuade' people in favor of certain positions, or 'manipulate' it to serve their own ends, or produce it as a saleable commodity that is 'entertaining'" (Webster, 2006: 161). ***-Tainted information*** threatens the ideal of a thoughtful, deliberate and	***-Informational capitalism*** combines enormous flexibility with global reach (Webster, 2006). ***-Technology as a structure*** organizing society *(Castells, 2000).* -The world is a trilogy of ***economy, Society & technology***. ***-Human actors*** (or agency) are portrayed as ***powerless***, or free from culpability for any of the ***structural inequalities*** in society	-The ***Technological determinism*** ignores the social, economic, and political changes accompanied with ICT revolution. -The ***economic view*** of the Information society explains how ***value creation is constructed and measured***. ***-Occupational view*** maps the characteristics of information society in terms of ***information activity levels*** (Bell, 1979). It addresses the ***functional capacity of ICT and web*** application. It considers how information ***workers manipulate***	***-Global economy*** -Planet-wide ***ICT*** & developments in ***robotics.*** -A new ***political economy*** in which influence & initiative is shifting from west to east. -Unsustainable ***population growth*** and *resource depletion*. -Advances in ***biological, biochemical & materials science.*** -A radically unstable	-We can understand reality using three tools; technical, Organisational, and Personal -It brings the ***power*** and conflicts of power to the surface. The ISD is a socially constructed process that reflects multiviews of stakeholders. -The BoP is multilayer context that reflect indigenous business systems

	knowledgeable electorate be achieved. ***-The partisan economic forces*** shape the social development of the public sphere communities. -There is a representative power that control our way understanding and thinking about reality.		***information* (Castells, 1996–8).** -The ***spatial dynamics of real-time*** data processing and the social interaction humans who use ***portable*** devices and ***location-sensitive*** mobiles. ***-Cultural*** elements identify the ***social structure*** of the information community at the BoP.	***relationship between human civilisation*** & the ***earth's ecological systems***, particularly its atmosphere and climate.	
Epistemological Assumptions	-Critical realism/ Mixed Methods -The system analyst should intervene personally to transform the problematic situation from worse to better	-Ideas are generated and ***exchanged*** between ***individuals and groups***, ultimately contributing to knowledge which is "intrinsically the ***common property of a group*** or else nothing at all" (Kuhn, 1970: 210). -Interpretative, socially constructed methods	-***Positivism*** – Technical & Economic - ***Interpretativsm*** – Occupational, Spatial, and Cultural The ***Singerian***, ***pragmatic*** approach	-Interpretative, soft manner. -Anthropological view of the future -Strategic foresight	-Kantian inquiry systems -Focudian principles where the analyst facilitates and builds appropriate tools that the system owners can use to change
Examples of Information Society	-Twitter as a public sphere for free expressions (White, Castleden & Gruzd, 2014). -Social media in Saudi Arabia (Al-Saggaf & Simmons, 2014).	-Global perspectives on ***mobile communication*** (Castells et.al, 2009). -Urban studies (Qiu, Castells & Cartier, 2009).	Adoption of ***open source software*** in mobile telecommunication (Biel, Grill & Gruhn, 2010).	***Mobile financial services*** (Mohamad, Wood-Harper & Ramlogan, 2014b)	***NHS commissioning system*** (Harrop, Gillies & Wood-Harper, 2012). **Mobile Money Services** (Mohamad, Wood-Harper & Ramlogan, 2014b)

APPENDIX 10: GIRAFE RATING ANALYTICAL FRAMEWORK